radio communication

January 1972

Journal of the Radio Society of Great Britain

PRESENTATIONS AT THE AGM

(Left): J. Bazley, G3HCT, receives the L. H. Thomas, G6QB, Trophy; (Right) Members of Croydon RSGB Group and Surrey Radio Contact Club receive the NFD Shield from 1971 RSGB President F. C. Ward, G2CVV.

(Left): Bristol Trophy presentation to Stockport Radio Society members; (right) E. M. Wagner, G3BID, receives the Calcutta Key.

(Left): Ostermeyer Trophy being presented to Arnold Mynett, G3HBW; (right) Rev P. W. Sollom receives the Wortley Talbot Trophy.

January 1972

radio communication

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CONTENTS

Radio Communication **(incorporating** *The RSGB Bulletin***) is published by The Radio Society of Great Britain as its official journal and is posted to all members of the Society on the first Tuesday of each month**

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GO MOBILE or BASE STATION Solid state plug in modules built-in speaker, supplied with YD 846 microphone. Dimensions 13½ inches x 6 inches x 11½ inches. Weight 30lbs. **£240** (free delivery) or with 160m conversion **£225**. Remote VFO **FV101 £38.**

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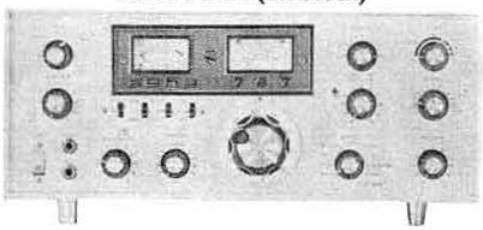
NEW FT 401 (Ex Stock)



The FT401 SSB Transceiver is a precision built transceiver providing SSB (USB and LSB). and CW modes of operation. This transceiver operates at a maximum input of (560) watts PEP for SSB, and (500) watts CW on all bands, 80 through 10 metres.

In addition to the high output power of the transceiver, many features that have previously been considered extra cost options are included as standard equipment on the FT401. Standard equipment includes built-in solid state power supply, CW filter, noise blanker, cooling fan, fully adjustable VOX, break-in CW operation, adjustable CW side tone, clarifier control provides ± 5kHz off-set receiver operation, dual calibration markers at 100 and 25kHz, 10MHz WWV Band, provision for two additional transceive bands outside the amateur bands between 3·5 and 30MHz, and front panel external VOF switching.

FV401 External VFO

The companion FV401 External VFO allows cross-band DX operation and has the effect of providing the operator with split frequency, separate receiver-transmitter operation, controlled by VFO or X-tal.

The FT401 has been designed to anticipate the amateur's future operating requirements and will provide many hours of trouble free service.

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The receiver has been specially made for WESTERN ELECTRONICS and is the only amateur bands receiver giving 160m., 80 to 10m., 4m. and 2m. This model is only available from us. PRICE: **£160**

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FL2100 Linear amplifier	£135.00	**FV101** Remote VFO	£38.00
SP101 Speaker for FT101	£10.00	**FT200** Transceiver	£134.00
FP200 AC supply for FT200	£38.00	**DC200** PSU for FT200	£45.00
FV200 Remote VFO for FT200	£38.00	**FR400DX** Receiver	£120.00
FR400 SDX Receiver	£160.00	**SP400** Speaker	£10.00
FL400 Transmitter	£140.00	**FL2000B** Linear amplifier	£135.00
FT401 Transceiver	£215.00	**FL2500** Linear amplifier	£118.00
SP401 Speaker	£10.00	**FV401** Remote VFO	£38.00
EP2AC Ac PSU for FT2F	£25.00	**FT2F** 2m Transceiver	£84.00
YC-305 Frequency counter	£97.50	**FP2AC/B** AC supply with batteries	£34.00
YD846 Hand microphone	£5.00	**YD844** Table Microphone	£12.00
FT101 Fan	£8.00	**FP50DX** Low pass filter	£6.60
FT200 Mobile mount	£4.20	**FT101** Mobile mount	£5.00
FR400 CW Filter	£12.50	**FT101, FT401, FT560** CW filter	£15.00
FR400 AM Filter	£7.50	**Crystals**	£2.00
FC2 2m converter	£12.00	**FR400** FM Filter	£7.50
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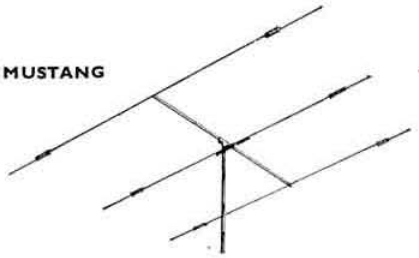

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THE SENTINEL DUAL GATE MOSFET 2 METRE CONVERTER

Please note the additional 2 metre IFs we are offering this month, 2-4MHz, 3-5MHz, 8-10MHz. These are overruns from contract work and are only available in small numbers, so they are ex-stock subject to being unsold.

The normal stock IFs are always available for immediate delivery. i.e. 4-6MHz, 9-11MHz, 14-16MHz, 18-20MHz, 23-25MHz, 24-26MHz, 27·7-29·7MHz, 28-30MHz. We can of course supply IFs to any frequency to order.

★ Low noise figure 2dB.
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★ Size only: 2½" × 3" × 1½" aluminium case—silver hammer finish with black trim.
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★ Same specification as the 2 metre converters.
★ Ex stock IFs: 25-25·7MHz, 28-28·7MHz.
★ Price **£13·75.**

THE SENTINEL LOW NOISE FET 2 METRE PRE AMPLIFIER

★ Low noise figure 1dB.
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★ Low noise figure 4·5dB.
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★ Low noise figure 3·5dB.
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★ 5 watts input. At least 2 watts output.
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★ Same size and appearance as the transmitter. Price **£10.00.**

SOLID STATE 9MHz SSB GENERATOR

★ Selectable USB, LSB, and CW.
★ 0·2 volts into 80 Ohms output.
★ Sideband suppression 45dB. Carrier suppression 50dB.
★ A sound basis for your SSB transmitter.
★ Price **£11.00** less filter and carrier crystals.
★ XF-9A filter **£11.00.** Carrier crystals **£1.50** each.

We can supply from stock the range of KVG 9MHz crystal filters

XF-9A	SSB	2·5KHz	**£11.00**
XF-9B	SSB	2·4KHz	**£15.00**
XF-9C	AM	3·7KHz	**£15.00**
XF-9D	AM	5 KHz	**£15.00**
XF-9M	CW	0·5KHz	**£11.50**
Carrier crystals			**£1.50** each.

We can supply the modules for a 2 metre output V.F.O. for **£15.00.**

Well, that's another year over, or rather another exciting year to look forward to. We have introduced several new successful lines this year and there should be still more next year and we are still able to supply equipment from stock. It might just be worth mentioning that, after three years, well over half our current customers have bought equipment from us before, you can't have a better recommendation than that.

We wish all success in '72 to all our customers, past, present and future, in fact to all who have read this far.

LOWE ELECTRONICS

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ALL THE VERY BEST FOR 1972

As U.K. authorised Yaesu Musen Co. Ltd. distributors, we stock the following, some of which regretfully has gone up in price due to the upward revaluation of the Japanese Yen.

FT-101 Transceiver	**£240**	FV101 Remote VFO	**£38**
SP101 Speaker for FT-101	**£10**	FT-200 Transceiver	**£134**
FP200 A.C. supply for FT-200	**£38**	DC200 D.C. p.s.u. for FT-200	**£45**
FV200 Remote VFO for FT-200	**£38**	FRdx400 Super Deluxe Receiver	**£160**
SP400 Speaker	**£10**	FLdx400 Transmitter	**£140**
FL2000B Linear amplifier	**£135**	FL2100 Linear Amplifier	**£135**
FT-401 Transceiver	**£215**	FV401 Remote VFO	**£38**
SP-401 Speaker	**£10**	FT-2F 2m Transceiver	**£84**
YC-305 Frequency Counter	**£97.50**	YD846 Hand Microphone	**£5**
YD844 Table Microphone	**£12**	FTdx560 Transceiver	**£195**
FT-101 Fan	**£8**	FT-101 Mobile Mount	**£5**
FR-400 C.W. Filter	**£12.50**	FT-101, FT-401, FT-560 C.W. Filter	**£15**
FR-400 A.M. Filter	**£7.50**	Crystals	**£2**
FC2 2m Converter	**£12**	F.M. Filter FR-400	**£7.50**
FR-400 F.M. Unit	**£7.50**	FC6 6m Converter	**£12**

Note: Prices include delivery by Securicor (almost invariably 24 hr and handled with care). Manuals available for most items at **65p.**

May we suggest that anyone wanting a good counter takes a close look at the Yaesu YC-305. Readout to 1 cycle up to 30 mHz, mains or battery operation. Typical Yaesu top quality at a record breaking **£97.50.**

In addition to the Yaesu range, we also stock the following equipment.

Inoue IC-700R transistor receiver **£80**

Inoue IC-20 2m F.M. transceiver **£95.**

Plain morse keys, ball bearing pivots **£1**

Katsumi EK-9X electronic keyers **£8.20**

Asahi twin meter SWR meters **£6.80**

Dummy load/wattmeters. A very superior tool switched 20/120 watts. SWR 1:1.2 3 to 500 mHz 50 ohm **£35**

Digital voltmeters half price at **£60**

Valve voltmeters. The well known TE-65 reduced from **£17.50. £10**

Valves. We stock the "hard-to-get" modern valves such as 6AH6, 6AQ5, 6BZ6, 6CB6A, 6GH8, 6U8A, 6CL6, 6AN8, 6EW6, 6EH7, 6BM8, ECL82, 6AW8A, 7360, 12BY7A, EF183, 6GK6 and also P.A. valves like 6JS6A, 6KD6, 6LQ6, 6JM6A, 6146B and 572B. Write for our valve list.

Antennae

Asahi 3 band, 3 element trap beam. The Rolls Royce of beams **£60**

Asahi "Echo 8"—40 to 10m trap vertical **£16**

G-Whip 2m ⅝ mobile vertical **£4.50**

Tavasu 160 to 10 mobile **£13.75**

In addition to the above, we are importing the Japanese "Diamond" line ranging in price from **£10** to **£40**

Worth your while to come to Matlock and see our antennae and try one or two on the air. Check such things as SWR—if you're really keen we'll loan you a Marconi r.f. impedance bridge.

Digital clocks—our well known 12 hour "Digitor" at **£5.50** or the 24 hour Copal 222 at **£8.50** or the even more exotic 601 at **£17.50**

Headphones, low impedance, padded **£2.50** without plug, **£2.60** with 2 circuit jack plug. Microphones all 50K dynamic. Teisco DM501 **£3** Yaesu YD846 **£5**, Yaesu YD844 **£12.** All top value in their respective class.

Low voltage p,s.u.s. SE-700. 240 v.a.c. input, 3, 6, 9 and 12v switched and regulated output to ½A. These are not hulking great surplus monstrosities, but are pocket size brand new stuff. Essential if you mess about with transistors (and who doesn't these days!) **£3.50**

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Complete with carrier crystals (except XF-9C and D)

Send for our filter list giving details of crystal and mechanical filters.

Connectors PL259 **35p,** S0239 **35p,** reducers **10p,** line connectors for PL259 plugs **80p.**

PLEASE NOTE THAT ALL THE ABOVE PRICES ARE CARRIAGE PAID (which means quite a bit today).

Second-hand items

Carriage on these by 24 hr Securicor is **£1.75.**

Trio 9R59DE **£35**	AR88D **£45** (callers only)
AR88LF **£30** (callers only)	Drake R4A **£160**
Vanguard late model **£20**	Sommerkamp FR-100B **£80**
Sommerkamp FL-200B **£80**	Sommerkamp FR-500 **£100**
Sommerkamp FL-500 **£100**	Eddystone 84OC **£25**
KW2000A and p.s.u. **£160**	

The above is a selection of our fully checked, serviced and guaranteed stock. Many more besides—get our latest second-hand list. H.P. is a pleasure and can be arranged with as low as 10% down, balance up to 3 years.

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Peter Ward, G3XWX	47 Radstock Avenue, Ward End, Birmingham, B36 8HD

Hours: Tuesday to Saturday 9—5.30 (closed for lunch 1—2 and all day Monday).—73 de Bill and Alan.

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QTC AMATEUR RADIO NEWS

Postage increases

The Post Office Users' National Council recently held a one-day conference to obtain the views of non-business concerns on the alterations recently proposed to the Post Office services and charges. The Society was represented by Roy Stevens, G2BVN. The main speaker on behalf of the Post Office was Mr D. E. Roberts, the Director of Operations. The Society's point of view is that the increase in charges is crippling (£2,000 in a full year for *Radio Communication*) and the deterioration in service will add considerably to the difficulties of producing the monthly journal. While these and other points have been made to the POUNC, the comments of Post Office representatives at the recent conference gave no indication that they were prepared to make any concessions. Indeed, the impression gained was that the whole matter is already judged and decided. The near future will tell us if this is so.

Mail delays

Because of the dock strike on the east coast of the USA much of the surface Christmas mail from the USA will not be delivered in the UK until the New Year. Letters and parcels will arrive on three ships, the first just before Christmas Day and the remaining two on 28 December and 3 January. The strike has not been settled but a 90-day "cooling off" period has been ordered. Little surface mail has been received from the USA since the strike began on 1 October.

Members' correspondence

When writing to headquarters regarding subscriptions or non-receipt of *Radio Communication*, would members please quote their callsign/BRS/A number and the month in which their subscription is renewed. This will assist in the location of the appropriate record cards which are filed alphabetically under the month of renewal.

As distribution of *Radio Communication* is linked with subscription records, all letters concerning non-receipt should be addressed to the general manager and not to the editor.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at the end of October 1971:

Class A	13,998
Class B	2,977
Class A/M	2,679
Class B/M	524
Television	214

Routeing through Birmingham

To assist amateur mobile stations visiting Birmingham and adjacent areas who may be confused by the ever-changing roads and one-way systems, Mr P. K. Williams, G3YZQ, Tel 021-449 0309, QTHR, and G3VPE, Tel 021-777 1320, QTHR, are prepared to arrange "non-rubber stamp" QSOs and supply information on routes. QSOs can be arranged on all bands 2-160m, excluding 4m, on ssb or a.m.

Contact G3YZQ or G3VPE by telephone after 6pm on weekdays, anytime at weekends, or preferably by letter.

Installation of President 1972

Mr R. J. Hughes, TD, DLC, G3GVV, will be installed as the thirty-eighth President of the Society during the course of a social evening on

Friday 7 January 1972

at the

Bonnington Hotel, Southampton Row London WC1

commencing at 7.30 p.m.

Admission will be by ticket, available on request (with sae) from Society headquarters. Tickets are restricted to two per member.

Propagation conference

The electronics division of the Institution of Electrical Engineers is to organize a conference on propagation of radio waves at frequencies above 10GHz. It will be held at the IEE from 10 to 13 April 1973. The continuing demand for spectrum space to extend radio services and to provide new services is already producing congestion in the microwave band below 10GHz. Propagation data must be available before efficient usage of these frequencies can be planned.

The organizing committee invites offers of contributions not exceeding 2,500 words for consideration for inclusion in the conference programme. Those intending to offer a contribution should submit a 250-word synopsis to the IEE conference department before 1 May 1972.

It will be recalled that there are amateur allocations at 10 and 24GHz, the latter including an exclusive space communication band.

Can you help?

Mr J. Barlow, G3TCJ, "The Pippins", Lake Lane, Liskeard, Cornwall, requires information regarding VOR (aircraft df equipment) NARCO OMNIGATOR Comm Class 2 Nav Class 3. He will pay all postages for any literature or loan of diagrams and guarantees their safe return.

WA3HUP wishes to obtain a QSL card confirming a contact made with the then G station operating from VS9KAB on 10 July 1968 at 2041gmt ssb on 14,295kHz. VS9KAB promised to send the QSL card on his imminent return to England and WA3HUP is most anxious to obtain this QSL of her first-ever VS9 QSO.

Interference suppression kits

A range of nine radio suppression kits has been produced by Philips Electrical, to cover the various types of interference created by ignition and electrical circuits. As well as the

usual capacitors, there are earthing braids, plug caps, filter chokes and special packs for earthing wheels, bonnet and boot panels. They are available through most specialist radio shops.

Change of name

A notification from the ITU states that as from 27 October 1971 the Democratic Republic of the Congo (Kinshasa) will be known as the Republic of Zaire.

Special event station

GB2BP will be the callsign of a special event station operating on 160m on 29 January and on 160-10m on 30 January in connection with Loddon District Scouts Patrol Leader training weekend. As many contacts as possible would be appreciated for demonstration purposes. Further details from, and QSLs to, M. W. Cleland, G3PWU, QTHR.

Advertising rates

The cost of commercial advertisements in *Radio Communication* was increased with effect from 1 January 1972. It is with reluctance that this step has been taken but the publishers cannot continue to bear the whole of the recent increases which have affected paper and printing.

The following figures show the increases in recent years related to the composing costs only (not including paper and machining) of a ½-page advertisement:

January 1967: £6.48
March 1970: £7.95
December 1970: £9.95
August 1971: £10.60

During the same period the advertisement rate for a half page appearing every month has increased from £14.50 to £17. These figures will provide some indication of the way in which revenue has lagged behind cost.

A recent investigation has shown that when all costs related to advertising are taken into account, and which include composing, machining, paper, clerical work and advertising agent's commission, the Society has in fact lost money on certain types of advertisements. Obviously this state of affairs cannot continue. A letter giving details of the new rates is being sent to all those who advertise in *Radio Communication*.

Members' Ads

The spiralling costs of printing and paper will not have escaped the attention of members. Further increases are now being negotiated, to which will be added the new postage rates recently announced. If the Post Office has its way the postal increase will amount to £2,000 in a full year for *Radio Communication*. It is the intention to maintain the quality and size of *Radio Communication* and it is therefore necessary to effect every possible economy. The present-day cost of printing an average Member's Ad (excluding cost of paper) is 60p and if this figure is multiplied by 160, being an average of the number of Members' Ads in recent issues, it will be seen that in a full year the cost to the Society is about £1,100.

The Council of the Society is aware that the facility of free advertisements is one of the advantages of membership and it is not the intention to ask that, in future, the full cost of advertisements should be paid by the member. However, it is considered reasonable to ask that each advertisement should be accompanied by a remittance of 25p. This will defray part of the cost and yet still be of benefit to members.

Therefore all Members Ads submitted for the **April 1972** issue (those received at headquarters **after 4 February**) must be accompanied by a remittance of 25p (preferably in the form of a postal order). All other conditions will remain substantially unaltered.

Contests calendar

8–9 January—1·8MHz AFS (Rules in December issue)
9 January—144MHz SSB (Rules in December issue)
January–February—432MHz Cumulative Contest (Rules in this issue)
12–13 February—First 1·8MHz (Rules in this issue)
5/13 February—2nd World SSTV Contest (Rules in this issue)
4–5 March—144/432MHz Open Contest
11–12 March—BERU
25–27 March—BARTG Spring RTTY Contest (Rules in December issue)
9 April—80m LP
9 April—70MHz
6–7 May—432MHz
21 May—144MHz
3–4 June—NFD
10–11 June—70MHz
24–25 June—Summer 1·8MHz
25 June–Microwave Contest
1–2 July—144MHz
8–9 July—HP Field Day
23 July—432MHz
13 August—70MHz
20 August—144MHz SSB
2–3 September—VHF NFD
2–3 September—IARU VHF
10 September—80m Field Day
7–8 October—21/28MHz
7–8 October—IARU UHF
21–22 October—7MHz CW
4–5 November—7MHz Phone
5 November—144/432MHz CW
11–12 November—Second 1·8MHz
November–December—70MHz Cumulative

Converting the Pye Cambridge radiotelephone to operate on 2m

by D. A. TONG, BSc, PhD, G8ENN*

Introduction

There must be an almost infinite number of ways of converting surplus radiotelephone equipment, and to many people this scope for individual preference is all part of the fun. The reason for offering the following notes on one particular conversion of the Pye Cambridge is threefold; firstly there seems to be an unjustified feeling that the Cambridge is awkward to modify; secondly, some of the modifications published already seem not to fully utilize the original contents of the unit; and finally, not everyone has access to the official manual for the equipment.

This article deals with receiver, transmitter and power supply separately. It should be understood that, unless otherwise stated, reference is being made to models designed to cover Band A (174 to 148MHz).

Receiver

First local oscillator

In its original form the Cambridge receiver is crystal controlled on one or more fixed frequencies. The frequency of the first crystal oscillator depends on the particular band. From 68 to 174MHz the first i.f. is 10·7MHz, and from 88 to 174MHz the local oscillator crystal has the frequency (f_x) given by $f_x = \frac{f_c - 10{\cdot}7\text{MHz}}{3}$, where f_c is the receiving frequency. The oscillator circuit is given in Fig 1 and the tank circuit is tuned to the appropriate harmonic (third in this case) of the crystal oscillation frequency which is itself a mechanical overtone. From 54 to 88MHz the second harmonic is used, and from 25 to 68MHz the first i.f. is 6MHz. The values quoted in Fig 1 for C12, C13, C16 and C24 refer to the band 148 to 174MHz and will be different for other ranges. Only C16 and C24 are needed in the tunable oscillator.

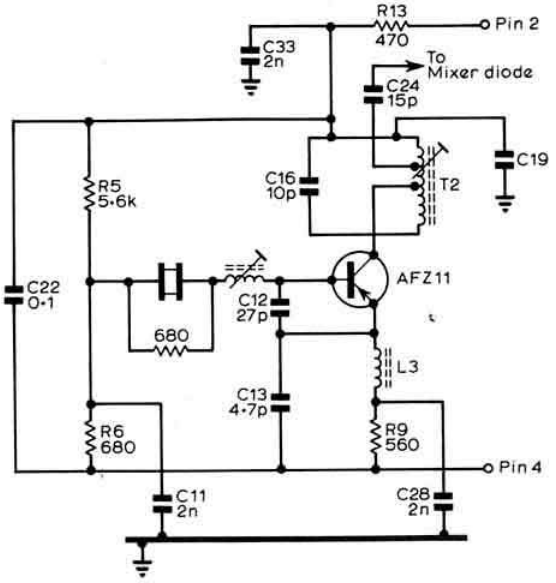

Fig 1. Original oscillator circuit

This oscillator circuit lends itself very easily to modification with a minimum of alterations to the rf printed circuit board. The circuit used by the author is shown in Fig 2 in which the original components retain their old labels while new ones are given numbers beginning with zero.

The varicap diodes, DO1 and DO2, are wired across the coil inside the area enclosed by the can. An extra tag (pin O1) can be added to the board near the end of R5 which goes to R6. CO1 is best mounted underneath the rf board using the minimum possible lead lengths.

In order to make the tuning coil tune correctly one can either replace the ferrite slug with a brass one or one can merely add a single shorted turn to the coil. It should be a tight push fit around the former and be immediately next to the top turn of the main winding. The coil will then tune with the original slug about 25 per cent into the main winding.

The use of varicap diodes to tune the oscillator leads to great flexibility in mechanical design since the tuning potentiometer can be located anywhere; it does, however, introduce the problem of obtaining a reference voltage of sufficient stability with which to feed the diodes. If, for example, the 2MHz range is tuned by a 2V swing, then a voltage drift of only, say, 10mV is enough to detune the receiver. Since the voltage of a car battery can easily vary from 11 to 15V depending on its state of charge and the engine speed, a fairly good stabilizer is required to drive the tuning potentiometer. An easy solution is to use a small 9V dry battery but this is not satisfactory as a long-term solution.

A suitable stabilizer is shown in Fig 3, which also shows the wiring to the tuning potentiometer. TR1, TR2 and DO3 form a conventional series stabilizer with an output of about 9·5V. This output is used to supply stabilized negative ht to the oscillator (remove R13 and feed this supply directly to the copper area that joins R5, C22 and T2). Further stabilization for the varactor supply is provided by DO4 and

* 11 Moor Park Avenue, Leeds, LS6 4BT.

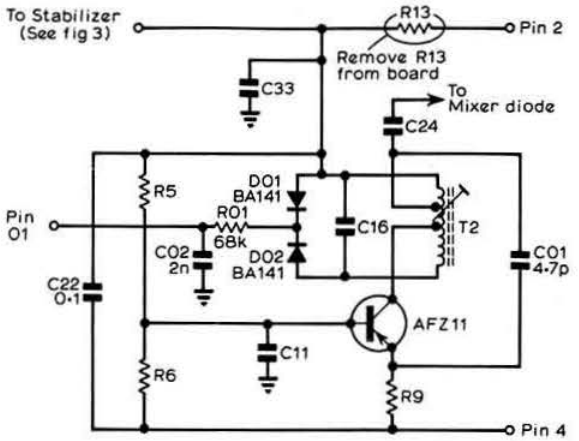

Fig 2. Author's modified oscillator circuit

RO3. The base emitter junctions of silicon planar transistors make excellent zener diodes with zener potentials usually between 6 and 7V. All the transistors used in Fig 3 (including DO4, see inset) were of the unmarked untested variety and cost 2·5p each. Provided silicon planar types are used, the exact variety is unimportant.

The oscillator is adjusted by setting RVO3 (the main tuning potentiometer) to its hf end and adjusting the slug in the oscillator coil to tune the receiver to 146MHz, RVO3 is then set to its other limit and RVO1 is adjusted until the receiver receives at 144MHz. The two adjustments are independent if carried out in the above order. If desired, one or more preset receiving channels can be incorporated, as exemplified by RVO2 and SO1.

Frequency stability is very important in all receivers and particularly so in mobile receivers. Despite the use of a vhf vfo, the modified Cambridge in a typical room environment will remain tuned to a station indefinitely after a drift of one of two receiver bandwidths in the first minute. In mobile operation, drift has not been apparent but no tests involving large temperature shifts have been carried out. A supply voltage shift from 10 to 15V will send a signal from one end of the receiver passband to the other but it will not normally be lost. Of course, during normal mobile conditions the battery voltage swing is less than this.

RF coils

The rf tuned circuits in the author's Cambridge would not quite tune down to the 2m band. The original tuning capacitors were as given in Table 1. Correct tuning can be obtained simply by adding 4·7pF padding capacitors to each of C1, 5, 9, 17, 21. The officially recommended capacitor values for the band 132 to 156MHz are also given in Table 2. Each variety of rf coil fitted in Cambridge receivers is designed to cover a fairly wide range, eg 132 to 174MHz, 112 to 136MHz. The author's receiver was initially tuned to 160MHz; a receiver designed for the range 112 to 136MHz would need smaller capacitors than the ones quoted above.

It is possible to obtain uniform gain over the range 144 to 146MHz by slight stagger tuning of the bandpass couplers in the rf tuned circuits.

Table 1

Capacitor	Band 148-174MHz	Band 132-156MHz
C1	10pF	12pF
C2	68pF	82pF
C5	10pF	12pF
C9	10pF	12pF
C17	10pF	15pF
C21	12pF	15pF

Table 2

Capacitor	Initial value (pF)	Modification
C103	75	replace by 82pF
C106	59	add 5pF padder
C108	59	add 3·3pF padder
C110	59	no change
C112	59	add 10pF padder
C114	110	add 10pF padder

It appears that in some specimens the existing rf coils will just tune down to the 2m band and it is probably worth trying this before actually changing the capacitors as described above.

Spurious signals

The frequency of the second local oscillator in the author's Cambridge was 11·155MHz and this gave rise to a harmonic in the band and several other spurious signals, also in the band. The cure is to change the frequency of the local oscillator. Substitution of the 11·155MHz crystal by a 10MHz crystal removed most of the spurii and reduced the first i.f. from 10·7 to 10·45MHz. In order to lower the frequency of the first i.f. tuned circuits, the modifications shown in Table 2 were carried out to the tuned circuit capacitors on the first i.f. board.

The choice of a crystal on 10MHz was because one was to hand. Probably many other frequencies on the low side of the first i.f. would be equally effective in eliminating the spurious signals. Best of all, of course, would be a crystal on 10·245-MHz since no retuning of the 10·7MHz i.f. would then be

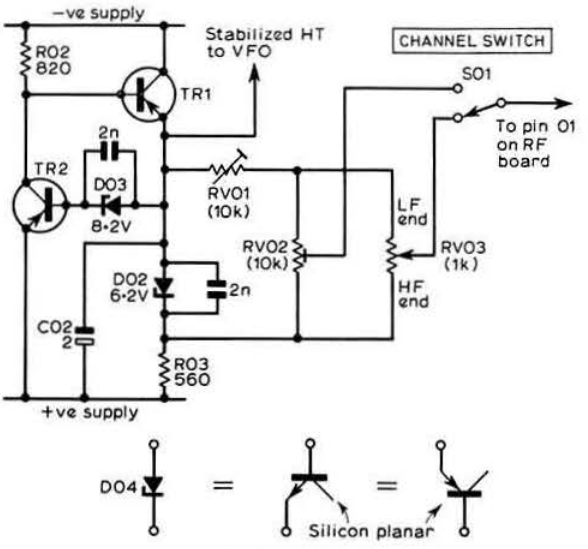

Fig 3. Stabilizer circuit

Table 3

Capacitor	Position	Recommended value (pF)
C604	Oscillator anode (pin 5 of 6BH6)	39
C610	First multiplier anode (pin 5 of 6BH6)	27
C615	Second multiplier anode (pin 8 of QQVO3-10)	5·6
C617	Driver anode (pin 6 of QQVO3-10)	10

necessary. I am indebted to the RSGB's technical reviewer for the information that such a crystal frequency does in fact successfully eliminate spurii.

Performance

Although the Cambridge receiver has very high gain and thus excellent agc performance, its signal-to-noise ratio on weak signals is not as good as that of some modern converters. Direct replacement of the first rf transistor by a transistor of lower noise figure is the simplest solution, and in the author's version a TIX M05 was used. This is a cheap low noise germanium planar device made by Texas Instruments Ltd and was used merely because it was to hand. No doubt other constructors will have their own ideas on such substitutions. Even in its original state the receiver performance is adequate for most purposes. Skirt selectivity is very good indeed and compensates to a large extent for the fairly wide bandwidth. Strong signal performance is fairly good and cross-modulation seems not to be a problem. The noise limiter is quite effective and is well worth retaining. The same applies to the squelch facility.

Mechanical points

The available front panel area is much increased if the large electrolytic behind the panel is moved onto the crystal-holder sub-chassis and if most of the metal sub-frame on which it was initially fixed is removed, leaving only enough to carry the protection rectifier and the on/off pilot light. Preset potentiometers for the receiver tuning can be easily mounted on the crystal-holder sub-chassis together with the varicap voltage stabilizer. Power for the latter can then be taken directly from the main on/off switch.

In order not to reduce the overall reliability of the transceiver by poor workmanship, all soldered joints should be made up to the same high standard as the original wiring, and tag strips should be used for component mounting.

Transmitter

Retuning

It is a very simple matter to retune a high-band Cambridge transmitter to the 2m band. The anode coils for the first three valves are designed to cover 112 to 174MHz depending on the tuning capacitors used. For the band 132 to 156MHz the officially recommended capacitors are given in Table 3.

Modulation

Ex-commercial radiotelephones have a reputation for undermodulation and limited speech bandwidth. The justification, of course, is that adjacent channel interference must be held to very low levels indeed in commercial service. Any modulation non-linearities introduce harmonics of the speech frequencies onto the carrier even though the original speech response is rigorously cut off above 3kHz. Such non-linearities will be greater at high depths of modulation. In amateur service, conditions are not quite so rigorous and greater modulation depths can be used without any problem, provided great care is taken to avoid that greatest of sins, overmodulation.

In the Cambridge transmitter the modulation depth is determined by a threshold setting of a speech compressor circuit. By reducing the value of R503 (1·2kΩ) on the audio board, the threshold can be raised and the modulation depth increased. A suitable procedure is to connect a resistor of 560Ω in parallel with R503.

Greater overall gain in the modulator can be obtained by reducing the negative feedback resistors R514 (68Ω) and R521 (22Ω) for VT503 and VT505. They may even be shorted out altogether with no obvious disadvantages but with a useful increase in microphone sensitivity. In a noisy car, of course, this may or may not be advisable!

Performance checks

The handbook for the Cambridge quotes typical voltages at the transmitter test-points and these are given below. They are correct when a testmeter of 20,000Ω/V sensitivity is used.

Test point	*Voltage*
TP601 (V601 grid voltage)	−0·2V
TP602 (V602 grid voltage)	−0·45 to −0·6V
TP603 (V603a grid voltage)	−0·35V
TP604 (V603b grid voltage)	−0·65 to −1·05V
TP605 (V604 grid voltage)	−1·25 to −1·8V
TP606 (V604 cathode voltage)	+0·55 to +0·7V

These figures will only be obtained when the supply voltage is the nominal 13·2V under the full load and, of course, when the transmitter valves, in particular the QQV03–10s, are in good condition. Except for the voltages at TP605 and 606, which should be as given, the figures quoted are typical values only.

Power supplies

In order to operate the Cambridge transceiver from a mains electricity supply one can either rewire the unit to operate with ac on the heaters and from an external ht supply, or

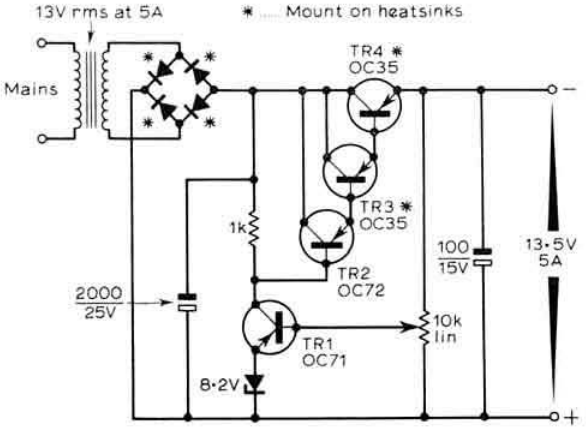

Fig 4. Power supply circuit

one can build a 12V, 5A dc power supply. In the author's opinion the latter is by far the best and simplest solution since full mobile capability is retained and also because the semiconductor components required are available at very low prices.

A suitable power supply circuit is given in Fig 4. Germanium transistors were used because they were lying in the scrap box. Such power supplies provide quite a useful way of using up obsolete germanium devices now that silicon devices are preferable in most applications. The components shown are entirely non-critical and any transistors are suitable provided they can handle similar currents to the one shown. TR4 and TR3 should be mounted on a heat-sink. Suitable diodes are available cheaply on the surplus market. If necessary, TR4 could comprise two lower current transistors in parallel. The 2,000μF reservoir capacitors should, of course, be a type having a high ripple current rating.

It may be worth pointing out that, since the Cambridge is designed to operate on a car battery which can vary between say 11 and 15V, very good regulation is not essential in a mains power supply and the circuit shown is more than adequate for the job.

Good hum reduction will only be obtained if the output from the rectifiers is at least 2V greater than the desired output from the regulator. On the other hand if the difference is more than 2V, the power to be dissipated in TR4 will rise proportionately and this should be borne in mind when making the heat-sink.

Acknowledgements

The author is grateful to members of the Leeds Amateur Radio Society (G3BEW) and other amateurs who co-operated by providing test reports on this conversion, and in particular to G8EER who kindly loaned a copy of the handbook; and last, but not least, to his xyl (G8ENO) who typed the manuscript.

Editorial note

A circuit diagram of the Pye Cambridge may be obtained from, The Editor, "Radio Communication", RSGB, 35 Doughty Street, London WC1N 2AE, at a cost of 10p (including postage and packing).

An indoor aerial

by W. G. BORLAND, G3NXM*

AT the author's present location, outdoor aerials of any kind are not allowed, including those for television reception, so he was faced with the problem of installing an indoor aerial. Fortunately there was space under the roof some 25ft by 24ft and about 7ft high to the ridge. Being rather an optimist the author wanted to work all bands, and tried several so called all-band aerials, including some commercial ones, but for various reasons was not satisfied with any of them.

Some years ago at a different QTH an outdoor trap dipole was used with satisfactory results, and even when the ends were bent down this did not appear to detract from the performance. It was decided, therefore, to try a trap dipole running back and forth in the roof space, and as it was indoors the construction could be considerably lighter than for an outdoor one. The design used was that described in an article by G2BVN in the *RSGB Bulletin* dated May 1957. For new members or those who do not keep their old copies, Fig 1 shows the details. (**Editorial note:** *These traps are suitable for indoor use only, as distinct from the traps in the original article which were weatherproofed.*)

The only point of construction which might cause difficulty is the traps. Each consists of about 6in of $\frac{1}{4}$in diameter insulated rod such as bakelite or polystrene. Two holes are drilled through the rod 4$\frac{1}{2}$in apart and a brass bolt is inserted through each hole. The coil consists of 70 turns 18swg enamelled wire close wound on the rod between the two bolts, occupying about 3$\frac{1}{4}$in, and the ends connected to the brass bolts. The capacitor is also connected across the coil between the brass bolts. In case of difficulty in obtaining a high-voltage capacitor, Radiospares† sell a high impulse voltage capacitor (12kV dc test) of the correct value at a cost of about 15p each (at least they were) for television sets, but they have been used successfully. The traps should be checked for resonance at 7·2MHz with a gdo and the coil adjusted if necessary. Fig 2 shows the construction of the traps.

The aerial wire consists of about 20yd of 2A clear plastic covered flat twin flex obtainable at numerous stores. It is split down the middle to give two pieces about 60ft long, this length allowing for terminations, and is connected as shown in Fig 1. The connection to the traps is to the brass bolts and this makes the traps themselves strain free. This twin flex has an impedance of about 75Ω, so another piece is used as the feeder to the Z-match. As the author's shack is also in the roof space, only about 8ft of feeder is required.

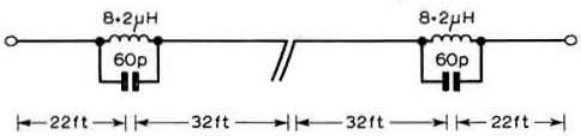

Fig 1. Details and length of aerial

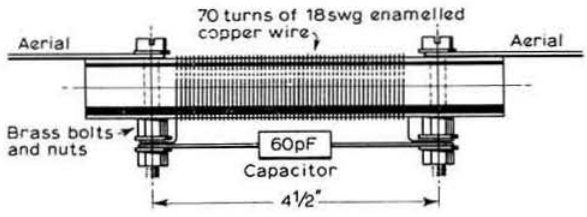

Fig 2. Details of trap

*10 Ashfield Drive, Baildon, Shipley, Yorks. BD17 6JA.

† Now known as RS Components whose catalogue items are available through retailers.

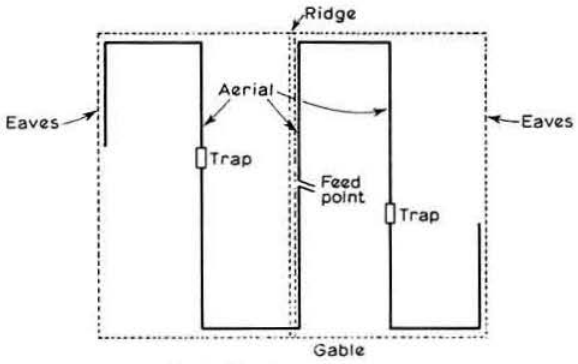

Fig 3. Plan layout of aerial

The feed point of the aerial is fixed to the centre of the ridge. Half of the aerial runs from this point along the ridge to the gable, down the gable about 7ft, back along the centre of the roof spars to the other gable, down the gable to eaves level and along there until the end of the aerial is reached. The other half of the aerial runs in a similar manner in the other half of the roof space. Fig 3 gives an idea of the layout in plan.

With this aerial, a Z-match and the G3PDM swr meter, an swr of less than 1·5 : 1 on all bands, sometimes almost unity, is obtained. So far, with an ssb transceiver at 160W p.e.p. input, the author has worked from the west coast of Canada to Tel Aviv, and had a very interesting Swiss contact using an indoor aerial.

This type of aerial is, of course, not the only solution; for example, a G5RV aerial could be used in a similar situation. The author preferred a trap dipole because of past experience and the very short length of 75Ω feeder.

For those interested in shortened aerials, it is well worth reading the article "Aerials for confined spaces" by G2QM which appeared in the January 1959 issue of the *RSGB Bulletin*. Very briefly, one of the aerials described was to cut a piece of wire as for a full-size aerial, erect as much as possible, and the remainder, that is the end away from the feed point, is wound on a former non-inductively, This former could be a flat sheet of hardboard with the wire fixed to pegs at least 1in apart as shown in Fig 4. G2QM states that with a 15ft aerial top indoors and the balance of the aerial on a square frame hung on the wall, using 8W on Top Band he received a letter of complaint from the GPO for causing interference to traffic at Blaavand, Denmark.

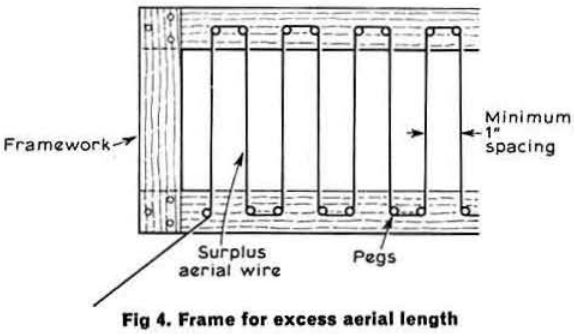

Fig 4. Frame for excess aerial length

Table 1. Sizes of birdcage for various bands

Band	Full-wave	Quarter-wave
2m	10$\frac{7}{16}$in	2$\frac{1}{4}$in
6m	29$\frac{3}{4}$in	7$\frac{1}{4}$in
10m	4ft 4in	13in
15m	5ft 10in	17$\frac{1}{2}$in
20m	8ft 8in	2ft 2in
40m	17ft 4in	4ft 4in
80m	34ft 8in	8ft 8in

All lengths are for the side A-B in Fig 5 which is also the turning radius. Sides B-C are twice the length of sides A-B. All are given for the low edges of the band

There is another type of aerial which it is hoped to try in the near future, the "birdcage" aerial designed by G4ZU which had a gain of 10dB. Fig 5 is a diagram of this aerial. K3LNZ and W3CYT were encouraged to experiment with scaled down and quarter-wave versions, the latter being called the "wee birdcage". Table 1 gives the dimensions for the aerial for the various bands, tending towards the lower edges. Referring again to Fig 5, there is a shorted stub connected to the reflector, as the reflector should be about 5 per cent longer than the director. The director is adjusted to give the best swr and the reflector stub adjusted to give the best front-to-back ratio. The final result will, of course, be a happy medium between swr and fb ratio. The quarter-wave aerial will only give about 4dB gain, the directional pattern will not be sharp, and the front-to-back ratio will not be large. Still, a 20m beam with a turning radius of only 2ft 2in and a height of 4ft 4in will fit into most roof spaces. For those who can erect a full-sized version for 20m, which would no doubt be outdoors, it will also serve as a quarter-size version for 80m.

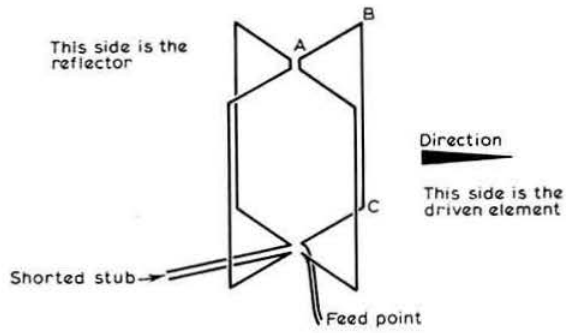

Fig 5. Basic electrical details of the birdcage

There must be many amateurs who have difficulty in getting a good aerial system. It is hoped that this article will encourage others to experiment with indoor and shortened aerials as the author feels a lot of work could be done in this field.

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MICROWAVES—1,000MHz and up....

by DAIN EVANS, G3RPE*

Microwave activity periods

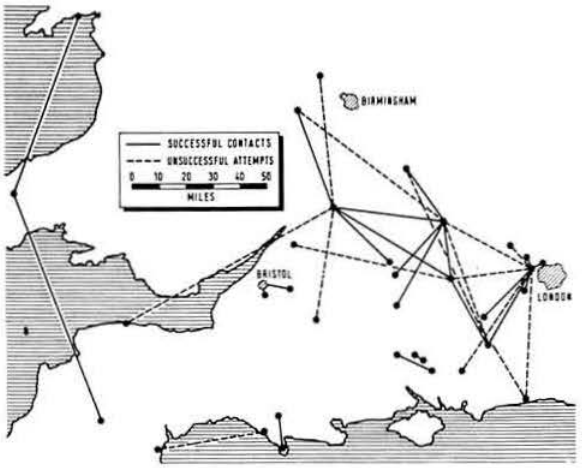
With the exception of the two main contests, the bulk of microwave activity has been limited to that arranged directly by the people concerned. This is clearly a wasteful way of doing things, especially since most microwave activity is based on portable operation with all the extra organization and effort that this involves. The VHF Committee has therefore designed the following programme of activity periods, set during the last weekend of each of five months, which should satisfy most enthusiasts demands:

25-26 March, 13, 9, 6cm; 29-30 April, 3cm, 15mm; 27-28 May, 13, 9, 6, 3cm, 15mm; (24-25 June, Contest for 23cm and up); 29-30 July, 13, 9, 6, 3cm; 26-27 August, 23, 13, 3cm, 15mm; (2-3 September, VHF NFD 23 cm); (7-8 October, Contest including 23cm and up).

The scheme is obviously a balance between having a number of opportunities to test equipment for each of the bands, while limiting the amount of equipment to be tested and transported on each occasion. A last-minute chance to test 23cm equipment before VHF NFD is given in August event.

It is anticipated that most activity will be concentrated on the Sundays, probably between 8am and sundown, although it will probably be worthwhile also looking out during the Saturday evenings, say between 6 and 12pm, for those who prefer to go out for the weekend or who are seeking improved propagation conditions. As the talk-back band, 70cm has obvious advantages and is much used. However, it would be valuable to know if there is sufficient demand for an alternative, perhaps 2m, to make it worth catering for.

It would add considerably to the value of the activity periods if the operating sites of stations were known in advance so that others could fit in. If you are reasonably certain of taking part in one by the first of the preceding month, for example by 1 February for the March event, then please let me have details including approximate location and accurate NGR, and the bands likely to be operated. Alternatively, if the same information can be supplied about 10 days before each event it may be practical to notify others via the GB2RS broadcast on the Sunday before the event.



30cm attempts during 1971

Setting up microwave contacts

In taking issue with me over the difficulties in setting up microwave contacts (see the October column), GW3IJE/EI2CB (Pontypool) cites his professional experience in establishing tv outside-broadcast links. The equipment he used employed a 4W 7GHz klystron in the transmitter, and 4ft dishes at both ends. After having previously spent a half hour with maps and graph paper to prove that there was an optical path between the proposed sites, the receiver dish was fixed in roughly the right direction (rarely using a compass), and the transmitter dish was panned slowly over an arc of at least 180° to prevent lining up on side lobes. Usually this resulted in some response in the receiver which was then the starting point for further adjustments at both ends. If this procedure did not work right away, the dish was removed from the transmitter and the rf sprayed in the right general direction. He also mentioned that the receiver and transmitter were both stable and accurately calibrated, and emphasized that the dish mounts were well engineered to ensure that the dishes were vertical and could be panned reliably. He asked why all the fuss when this simple procedure was all that was used by engineers virtually every day.

By way of reply, I entirely accept his point about checking the path beforehand. One wonders how many times people have been disappointed and have drawn the wrong conclusions because of the lack of this preliminary check. I also accept that the dish mechanics must be of a high standard, especially when large dishes are being used. Where we differ is simply in his suggesting that we, in fact, differ! I think that his example illustrates the points that I was trying to make, that one should try to reduce the number of variables to contend with. In his case, reading between the lines, it appears that the stability and calibration accuracy were within the bandwidth of the receiver. This effectively eliminated two of the four variables, receiver and transmitter tuning, and left only the dish directions as variables. Add to this the obvious advantage of high power, and 4W *is* high power, and confidence in success given by experience, and one can see that it might seem quite straightforward. By contrast, the amateur may be trying to cope with too many variables, receiver and transmitter frequencies and two dish directions, as well as suffering the handicaps of low power (perhaps 20mW) and inexperience. The point of my article was that as the number of variables increase, the difficulty in making contacts multiplies very rapidly. Surely GW3IJE's information demonstrates the value of improved control; this was the point of my article.

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Microwave transistors

by P. B. BRODRIBB, G3ONL*

THE upper operating frequency of both valves and transistors is largely determined by transit time. In the case of the valve, this is the time taken for an electron to travel from cathode to anode. The problem of reducing transit time in a valve can be tackled in two ways. One is to reduce the inter-electrode spacing, and the other is to increase the electron velocity by increasing the anode potential. However, as spacing is reduced, the risk of voltage breakdown between anode and grid is increased and so a compromise between spacing and operating potential must be reached.

Transit time in a transistor is also the time taken for a charge carrier to move through a given distance. The distance can be the emitter-collector spacing of a bipolar transistor or the source-drain spacing of a field effect transistor. Again, in order to reduce transit time, two methods of approach are possible; reduce the distance through which the charge has to travel, and increase the charge velocity. Thus, in both valves and transistors, high power and high frequency are incompatible.

One of the first attempts to increase the high frequency response of a junction transistor was the diffused junction. In this transistor the impurity density in the base region is graded throughout the base width instead of being uniform. The electric field gradient that results from this technique increases the charge carrier velocity and so decreases transit time. This "drift" field produces a potential difference of only a fraction of a volt, but the distance across which it is applied is so small that electric field intensities of the order of 100V/cm or more are produced. This technique extends the high frequency characteristic of the transistor to several hundred megahertz.

Though the drift technique raised the high frequency operating level, the junction transistor was still not satisfactory at microwave frequencies because the alloyed junction method of fabricating transistors, till then common to most types, gave large and not easily controlled base widths in return for reasonable production yields. The **mesa** transistor, illustrated in Fig 1, limited the base area by etching well-defined regions, leaving the transistor on a plateau (hence, mesa). The results were to some extent disappointing. Certainly the frequency response was enhanced, but the surfaces were now exposed to contamination, and because of this the transistor could become noisy.

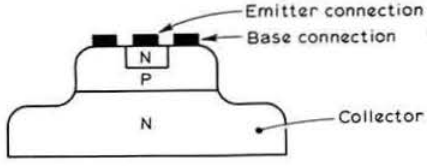

Fig 1. A mesa transistor

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The big breakthrough in transistor manufacturing techniques was the advent of the **planar** transistor. The planar transistor uses a slab of silicon, doped n-type, to form the collector of an n-p-n transistor. This slab is scrupulously cleaned by etching, and then heated in oxygen to form a durable protective electrically insulating layer of oxide (silica). Subsequently, windows are etched in the oxide layer and the base and the emitter regions are diffused through these windows. The completed transistor is given a final oxide layer so that no active surface can come into contact with any contamination whatsoever. Fig 2 shows a stage in the manufacture of a planar transistor. The transistor as described suffers from a relatively high collector resistance since the basic n-type slab must have a reasonable thickness in order to give the device sufficient mechanical strength. This is overcome by the epitaxial technique. This technique divides the collector into two parts; one, a highly-doped low-resistance section to which electrical connection is made, and the other the normal collector region, Fig 3.

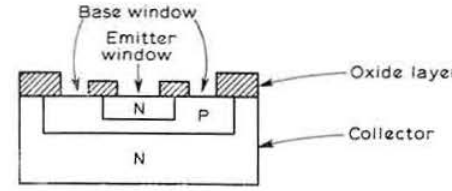


Fig 2. Showing windows in the oxide layer through which the appropriate impurity is diffused into the base and emitter regions. Metal for electrical connection is then laid down on the base and emitter

The planar technique allows a very small transistor to be made with well-defined active areas, and a graded base. Small signal operation up to the lower microwave frequencies is possible, but to date current gains (h_{fe}) are somewhat less than for lower frequency types.

A current trend in the development of microwave transistors is towards the use of gallium arsenide (GaAs) as the semiconductor material. Electron mobility is higher for gallium arsenide than for silicon by a factor of 3 or 4, and hence transit time is less. Consequently the upper operating frequency is higher for a gallium arsenide transistor than for a silicon transistor of similar dimensions. However, silicon processing techniques are very well established. The production of high purity material and planar construction

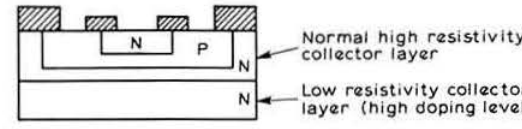


Fig 3. Showing an epitaxial collector

methods have reached an advanced stage of development, but the encouraging results obtained from gallium arsenide Gunn devices, impatts, trapatts and the like, have given an impetus to the work being done on the purification and fabrication of gallium arsenide. For the present, though, the more advanced "state of the art" of silicon gives it the lead. Silicon also has the advantage of a higher thermal conductivity with consequent greater heat dissipating properties, but this is mainly of importance in power transistors.

Power transistors suffer from most of the difficulties of small signal transistors plus the handicaps that result from high current densities. The base current of a power transistor can be appreciable, and this current flow through the resistance of the base layer causes a voltage drop which reduces the forward bias. Those regions of the emitter that are remote from the base area are more affected by this "de-biasing" than the nearer regions since the resistance is greater, hence most of the effective emitter current is obtained from a narrow band around the edge of the emitter.

Thus the design of a power transistor is a matter of producing a base area that is sufficiently large to dissipate the heat generated, and then putting the greatest emitter periphery into this area. The overlay transistor is one method of accomplishing this. The interdigital transistor is another. Fig 4 depicts a section of an interdigital transistor. Base widths less than 0·5μm can be obtained and finger widths are of the order of 1-2μm. The collector is usually epitaxial.

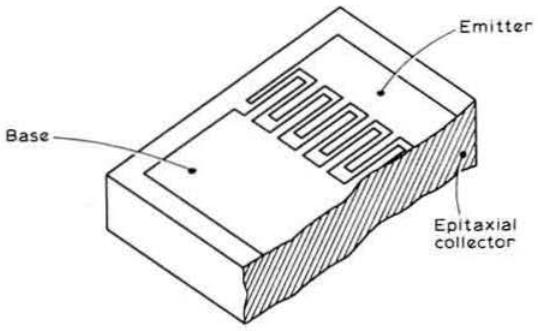


Fig 4. A microwave transistor showing the interdigital construction

Microwave transistors have till recently been operated in the common-base configuration, since gain falls at a slower rate, as frequency increases, than it does in the common-emitter arrangement. This configuration has the disadvantage that collector capacitance is responsible for positive feedback, and instability may result if the load impedance is incorrect. However, advancements in manufacturing techniques now permit useful gain to be obtained when the transistor is operated in a common-emitter circuit even though the collector capacitance then supplies negative feedback with consequent reduction in gain.

Stripline waveguides are very suitable for microwave circuits, and microwave transistors are packaged to suit this type of construction. Stripline is a form of waveguide consisting of two parallel conducting plates and can easily be constructed by printed circuit techniques, Fig 5. Some energy will be lost by radiation from the open sides, but if the spacing is close enough such losses can be held to acceptable

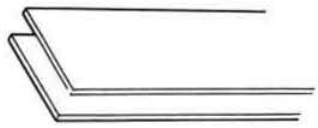


Fig 5. Stripline waveguide

levels. Of course, close spacing reduces the power handling capability of the waveguide but this is unimportant at the power levels involved. Microstrip is a form of stripline involving a conducting plane and a single strip.

Various dielectrics such as polystyrene, Fibreglass and ceramic, to name but a few, are used in constructing stripline waveguides. The relative permittivity (ϵ_r of the dielectric plays an important role in that the dielectric with a high value of ϵ_r tends to concentrate the field in the vicinity of the plates and loss by radiation is reduced. The wavelength in stripline is decreased by a factor of $\sqrt{\epsilon_r}$, as is the characteristic impedance of the line. Cross-sections of stripline are shown in Fig 6.

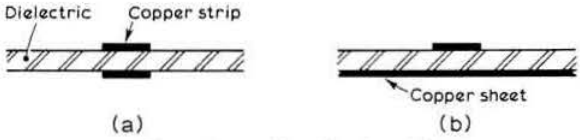


Fig 6. (a) stripline (b) microstrip

Transistors for use in common base circuits may have the base connected to the outer casing, and all three connections may be in the form of flat strip to facilitate connection to stripline. Input and output impedances are readily matched to the source and the load by means of lengths of stripline acting as transmission line transformers. The characteristic impedance of such a length of stripline can easily be tailored to any desired value merely by altering its width, or a tapered section can be used to transform one impedance to another. A stripline circuit with a microwave transistor connected in common base is shown in Fig 7. If the dielectric has a relative permittivity of 6, a quarter-wave transformer at 2GHz will be about 1·5cm long whereas in air ($\epsilon_r = 1$), the length would be nearer 4cm.

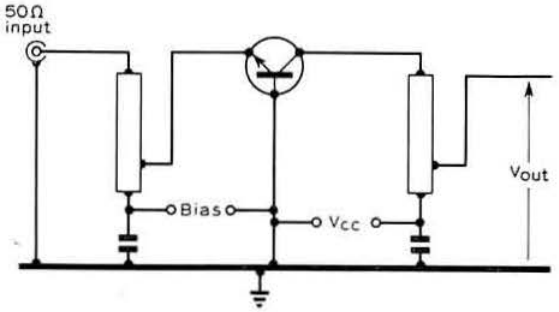


Fig 7. A common-base stripline amplifier

Modern microwave transistors are capable of an output of a watt or so at the lower microwave frequencies, and higher powers at higher frequencies will surely follow. It remains to be seen whether the transistor or the diode takes pride of place in microwave electronics.

Lightning and your aerial

by G. R. JESSOP, G6JP*

IN this country the frequency and severity of thunderstorms is fortunately a less serious hazard than in many other countries. However, from time to time there are storms of tropical severity, and when these occur considerable damage can and often does result.

Most amateurs, for obvious reasons, like to have their aerials as high as reasonably possible, and these are a potential target for atmospheric discharges, even if they escape a direct lightning strike. Also heavy rainstorms without lightning are often very heavily charged and cause considerable static discharges.

It is wise, therefore, to provide proper protection to the aerial system, so as to prevent, or at least minimize, damage to equipment, property, and especially the operator. Suitable precautions are normally taken in professional installations, but the vast majority of amateurs are believed to rely either on the wholly unsatisfactory method of disconnecting the aerials or switching it to earth inside the radio room. If switching to earth is to be useful at all it must be done outside the building and preferably away from it, so that the earth connection is as far as possible a straight-down path into the ground.

The most suitable method for any exposed aerial system is to provide a proper discharge path to earth, which can be permanently installed so that it is effective at any time without interrupting operation of the equipment.

The first essential requirement is to provide an adequate earth connection of suitably low resistance. The actual form of this will obviously vary according to the nature of the ground into which the connection is to be made, but the most satisfactory earth connection is provided by one or more copper rods driven into the ground in an appropriate position. The position of the earth connection should be sited so that it is directly under the aerial feeder, to provide the most direct path to ground.

Details of standard copper rods are given in the appendix. Methods of testing the effectiveness of an earth electrode are given in the IEE Wiring Regulations Appendix 6.

The most satisfactory method of providing the direct but isolated earth connection for the aerial feeder, is to use a gas-filled surge arrester fitted in an adequately insulated mounting in which is included a parallel air spark gap. Two different types of suitable devices and mountings are readily available.

The single-gap glass envelope surge arrester Type No 15 fitted in a No 6 mounting in which is incorporated an adjustable air spark gap is suitable for use with twin or single wire feeder lines as illustrated in Fig 1 (a) and (c). Alternatively, a three-electrode metal ceramic surge arrester Type 16 as shown in Fig 1(b) is both more efficient because it protects each line to earth and between lines, and it is less expensive. This is normally fitted in a Type 53 mounting which includes two preset air spark gaps between line and earth.

The three-electrode type has a very distinct advantage over the two separate units for the protection of twin lines, because once one gap in a three-electrode type has fired, the other gaps follow much more rapidly.

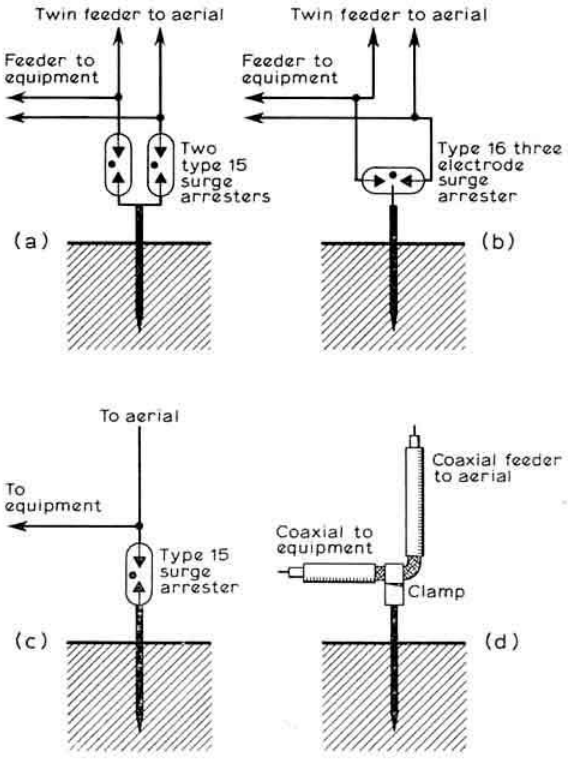
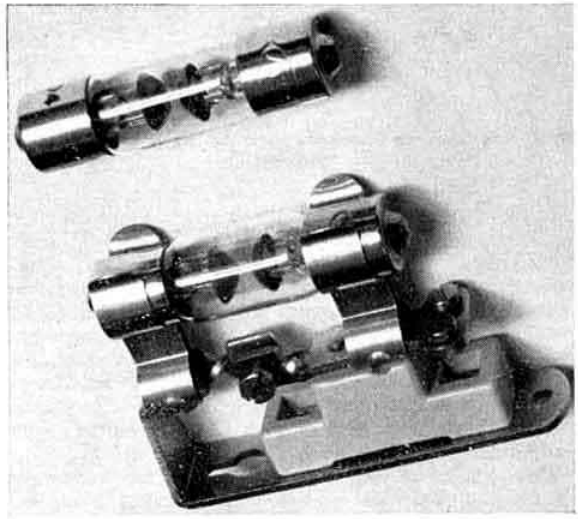
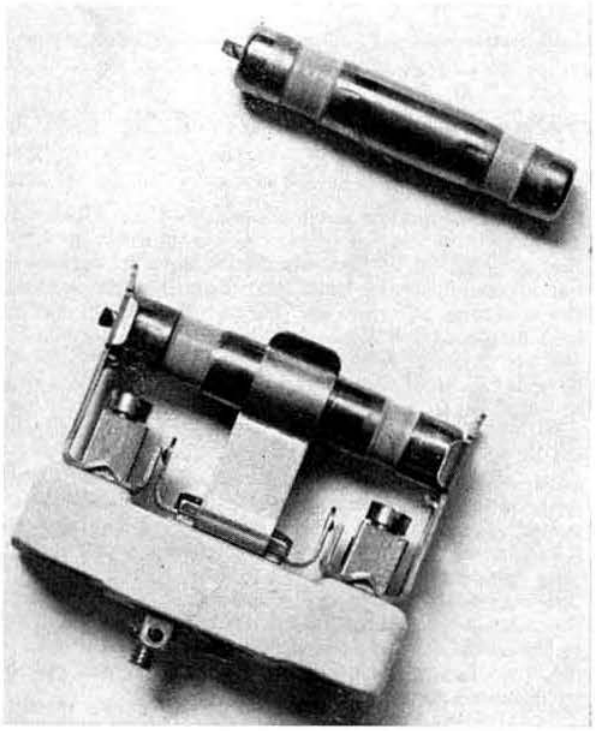


Fig 1. Illustration of the method of installation of gas-filled surge arresters to open-wire-fed aerials



Type 15 single-gap gas-filled surge arrester, above, and mounted in Type 6 mount, below

* 32 North View, Pinner, Middlesex.

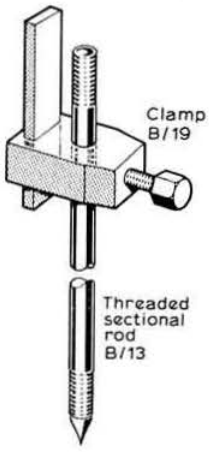


Type 16 three-electrode gas-filled surge arrester, above, and mounted in Type 53 mount, below

Both types of surge arrester are capable of isolated discharges of up to 20,000A without destruction. The metal-ceramic is obviously more robust than the glass envelope type, though the latter has other useful features, eg the operator can observe the presence of discharges and the self-capacitance is about half that of the other type.

In the case of aerials fed with coaxial feeders the outer braid should be solidly clamped to the earth electrode as shown in Fig 1(d).

Appendix—Copper earthing rods



Plain rods

Length	Diameter	Cat No
4ft	⅝in	B/14
5ft	⅝in	B/15

Threaded sectional rods

Length	Diameter	Cat No
4ft	⅝in	B/12
8ft	⅝in	B/13

Accessories

Rod clamps
⅝in diameter rods, Cat No B/18
¾in diameter rods, Cat No B/19

Rod connectors
⅝in diameter rods, Cat No B/16

Driving bolts
⅝in diameter rods, Cat No B/17
Supplier and catalogue references:
British Central Electrical Co,
16 Banner Street, London EC1.

Editor's note
Type references are AEI, sold by M-O Valve Co, London.

EQUIPMENT REVIEW

Shinwa low-pass filter type 1005S

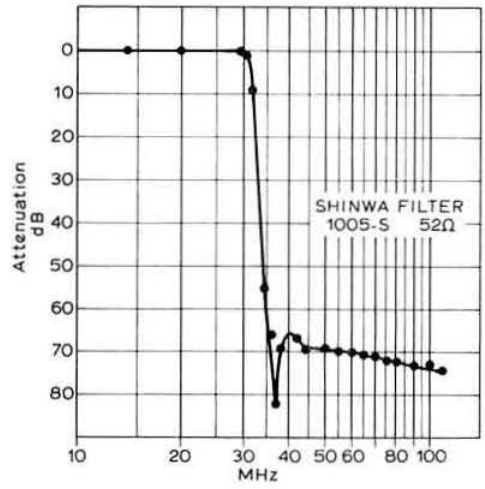
by B. PRIESTLEY, BSc, G3JGO

Following the somewhat disappointing results obtained with the Yaesu-Musen type FF50DX low-pass filter where the maximum attenuation was not ideally placed for the UK Band I television channels, Western Electronics (UK) Ltd submitted a Shinwa filter for test. This is a filter designed for 52Ω circuits, and is known as type 1005S.

It is hoped that this Shinwa filter will be available in the near future from Western Electronics (UK) Ltd, Osborne Road, Totton, Southampton, SO4 4DN.

Attenuation figures were as follows:

14 MHz	0·1dB	29MHz	0·6dB
21MHz	0·2dB	29·5MHz	0·7dB
28MHz	0·6dB		



TECHNICAL TOPICS

by PAT HAWKER, G3VA

RECENTLY, in the course of a 3·5MHz contact, the subject came up of the "old-fashioned" (?) single-crystal filter for cw operation. In practice, since the dominance of ssb for phone working on hf became evident, this type of filter has virtually vanished from the factory-built receivers in favour of bandpass multiple-crystal or mechanical filters. Yet the original 40-year-old filter, when fed into a switchable impedance, with a balancing/phasing variable capacitor and good screening between input and output, has always been—and remains—an excellent device for narrow-band cw working. By using "stenode" tone-correction (*ART*) it is also useful for phone.

This set me thinking about receivers of the 1936–50 era. It is all too easy to list the improvements of current models; the coming of the product detector; the better stability; the tuning rates that allow the tuning of ssb without difficulty; age that functions effectively on ssb and cw—etcetera. Yet, if we are honest, we must sometimes feel that (certainly mechanically) they do not make them so good any more. Visiting the new Telecommunications Gallery at the Science Museum, I noted that one of the exhibits (presented by the RAF) is an AR88 receiver—for many amateurs still by no means a museum piece. One wonders how many of the latest 1972 models will still be as relatively useful in 2002 AD as the AR88, HRO, Hammarlund Super-Pro and the like, with their effective variable-selectivity single-crystal filters, remain today.

If, perish the thought, one was to attempt to draw a moral, it would simply be that the early designers were less imbued with planned-obsolescence and value-engineering and often paid significantly more attention to the mechanical aspects of their built-to-last designs. If it came to a showdown between a good slow-motion drive and digital presentation of frequency, I know which I would pick—useful though the Nixie-tube approach can be.

But what, someone is sure to be saying, about the greater reliability and stability of semiconductors? Well, perhaps. Yet one could quote a recent editorial by Louis Cuccia in *The Microwave Journal* (drawn to our attention by Stan Andrews, G3OGY): "Somewhere back along the line someone invented the phrase 'solid-state means long life' and this fiction continuously crops up." Far be it for *TT* to appear to have developed any form of anti-transistor bias, but it is worth emphasizing that people are at last beginning to weigh up the pros and cons of semiconductors a little more realistically than in the rush to solid state of the 'sixties. What we want to do is to encourage the use of semiconductor devices *for those applications for which they are really most suitable*—and in some other respects to thank goodness for the good old valve! It is often said that if the valve had been developed *after* the transistor, it would have been hailed as the answer to all our problems; as Cuccia puts it in a microwave context: "I can't help but wonder what would have been the impact of a reversal in technology histories—with the solid-state pump coming first, followed in recent years by the announcement of the development of the klystron. I personally feel that a rush to the latter as the glamour device would have occurred."

FM and a push-pull fet vfo

In a recent *TT* (October 1971) some notes were included on the differences between fm and phase-modulation, and reference was made to the problems of linearly modulating an oscillator. But it can be done, and a useful approach (which is also of interest in general vfo application) comes from Peter Cole, VK6AI/G3JFS, in Morley, West Australia. Fig 1 shows his 9MHz push-pull fet vfo for fm working; this is frequency modulated using a pair of varactor (varicap) tuning diodes. The entire unit is substituted for a transistorized ssb generator when he wants to work fm on a 50MHz rig. Local fm operation, he points out, is carried out on net channels using ex-commercial equipment for which the nbfm deviation of 2·5kHz, as used in the UK, would not be suitable.

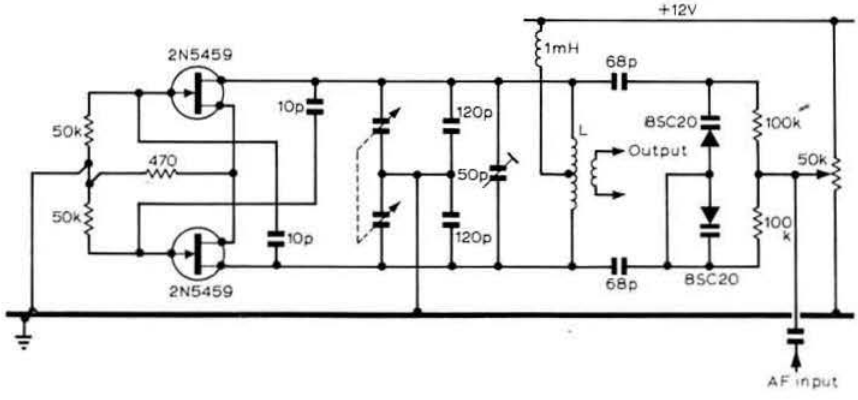


Fig 1. VK6AI's 9MHz frequency modulated fet push-pull oscillator. L is 15 turns, 18swg approximately 1in diameter with two-turn link over the centre. The FETs are 2N5459, and tuning diode varactors 8SC20, but these were chosen simply for availability

The arrangement in Fig 1 was arrived at after several unsuccessful attempts to produce sufficient linear deviation in single-ended transistor circuits without affecting stability. The push-pull configuration has good stability and an LC ratio that is more favourable for deviating with tuning diodes; with a bias of 3·9V to the variable capacitance diodes he can swing the ocillator ±15kHz, with good linearity, using about 1V (peak-to-peak) of audio signal. These figures have been checked with a digital voltmeter and frequency counter.

With the exception of the tuning capacitor and trimmer, the circuit is built on a piece of matrix board; the coil was carefully threaded through the holes, with the remaining components mounted on pins in the board. Once the unit has been thoroughly tested, the coil and components were bonded to the board with a liberal coating of Araldite, producing an extremely rigid assembly, which was enclosed in a rigid metal box.

VK6AI points out that apart from its use for fm, this form of push-pull fet oscillator is worthy of consideration for other applications: it is very tolerant of large changes in LC ratio (his 9MHz unit still oscillates readily, though of course with reduced output, when a 1,000pF silver-mica capacitor is connected across the coil); the waveform is good; and the output level stays reasonably constant over an appreciable tuning range (a 14 to 15MHz unit varied less than 1dB in output across its range).

A cynical view of ssb speech clipping

Stephen M. Dykes comments a little cynically on the recent notes on ssb speech processing (*TT*, November 1971). Even if his views may seem rather strongly put, most amateurs will admit sadly that there is some basis to them. He writes:

"It should be remembered that the power gain obtained by the use of the rf clipper/filter arrangement is measured relative to the power obtained before clipping, assuming that in the un-clipped state the rig is being driven *below* the point at which peak limiting starts to take place. The only amateurs likely to be operating their rigs in this way are those who monitor their outgoing signals with a cathode-ray oscilloscope. And even among those who do monitor their signals, a small percentage may still 'flat top', either because they don't know, or more likely because they don't care.

"As for those who operate at or near the point of peak limiting (anyone with two 6146s drawing more than 75mA or two 6HF5/6LQ6s more than 180mA will almost certainly be one of these), they are in effect already reaping the benefits of rf clipping—albeit at the expense of stations trying to use adjacent channels.

"Mr Average Ham happily shouts the meter of a rig using two 6146s up to 150mA, since this 'seems about right'—with the result that his rig runs with severe flat-topping. The effects of this are: first, to produce distortion products which broaden the bandwidth of the transmission; secondly, to bring up the mean power level. Since most amateurs run their ssb rigs well into the distorted region, few reports are given of the increased bandwidth; usually it is accepted as about normal for the mode. But there is left the high mean level to peak level.

"At the receiving end, the i.f. filter removes the unwanted (out-of-band) distortion products. The result is that the extracted audio is reasonably clean and, what is more, the mean level is high. In other words, the overall system is precisely that of the rf clipper/filter, but with the radio link occurring in the middle instead of at the end. The ssb signal is generated, clipped by the overdriven pa stage, then filtered back again at the receiver.

"For this reason, I doubt that, on the amateur bands, the addition of an rf clipper/filter system would give more than about 3dB power gain over your neighbour—often no gain at all."

Stephen Dykes concludes by disclaiming any intention of building an rf clipper/filter until he is able to tune across the phone bands without hearing sounds similar to men strangling their pet cats. The absence of such sounds might signify that overdriving has stopped—and then there could be significant advantage in speech processing. He hopes to start building soon—but doubts it!

There must be times when some of us still wonder whether the ssb mode is really suitable for general use in the absence of test equipment, including oscilloscopes: we remember this view being put strongly by Reg Hammans, G2IG, even though, back in the early 'fifties he did much to help popularize ssb in the UK.

Phil Coull, G3XVY, draws attention to a method of rf clipping that does not involve the use of a second ssb filter in the transmitter: this is to clip the dsb rf signal before filtering out the unwanted sideband. This technique has been described in *SSB for the radio amateur* (ARRL) as part of an ssb module by ON5FE. It is pointed out that this results in rather more in-band products than when clipping the ssb signal; although G3XVY is not at present using this technique, he feels that it could provide an easy and economical method of clipping.

VXO for 144MHz

C. F. Robjohns, G8CBZ, has sent along details (Fig 2) of the transistor vxo which he has been using recently on 144MHz with a measured drift of 10kHz/hour (after the ambient temperature has stabilized, this figure will decrease markedly). He has been using this in conjunction with the phase modulator included in the October *TT*. With the aid of crystals at 8,021, 8,032, 8,045 and 8,056 he is able to cover the range 144·15 to 145MHz with ease. No special precautions were taken in construction, other than mounting the tuning capacitor away from any source of vibration and varnishing the coil. Since phase modulation is used, the tuning capacitor is not shielded, affording a stabilizing feedback from stray

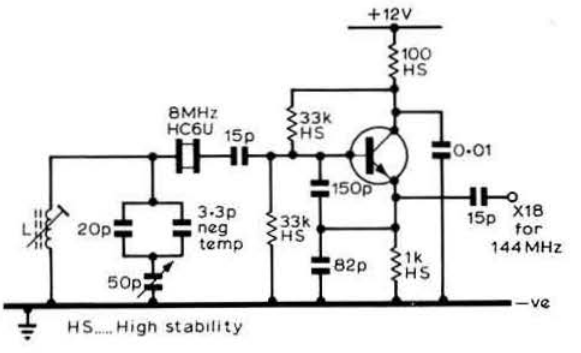


Fig 2. G8CBZ vxo for vhf operation

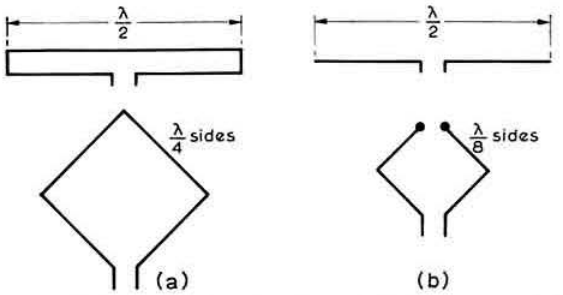


Fig 3. (a) Conventional quad based on folded-dipole; (b) Levy-Quad based on dipole reduces dimensions by one half with lower gain

radiation from the power amplifier. The vxo coil consists of 80 turns, close-spaced 36swg enamel wire wound on ⅜in *iron* (not ferrite) core. Suitable transistors would be 2S103 or BFY11. Capacitors should be silver mica types except the 3·3pF negative temperature coefficient capacitor. G8CBZ powers his unit with very smooth 12V dc, obtained—for example—from two type 996 batteries.

The Levy-Quad

The classic cubical quad, with full-wave loop, and sides of ¼λ makes—it is universally agreed—an extremely fine and effective dx aerial. But for 14MHz, it is big, oh so big! An alternative, half-size form, with some sacrifice of performance, has been around for some time, though we cannot recall it ever appearing in *Radio Communication*. This is the so-called Levy-Quad which is essentially just a ½λ dipole, bent round into a square, with ⅛λ sides and a gap of about 50cm at the top: see Fig 3. It is thus a cross between the usual quad and a Yagi. Feed impedance will be low, and probably the simplest way to feed it is to use a short length of resonant open line or 300Ω feeder with a Z-match or similar atu into coaxial cable.

The attractions of the Levy-Quad, as a simple directional aerial, have been set out again by J. P. Seuillot, F6AMA, in *Old-Man* (No 11, 1971)—the article was originally published in *Radio-REF*. This describes a two-element array, using a reflector slightly longer than the fed element, tuned by means of a stub section. The array uses a boom (2·5m) with cross-pieces formed of plastic tubes, 4m long and 32mm in diameter; these proved sufficiently rigid for a three-band (14, 21 and 28MHz) array. The three driven elements are best adjusted using a dip-meter since because of the bending they will be a little longer than the text-book figure for a dipole; it is also desirable for the current maxima to be in the element rather than in the feeder. For the reflector, the three wires are independent of each other.

F6AMA is apparently well satisfied with the results achieved with this simple quad, though he is unable to provide comparative figures with a two-element Yagi or full-size quad. He points out that this form of construction also offers scope for a 7MHz beam, comparable in size to the usual 14MHz quad.

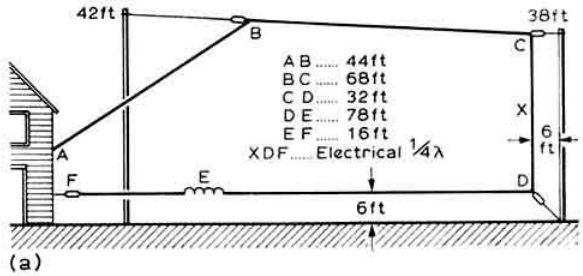
The G8ON multiband aerial

In *TT* (November 1971) a brief note was included on a 1·8MHz aerial used by G3PPE before he went to California; this was likened to the U-type, low-frequency aerial shown in *Radio Communication Handbook* (page 13.45). This led to correspondence with Harold Chadwick, G8ON, whose article ("The Top Band Special", *RSGB Bulletin*, September 1957) was the inspiration for the *RCH* notes. Later he showed ("The G8ON all-band aerial", *RSGB Bulletin*, June 1966) how this configuration could result in an effective multi-band aerial.

G8ON believes that the version built by G3PPE (and reported by him to be very effective but dependent on good earth conductivity) loses some of the basic advantages of the original; further he feels that the simplified diagram in *RCH* may mislead amateurs into thinking of the aerial as a current-fed Marconi. G8ON has been using and evaluating this type of aerial for 15 years; he considers it can perform well even over a poor sandy earth (some disappointments have been reported in areas of good earth conductivity). He also points out that the "in phaseability" between top and bottom wires is important, particularly when using it as a multiband aerial. Like G3PPE, he is convinced of its anti-fade properties, possibly the result of the mixed polarization. The main design aims are to achieve a current maximum at point X and voltage feed.

For those who do not have access to the earlier issues, the basic dimensions of both versions are given in Fig 4, although, if possible, reference should be made to the original articles which provide a good deal of additional information. G8ON has provided some information on 3·8MHz signal strengths during the early morning periods which appear to support his view that the angle of radiation is low. By using a loading coil on 1·8 and 3·5MHz (as described in his 1957 article), the aerial can be put up in less space than a trap-dipole or G5RV aerial, yet is resonant on one more band. But the main point on which G8ON insists is the need to bend the aerial "in the right places"; he thinks that because it is easier to measure current than electrostatic potentials, the importance of the latter tends to be overlooked. Above all he is dismayed by some amateurs who have copied the "U" pattern in the horizontal plane (G8ON reckons this should be fine for satellite working but *not* for terrestrial dx!).

Another type of aerial which he finds effective, and again so often overlooked, is the sloping wire dipole, with the low



	A–B (ft)	B–C D–E (ft)	C–D (ft)	Pole (ft)
1·8 MHz*	44	84	30	38
3·5 MHz	14	52	28	36
7·0 MHz	14	27	12	18
1·8 MHz	44	116	33	38

* Loaded with coil and 11ft of wire beyond E

Fig 4. Diagrams reproduced from the original G8ON articles

end towards the target area; with one of these, with a 30° slope (but broadside to the USA with the high point to the south), he has kept an International Rotary Net schedule on 21MHz for 192 out of 204 Sundays in the past four years —more consistently than some members with beams.

Joost Berden, G3RND/G6AAR/T, is another reader who believes that for simplicity and efficiency there is still much to be said for long-wire aerials; he has a 240ft end-fed aerial, much of it at about 80ft thanks to a mast on an old railway bridge; on 3·5MHz he zepp feeds this with 600Ω open line from a Z-match atu or, alternatively, a Windom which provides a perfect match on 3·5, 7, 14 and 28MHz. He is thus a firm supporter of the theory that "old-fashioned" long-wire type aerials do work very well.

The window-pane simple quad

G8ON also mentions a subject which has long been a favourite theme of mine—that "textbook" aerials are not the only types that can be used, provided always that sound basic principles are followed. He uses no textbook types, even for Band I, III and IV television and Band II sound reception. For example his uhf television aerial is a coaxial-fed centre-tapped two-turn coil, 8in in diameter, indoors,

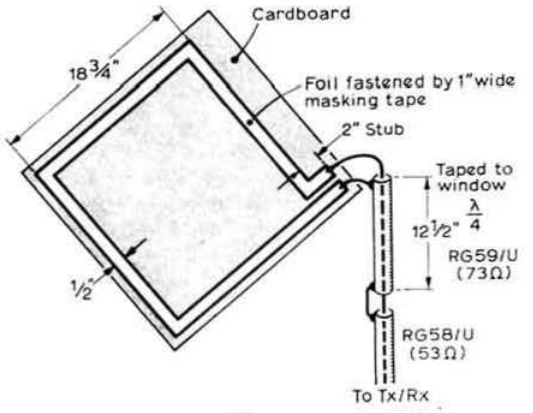


Fig 5. Window-pane single-element quad for 144MHz operation using household aluminium foil mounted on cardboard

4ft above ground, yet 40 miles away from the new concrete aerial-support tower at Emley Moor. One day, he threatens, he will tune his dustbin as a cavity.

This brings us, conveniently, to what George Goldstone, W8AP, describes in *QST's Hints and Kinks* (September 1971) as "a quickie quad for two". This is another aerial based on the use of household aluminium foil, mounted on a sheet of cardboard and taped to the inside of a window: see Fig 5. It looks as though it could form a useful travelling or alternative address aerial for local—and not so local—144MHz operation.

Construction is roughly as follows: Cut a piece of aluminium foil to the outside dimensions, and a piece of cardboard of the same size. With one-inch masking tape fasten the foil and cardboard sheets together on the window. Cut the inside of the foil out with a razor, taking care not to go through the cardboard and scratch the window. Then tape the inside edge of the foil to the cardboard, leaving the 2in slit free of tape. The ‡λ matching transformer reduces the

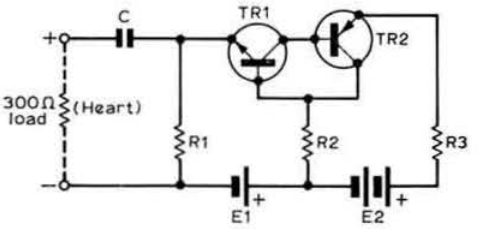


Fig 6. The GE Pacemaker pulse generator

feed-point of about 100Ω to match the 50Ω coaxial. The aerial when arranged as shown results in vertically polarized signals: if it is moved around through 90° so that the feed point is at the bottom of the square, the signals will be horizontally polarized.

Pulsemaker

From the medical world of pacemakers, Dr Tony Carr, G3OSU, has noted a useful and simple form of pulse generator capable of providing 4V pulses of about 8ms duration at a rate of 70 per minute. The circuit (Fig 6) comes from page 300 of the book *Cardiac Pacemakers*, by Siddons and Sowton, published by Chas Thomas, Springfield, Ill, USA. Unfortunately component values were not given, but since the principles of operation are simple it should be possible to find suitable values by experiment; power in the original GE Pacemaker form comes from five miniature mercury cells. The basic arrangement could be useful for a number of applications.

Ring-diode mixer modulators

In recent years many references have been made in *TT* and elsewhere to the value of the ring diode mixer/modulator, especially as a means of achieving wider dynamic ranges in semiconductor front-ends; we have also reported the important series of theoretical papers on mixers by Dr J. G. Gardiner. Therefore, it seems worthwhile drawing attention to the coming together of these two matters in the paper "The signal-handling capacity of the square-wave switched ring modulator" (Dr J. G. Gardiner, *Radio & Electronic Engineer*, October 1971). This gives a detailed (and pretty tough-going) analysis of the effects on dynamic range of this type of mixer resulting from degrees of mis-match. He shows, for example, that this can effect the maximum signal that can be applied without resulting in cross-modulation by a factor of two to one. He also points out that where noise factor considerations are all important (for example in vhf practice) a degree of deliberate mismatch may be preferable to protecting the stage by means of an aerial attenuator. He indicates that using Schottky-barrier (hot-carrier) diodes such as the HP2900 it is possible to obtain negligible cross-modulation with interfering signals up to and beyond 500mV, provided that careful consideration is given to factors such as load and input matching, and the use of a square-wave switching waveform.

Mini-band 144MHz converter

An unorthodox but interesting approach to 144MHz converters has been adopted by P. W. Haylett, G3IPV. For some time he has been looking for a way to improve the

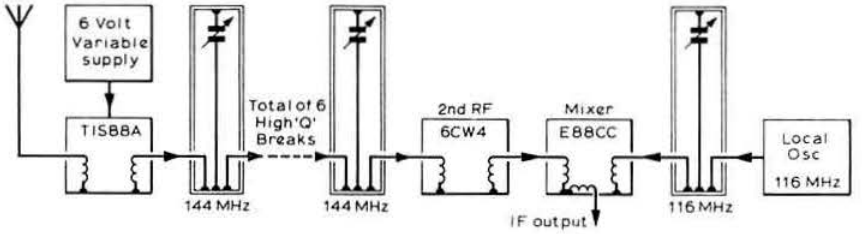


Fig 7. 144MHz converter with high front-end selectivity as used by G3IPV

conventional 2m converter and experimenting in the reduction of noise by reducing the bandwidth of the rf stages. To do this he has inserted a large number of high-Q breaks between the first and second rf stage: Fig 7. When carefully adjusted, he has a noise bandwidth of about 50kHz from the first rf stage which uses a TIS88A. In order to keep the system stable, the supply volts to the TIS88A are progressively reduced. He has been very pleased with the results (unfortunately he is not in a position to measure performance accurately) and the system has also been adopted by G3TTB. Personally, we feel a little doubtful about the signal handling capabilities of the broadly-tuned first stage, particularly when this is operated with low supply voltage; nevertheless the system is not without interest, particularly for those who believe in front-end selectivity as opposed to broadband converters.

Variable-selectivity i.f. technique

It seems a long time since any serious attempts were made in domestic broadcast receivers to provide variable selectivity. Indeed, in general one feels that medium-wave reception has long been allowed to drift into the doldrums with set-makers saying that it is no good taking much trouble in view of the overcrowded state of the European mf spectrum. Yet, as we have noticed recently, even today a good receiver with a long outdoor aerial can still bring in many different stations with clear reception.

Recently, in the Yugoslav journal *Radio Amater* (September 1971) we found a technique (originally described by Siemens in Germany) using a variable capacitance diode to modify the bandwidth of i.f. stages. Several arrangements were shown, the simplest being that of Fig 8; also shown were some rather more complex, multi-diode configurations that provide rather more symmetrical response curves.

On the subject of tuning diodes, we note that Siemens have recently developed a new triple diode (BB113) intended primarily for use in a.m. car radios; this is claimed to have much improved large signal performance and also to make possible good tracking on mf.

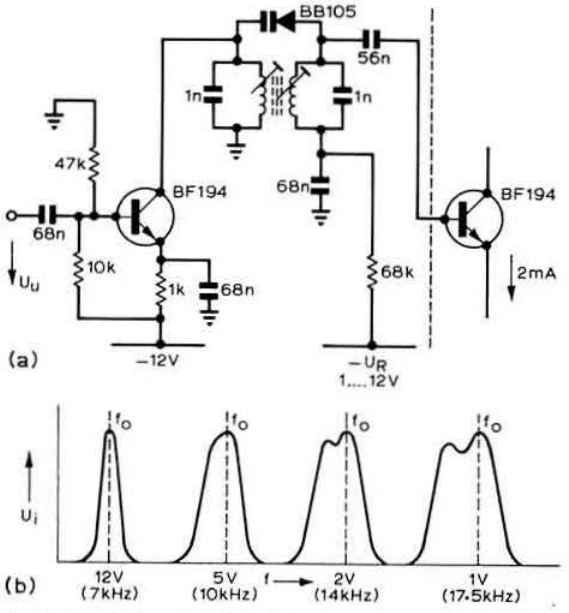


Fig 8. Variable selectivity i.f. arrangement using BB105 variable capacitance diode; greater symmetry of response curve variation can be achieved using more diodes

General purpose power unit

From LA4HK's "Teknisk Brevkasse" (*Amator Radio*, Nr 10, 1971) comes a general purpose power supply which, while perfectly orthodox, is the type of unit which can find many uses for the transmitting amateur: Fig 9. The current ratings will depend on the transformer used.

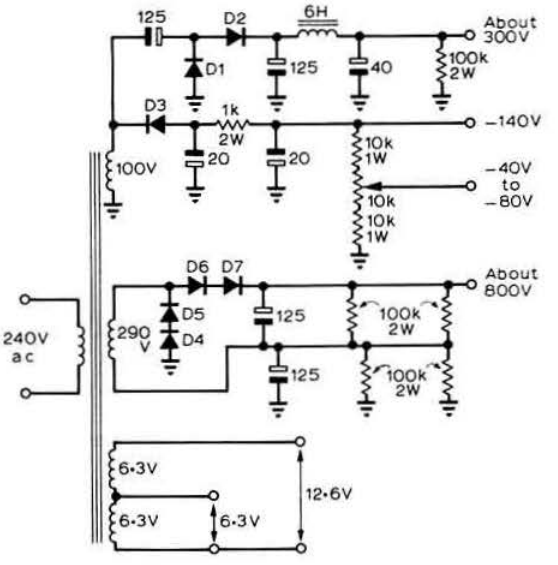


Fig 9. General purpose power supply using BY100 or equivalent silicon diodes

Here and there

A note from Terry Roeves, G3RKF, who is marketing manager for MCP Electronics, indicates that a number of rf power transistors are being offered to amateurs at much reduced prices; in some (but not all) cases the types are becoming obsolete, but are still likely to be very acceptable for amateur operation. They can be obtained in small quantities from Langley Electronics, Langley House, 60 Abbots Road, Abbots Langley, Hertfordshire, or from Terry Roeves at MCP Electronics Ltd, Alperton, Wembley, Middlesex, HA0 4PE. The types involved include: 2N4427, 1W output to 175MHz, 12·5V, 10dB gain, 75p; 2N3866, 1W, 400MHz, 28V, 10dB, 75p; PT3501 2W, 175MHz, 12·5V, 10dB, 80p; PT-6D 10W (a.m.) to 144MHz, 12·5V, 5dB, £1.75; PT-22 7W (a.m.) to 72MHz, 12·5V, 7dB, £1.25; and BFY90 (£1) or its plastic-encapsulated equivalent BF377, 75p.

The mystery about the "NASA" filter (*TT* September, Fig 2) may have been punctured by Gerald Lander, HB9AJU/G3OOH, who stresses that the circuit appeared in the *April* issue of *Radio-REF* with the alleged NASA engineer called "Scherz" which is German for "joke". We always hesitate to take *any* information from the April issues of amateur journals, but this time it may well be that we were taken in! But we would stress that our commentary on this matter of unnecessary audio frequencies is by no means an April fool topic!

SWL NEWS

by ROBERT A. TREACHER, BRS32525*

This is the start of a regular feature designed specifically for the vast number of short wave listeners who are members of the RSGB. Its continuance is entirely in the hands of you, the SWLs. Following the publicity given in several issues of *Radio Communication*, I have received numerous enquiries offering contributions and assistance; this is most gratifying and I trust the interest will be sustained.

First, a few words about myself. I am 22 and have been an swl for about six years. My main interest lies in phone dx on all bands, although 80m is the band I prefer most of all. The receivers in use are a Sommerkamp FRDX500, with the Minimitter MR44/11 and Codar T28 as standbys. The aerials are a long wire and dipoles for the hf bands and inverted-V dipoles at 30ft for 40 and 80m. I have heard 260 countries and have 208 verified, and also have an interesting collection of awards, including DXCC.

SWL help needed

The TVI Committee of RSGB is anxious to learn what proportion of licensed operators in built-up areas goes on the air on the 14MHz band either on phone or cw during tv hours. The SWLs part in this is to monitor and log British Isles stations heard during these times and send a comprehensive report to RSGB HQ whenever they wish, giving callsigns, times, phone or cw and their times of going "on and off listening watch". Signal strengths are not important but a series of reports (sent in one envelope) will be most useful. Any station noted as operating for an extended period should also be indicated.

It is hoped that SWLs will give this venture their full support. In this way it will encourage the swl in the knowledge that he has a real part to play in the amateur radio movement.

Band conditions and reports

Each time this column appears (we hope it will be at two-monthly intervals) we will endeavour to give a brief resumé of dx conditions on each band with a list of the more exotic calls with time heard, etc. Recently band conditions have, in general, been rather poor. This is not surprising bearing in mind the sunspot number for November. Apart from an early morning flurry of activity from the Pacific and openings to Africa and the Caribbean during early evening hours, 20m has been disappointing. Signals from VK and ZL are audible on 15m during morning hours when they are not engulfed in the stronger JA QRM. Ws dominate the afternoon and early evening session on this band. The lower frequency bands, and in particular 80m, have been in very good shape. There has been a great deal of long skip conditions on both bands and some exotic dx has been logged. The following have been heard on ssb during November.

10m: 7Q7BC 1144, 9J2DT, 1035.

15m: JD1ABZ 1018, KX6IJ 0800, VQ9R 1350, 5T5AD 1011.

20m: EA9AI 0826, FB8WW 1534, HR1RF/KS4 1819, KG6JAJ 0826, KW6GJ 0641, MP4MBC 1532, ZS2MI 1712.

40m: CR4BC 0028, EQ2BQ 1915, HP3ML 2248, WB4RJK/TF 1900, ZD3Q 1910,

80m: DJ6QT/CT3 1916, EQ2DX 2242, FP8CT 2330, KP4AN 2327, KV4FC 2332, OD5HB 2218, PZ1CU 2240, VS6DO 2303, ZD3Q 2227, 3A0FN 1932, 5X5NK 2011, 9G1DY 2256, 9K2AL 1904, 9Y4VU 2241.

160m: DK3BJ 2105, DL5XF 2058.

SWL awards

It is hoped to give details as space permits of awards which are available to SWLs.

City of Gwelo Award: GCR list with full log data (say if QSL to hand). To qualify, five QSOs from 1 January 1971. Same station of different bands counts as separate QSO.

* 392 Rochester Way, Eltham, London SE9 6LH.

Six IRCs to Awards Manager, PO Box 605, Gwelo, Rodesia.
HCV: Awarded for hearing Cray Valley Radio Society stations. G SWLs require 15 points, European SWLs 10 points, dx SWLs five points. One point for each member heard, three points for club station. Cost 10p. Full details plus list of CVRS members from the writer or 5 IRCs.

A heavy mail

Bernard Hughes, BRS25901, joined the RSGB in 1964 and runs a Trio JR310 feeding into 10/15/20m dipoles. He hopes to have a Moseley trap dipole in use in the near future. A member of CHC/FHC, Bernard has 103 awards and has 288/324 countries verified.

From Mike Hardy, ZE101, we hear that ZE6JL has recently erected an 18AVT vertical and will be concentrating on 40/80m in an attempt to obtain his 5BDXCC. Norman Henbrey is also the proud owner of an FRDX500 and he is hoping to go vhf with a 2m converter to an 8/8 Yagi at 35ft. Norman is very keen on contest work and usually participates in the RSGB listeners contests.

When T. P. Ellis, A7791, wrote, he was deeply involved in "O" levels, so amateur radio has regretfully had to take second place—it must be remembered that amateur radio is a hobby and one must tackle the homework first! He raises a very topical point regarding Russian prefixes: much confusion has arisen with the advent of the UK prefix. A full list of these prefixes is given on page 38 of the January 1971 *Radio Communication*. As for an RAE course at Guildford we do not know of one; write to your local Education Authority and they will supply you with a list of centres where the RAE course is offered.

Fred Day, BRS30033, is a resident of the delighfully named village of Cherry Willingham, near Lincoln. Fred has recently moved QTH but the equipment should now be re-installed. CW is Fred's main pleasure—as he says, after 15 years it is hard to shake off! If anyone has information on the Wireless Set No 31 Mk 1/1, Fred will be pleased to hear from him. His QTH is 5 St. Mark's Avenue, Cherry Willingham, Lincoln.

The main interest for BRS30484, Jim Batchelor, is in rtty and for this he has a Creed 7B with terminal unit tuning scopes. His station covers from 45kHz to 148MHz and he enjoys a considerable amount of success with this form of listening.

Basil Coffey, BRS32395, has been interested in SWLing for some 30 years and for much of the time has devoted his attention to commercial short wave stations. However, he recently acquired a Hallicrafters SX28 and a B40 and ventures further into the realms of amateur radio, which he is not regretting.

An interesting letter from Pat Curley, BRS32707, remarks on lf band aerials. The best type for catching the dx is perhaps a vertical, but for the swl with limited aerial space an inverted-V dipole is probably the best type to use. These aerials are very popular and very effective, and erected properly they can be surprising with the strength and type of dx which can be heard.

Future plans

Because of the limited space, it has been impossible to include all the news and comment which is to hand. However, I hope those correspondents not mentioned will not be too disappointed.

It is hoped to have a regular contest section giving details of those contests in which swl entries are permitted.

Black and white photographs of swl shacks will be welcome and will be returned if requested.

It is also intended to incorporate a countries heard table —1·8 to 28MHz starting on 1 January 1972. All contributions for the next *SWL News* to reach me by 1 February 1972.

NEW PRODUCT

Solid state receivers

A new range of solid state hf receivers is announced by **Racal Communications Ltd.** Designated the RA1770 range, the receivers comprise free-tuning versions and synthesized versions covering the range 50kHz to 30MHz. The RA1770 free-tuning receiver has the tuning range divided into 1MHz bands with an effective film scale length of 30ft. Up to six crystal-controlled channels may also be accommodated. Demodulation facilities for ssb, cw and a.m. are fitted with options for isb and fsk. The manufacturer claims that the specifications are superior to other receivers currently available, including those using thermionic tubes. Integrated circuits have been used where these offer advantages.

While it is doubtful if many of these receivers will yet find their way into amateur stations, the design features will be of interest to many. Details from Racal Group Publicity and Technical Services, 26 Broad Street, Wokingham, RG11 1AJ.

The RSGB News Bulletin Service

The RSGB News Bulletin, callsign GB2RS, is broadcast every Sunday morning. This bulletin can be received on either vhf or hf, which gives almost complete coverage of the British Isles. It keeps radio amateurs up-to-date about happenings in the world of amateur radio and gives information on coming events, supplementing and bridging the gap between successive issues of *Radio Communication*.

SCHEDULE

Time (bst)	Frequency (MHz)	Location and coverage (hf) or beam heading (vhf) of station
0930	3·6	Bromley, Kent (SE England)
1000	3·6	Cheltenham (SW England)
	145·8	Aberdeen (NNW)
	145·095	Farnham, Surrey (NE)
1015	3·6	Belfast (N. Ireland)
	145·8	Bangor, Co Down (N)
1030	3·6	Derby (N. Midlands)
	145·8	Aberdeen (SW)
	145·89	Bishop Auckland (N)
	145·3	Sutton Coldfield (NW)
1045	145·89	Bishop Auckland (E)
	145·095	Farnham, Surrey (SW)
1100	3·6	Bridlington (NE England)
	3·6	Aberdeen (NE Scotland)
	144·3	Sutton Coldfield (SW)
1130	3·6	Motherwell (S Central Scotland)
	145·5	Bradford (NE)
1200	145·5	Bradford (SE)

Exhibitions — Beacons — Conventions — Contests — Local events Rallies — Scientific projects — Meetings — Licensing — Clubs Propagation reports — Lectures — Field days — Expeditions

FOUR METRES AND DOWN

by JACK HUM, G5UM*

Propagation pointers

From F8SH a thank-you to all G-men who were able to send him info on the sporadic-E happenings on 2m of 24 May last. Many more logs for that date, *and also for the historic "E" opening of 4 July 1965*, would be welcome. When his study is finished he proposes to send a review of the phenomena to URSI. Meanwhile, he asks for the following in respect of the above dates:

Callsigns and QRA Locators of stations at both extremities of the circuit: Time (gmt); Reports exchanged between stations; Callsigns and QRA Locators of stations which were *heard only* during the "E" openings referred to.

Write to S. Canivenc, F8SH, 6 Rue de Pont-Hele, 22 Perros-Guirec, France.

* * *

The day the balloon went up was 19 September last. Many G-men unable to hear Sonde 4 were heard commenting that ". . . it must be a *canard* or dead duck". In fact, it did fly, and according to *Radio-REF* rose to an altitude of 16,000m, very favourable to the promotion of numerous contacts within France and between F and neighbouring countries. Best dx achieved appears to have been F9XG, Le Havre, with OE2OML—and all this on an up frequency of 432MHz and a down frequency of 144MHz with 4W of rf behind it.

Three met balloons were used for the lift, and remained up for over four hours with the two radio modules suspended beneath them.

* * *

From OE6AP a request for meteor scatter schedules with any cw stations anywhere in the British Isles on 144·100MHz. He has been doing m-s for many years, with particular success northwards to SM6BTT. His 40-el beam is powered from a 4X250A. Receiver front-end : TIS88A. Letters to Alois Pendl, Pludemangasse 48, A8010, Graz, Austria.

* * *

Ron Ham, BRS15744, reports a big solar noise storm from 16-20 November coincided with bad weather conventionally associated with poor vhf propagation. But did it? There might have been some "anomalous". Check logs to see.

* * *

Plotting his GB2RS coverage from 18 months of reports and QSL returns, Mike Hearsey, G8ATK, notes that the 10am transmission from Farnham gives the expected NE service area out to the Norfolk coast, but that the 1045am bulletin to the SW goes considerably further, helped by a sea path after the signal leaves the Hampshire coast. A regular listener is George Carter on Alderney, who produced some useful information on possible side-lobes from the G8ATK aerial (most of us have these, their amplitude dictated by site and power level). This explains why members in Bristol, which is to the west of Farnham, receive a good GB2RS service when the 'ATK beam is, in fact, headed SW.

Four metres and down certificates

To bring the Four Metres and Down Operating Awards story up to date to the end of 1971 we list the certificates allocated since last month's annual table was published. *70MHz Transmitting:* 89 G3REP. *144MHz Transmitting:* 240 GI8AYZ/P, 241 G8CPG; 242 G3NHE; 243 G3DAO; 244 G4ADE. *432MHz Transmitting:* 83 G8AAC/A, 84 G8CIT.

Further to QSL return rates (*FMD* last month), G8CIT reports 40 per cent from 196 stations worked on 432, compared with a 35 per cent return on 2m. Now he is heading for the prestigious *432MHz Senior* backed by 38 counties and eight countries worked ". . . but the countries are proving difficult to obtain cards from".

The difficulties transmitting men have in prising QSLs from absent-minded or uncaring colleagues are doubled in the case of the BRS men (BRS means British Receiving Station, and the number is allotted by the RSGB to corporate members who are not licensed: this explanation will answer many enquiries we get on this point). For the BRS, the Four Metres and Down Certificates rules are the same as for the full-call holders (copy from G5UM if sae sent). But he is up against the handicap that to send reports to vhf stations in his neighbouring counties is of little value when it is known that big signals are laid down over a fair distance. This reduces him to sending reports to the distant ones, probably fewer in number.

Last month's annual table showed only 28 listeners' awards, with the redoubtable Ron Ham, BRS15744, heading three of the four receiving sections. These sections will fill up as BRS and "A" (RSGB Associate member) activity increases on vhf/uhf, and more transmitting men reply to the QSLs-with-sae which are invariably sent.

Big contests are the time for the BRS to excel. Ron Ham's friend and neighbour Terry Cooper, BRS28005, had a field day when no portables were about, meaning the 144MHz Fixed Contest of 5 December; he logged 88 stations from Paris to Scotland. If a reasonable QSL return occurs he will be able to claim a place in the *144MHz Receiving Section.*

Further to that 144MHz Fixed. . . .

Contest commentary

The eight-hour 2m event of 5 December, home stations only and no portables making the running from advantageous sites, brought what G3PKV described as ". . . a staggering activity level, almost like VHF NFD at times". The 100-stations-worked target was exceeded by many participants well before the 5pm deadline. To dodge the A3

* Houghton-on-the-Hill, Leicester LE7 9JJ

QRM many resorted to A1—and doubled their ranges even under the "up" conditions prevailing. Said G6XX: "It's quite like an old-timers' contest", remarking on the dozen G6-plus-2 heard wielding the key, among them one of the most famous of all, G6CJ, "aerial king" Charman, now located in delectable Dorset, and recommissioned on 2m only the day before the contest.

Reminder: The 2m sideband event is right upon us, 9 January. Then come the 70cm Cumulatives, which will be new to the one or two hundred men who have started on 432MHz since last year's Cumulatives took place.

How good?

Natural optimism as 1972 opens needs to be tempered by recollection of two sharp jolts to the vhf movement in 1971, one from the Society's VHF Manager addressing the Midlands VHF Convention in June on the theme of "We must be better at our business", the other from the Geneva Space Conference, with alarming implications that we must indeed be better at our business if the movement is to survive in any positive or worthwhile form.

At Geneva, nations known for their sympathetic attitude towards amateur radio in the past showed that they do not have it today. To re-establish our credibility in their eyes, and sustain it in the eyes of our own sympathetic licensing authority, is one of the major jobs to do in 1972.

What we say over the air—how we go about our business —represents our image both to the listening world of officialdom and the mass of broadcast listeners with their cheap, general coverage vhf transistor receivers.

* * *

There is also the image which we present *to ourselves*, the opinions we form of our fellow operators, whether they talk a load of rubbish over the air (goading others into praying for the day when they will either grow up or give up), or whether, like the great majority of metre-wave people, they radiate good sense with good signals.

"Good signals . . .". Here is something that grows in importance almost month by month. The technical demands upon an expanding vhf movement become increasingly stringent as our numbers multiply. A population explosion such as the one we have on 2m already brings its own pollution problems.

This pollution comes from people who fail to ensure that their equipments are "livable-with" by others sharing their bands—and some of these may be only a short distance away.

Obvious elementary cures for radio-pollution are: avoid overmodulation or (on nbfm) excessive deviation, and on cw key a low current line to minimize key clicks: *never* swish a vfo over the band with carrier on, co-channel with a wanted station only if a net is to form up, otherwise sit a few kilohertz away to avoid blotting him out; if you are a wanted station announce "Listening 5 up (or down)", not "On this frequency".

Less elementary are the engineering problems involved. Being better at our business means bettering professional standards of −60dB rejection of unwanted products. The amateur should aim at −90dB. Failure to achieve it means his neighbour in the next suburb detects his unwanted products where they should not be.

How to achieve engineering standards better than the professionals' when we as amateurs do not possess their test equipment facilities? Collective club effort using a centralized pool of instruments is worth considering; or it is possible to invoke self-help in the manner of two Sussex members who beamed QRO sideband transmitters at each other three miles apart, checked 2m for unwanteds, then cleansed the transmitters until they were removed.

Where the other man's standards fall, say so. *Tell* him when he swishes his vfo, *tell* him when his ssb is detectable where it should not be, *tell* him if his note is T7 (this will help him make it T9). If through these actions friends are lost they are probably well lost anyway. Most vhf workers are responsible people who respond to responsible leadership and responsible comment—and for this reason there is every hope that in spite of present pressures the metre-wavebands will continue to offer more pleasure and rewards than any other part of the amateur spectrum, so long as we continue to strive *to be better at our business.*

A window on 2m for GM and GI

Zone D of the 2m bandplan extends from 145·5 to 145·95 MHz, which is to the edge of the beacon band. It is heavily occupied by G stations over a huge area of northern England, and by stations in Scotland and Northern Ireland. This means that the GM and GI men, suffering a permanent overlay of QRM from stations in the thickly populated areas south of the border, have a good case for requesting the use of a zone for themselves.

Rather than alter the existing simplified 2m bandplan in view of the efficacy with which it functions, it is suggested that G operators in Zone D should voluntarily allow a frequency window 100kHz wide to be opened for the GM and GI operators.

If the area 145·85 to 145·95MHz is left clear for use by stations in Scotland and Northern Ireland these will stand much more chance than they do at present of being heard at a distance. In turn, G stations will stand much more chance of working them.

So the drill for English stations is: keep below 145·85, turn beams north-west and watch the "window".

For the record—distances

The panel we now feature in *FMD* stating metre-wave distance record claims is intended to be current, not historic. In other words, it is to show the standing records of today, not "firsts" made in the past.

Today's achievements are frequently established on the basis of others' pioneering work. In this context it is worth noting that as long ago as 1960, GW3IUD/P on the Great Orme covered 80 miles to G3NLZ/P in the 2·3GHz band; two years later he worked 38 miles from Mow Cop on 3·4GHz to G3NLZ/P on Winter Hill, both believed-records in their time.

Our VHF Distance Records panel will include claims made for QSOs completed on any vhf/uhf band by "natural" means, ie via aurora, tropo, m-s, but not via satellites natural or artificial, nor via repeaters.

If *your* best dx exceeds the QRB at present shown in the panel send details to *FMD*.

To correlate metre-wave records internationally, this subject will be on the agenda for the IARU Region 1 Conference in Holland in May.

For the record—microwaves

At its last meeting the VHF Committee asked that the rules for claiming the new Microwave Certificates should be restated.

This award will be made in respect of your *first QSO* beyond 500km on 13cm, 400km on 9cm, 300km on 6cm, and beyond 150km on 3cm and 15mm. Thus, a total of five certificates is available to microwave men for the initial QSO they effect on the above bands, over the prescribed distances.

Microwave claims, supported by QSLs, to G5UM, please.

Further to microwaves, over now to Dain Evans for info about the events of 25 September last. . . .

150km on 3cm

Much of the success of the 25 September microwave expedition which saw the Bristol Channel spanned on 3cm beyond the 150km "certificate distance" may be attributed to careful optical alignment tests made the weekend before over a 30-mile clear path between the Surrey and Middlesex hills.

Dain Evans, G3RPE, says: "The main purpose of these tests was to calibrate sighting devices mounted on the relatively large (4ft and 3ft) dishes in use. Once set, these sights enabled the dishes to be pointed in any particular direction within a degree or two, besides checking that the dish was angled correctly in the vertical plane." Over this 30-mile path signals were so good that even with a 30dB attenuator in one aerial they suggested there would be at least 20dB in hand over a path three times as long, provided it was still optical.

Arrived on site on Dartmoor, there was alarm at G3ZGO/P when GW3RPE/P was only S1-3, in spite of careful optical lining up. The reason soon became clear: the dish had been precisely aligned on the wrong tor ("They all look the same anyway", remarks 'ZGO). A small angular adjustment brought signals up to RS59 both ways, still readable with a 20dB attenuator in the aerial feed, or when a 1ft horn was substituted for the 3ft dish.

Then followed the GW3RPE/P to G8APP/P contact for the UK record of 153·8km plus 1ft on 3cm.

Brief technical details of the equipment used:

G3ZGO: Gunn diode receiver, 5mW output to a 4ft dish. Single-ended mixer 1N23WE to a 30MHz i.f. amplifier (modified tv i.f. strip) fitted with an fm detector and afc.

The Dartmoor end of the record making 3cm contacts between G8APP/P (twin dishes at left), G3ZGO/P (4ft dish at right) and GW3RPE/P across the Bristol Channel. Says G3ZGO/P "The difficulty in identifying the right tor for aerial alignment purposes will be appreciated from this picture"

BEACON STATIONS

Callsign	Location	Nominal frequency	Emission	Aerial direction
GB3ANG	Angus	145·95MHz	A1	SSE
GB3CTC	Redruth, Cornwall	144·13MHz	A1	ENE
GB3DM	Burnhope, Co Durham	145·975MHz	F1	N/S
GB3GW	Swansea	144·25MHz	A1	ENE
GB3GM	Thurso	70·305MHz	A1	N/S
GB3GM	Thurso	145·995MHz	A1	N/S
GB3GEC	W. London	433·45MHz	F1	N/W
GB3SC	Sutton Coldfield	433·50MHz	F1	N/S
GB3SU	Sheffield (temporary location)	70·695MHz	A1/F1*	Omni
GB3SX	Crowborough Sussex	28·185MHz	A1	E/Omni
GB3SX	Crowborough	70·699MHz	A1	N
GB3VHF	Wrotham, Kent	144·500MHz	F1	NW

* Callsign on F1 continuously, on A1 once a minute. When on A1, F1 is suppressed

G3RPE: Gunn diode transmitter, 10mW output to a 3ft dish. Receiver: Gunn diode local oscillator fixed tuned to 10,200MHz, single-ended mixer CV2154 to 130–180 MHz tunable i.f., to 30MHz second i.f.

G8APP: Klystron K337 (CV2304) transceiver to two 2ft dishes. Balanced mixer (CV2154, CV2155) to a 30MHz i.f.

From the above it can be seen that none of the equipment was very special in any way.

Beacon news

For the super-dx observer two 6m beacons are ZS6VHF on 50·1MHz on high ground near Jo'burg, radiating Friday night to Monday morning every weekend; and ZC4VHF on Cyprus, planned to put out 20W on 50·5MHz into an omni-vertical. Mode: fm with 1kHz tone and callsign once a minute. Man behind the project is ZC4TE, chairman of Limassol Amateur Radio Club, or, in RAF language, Ch Tech Evans, B. W., 12SU, RAF Episkopi, BFPO 53.

Tech Corner

From G8CYK (Bill Poel, of Brentwood, Essex)

One of my main headaches with vhf transmitters has always been how to modulate properly, and deeply, with transistor circuits. I cannot get commercial modulation transformers with (*a*) correct input and output impedances, (*b*) correct turns ratio, and (*c*) sufficient iron in the core to obviate saturation caused by the high currents involved with transistors—and all this in a size that will not make the bench sag!

By chance I stumbled across a local firm, Drake Transformers, 69 Kennel Lane, Billericay, Essex, whose Mr Daniels immediately offered me much assistance with my problem, offering to design a modulation transformer to any specification required. The charge for all but the most complex units is £4, and much less if a quantity is bought. All I had to do was to state power, audio and rf, and the current in the windings, with an af frequency range required.

Current VHF/UHF Distance Records

Band	QRB	Date	Participants
70MHz	1,150m	27 June 1969	G3JVL-TF3EA G8LY-TF3EA
144MHz	Claim awaited		
432MHz	620m	17 May 1959	G2XV-SM6ANR
1296MHz	Claim awaited		
2·3GHz	100m	11 May 1969	G3EEZ/P, G3BNL/P
3·4GHz	54m	11 Sep 1969	G3EEZ/P, G3BNL/P
10GHz	95¾m	25 Sep 1971	GW3RPE/P, G8APP/P

Claims for current distance records established on all bands from 70MHz upwards are invited and will be included in this table until bettered.

From G8DWC (Vince Taylor of Watford)
Further to recent comments about methods of pulling crystals to give a reasonable frequency swing at 144MHz, I find that a 50pF variable *in series* with my 8MHz crystals purchased from Senator Crystals will pull the 2m frequency by as much as 120kHz using an EF91 in the usual Colpitts configuration. Although this may be an old dodge there may still be some readers of *FMD* who have not tried it.

Here and there

If a microwave expedition is contemplated please give *FMD* as much notice as possible so that full details of site, frequency, dates and times may be printed here to alert others.

* * *

"While in port I have entertained aboard, and been entertained ashore, by a great many vhf amateurs all over the country. It's been really great, and I've made lots of new friends. I've even had 2m people waiting for the ship to dock at anything up to 2am and 3am, and that's keenness for you!" —G3UGF/MM.

* * *

"The University of Manchester Institute of Science and Technology Radio Society (UMIST) hopes soon to have 90W of rf into a 14-element aerial 280ft agl, using G3ZSS/A. The other UMIST callsign, G3CXX, is lf bands only, in a different part of the campus. G3VUM is the callsign of Manchester University, a completely separate organisation" —G3ZSS, Peter Bacon (home QTH, Lichfield).

* * *

"A disturbing anti-social habit of some G6 - - - /T men is to radiate extensive video tests below 433·5MHz, rendering the phone section useless to others"—G4AGQ.

* * *

No, the VERON callbooks are not quite sold out. A few are still to be had from G5UM at 50p each including postage.

* * *

"Sorry to hear *FMD* is to be compressed into four pages instead of five. I was looking forward to six. Subversive thought: how about a new column exclusively devoted to 70cm . . . say, '432MHz and Sideways'?"—G4AGQ.

* * *

Video night on the air in Bedfordshire is Wednesday from 8pm. At least four /T members of the Dunstable Downs Radio Club appear between 435-437MHz, accompanying sound channel on 145·05, the club's net frequency. They look for video QSOs beyond Bedfordshire.

* * *

"Can spring be far behind?". Many groups will now, in the dead of winter, be planning microwave expeditions for a few months' hence. Please give G3RPE and/or G5UM advance details well ahead to alert other groups. Preferred talk-back channel on such occasions is 70cm, but 2m if all else fails.

25 YEARS BACK

"Following the Annual General Meeting, Dr H. G. Booker, of Christ's College, Cambridge, lectured on "The Dependence of Ultra-Short Wave Radio Propagation on the Weather".—*RSGB Bulletin*, January 1947.

VHF Contests and their organization

by JACK HUM, G5UM

Last year about two dozen contest events on bands above 30MHz were organized by the RSGB. In every month of 1971 at least one, sometimes more than one, metre-wave contest took place. In 1972 the pattern will be similar.

Clearly, a big following exists for vhf/uhf competitive events (and receiving ones, too, for there are due rewards for effort by the BRS-men). Year by year the number of participants increases, with VHF NFD absorbing the greatest effort measured in terms of the number of persons involved (about 25,000 QSOs are exchanged that week-end).

The publication in this issue of the General Rules for VHF/UHF SHF Contests in 1972 raises the curtain on a fresh year of competitive activity that will do much to improve further the performance of equipment and operators alike. That is one thing: another is the opportunity contests provide for the mass observation of metre-wave phenomena over a concentrated period of time. The unexpected often happens on vhf/uhf: sometimes it happens when one or two thousand observers engaged in a contest are present to witness it. Useful scientific spin-off derives from this.

Already the first contest of 1972 is almost upon the VHF Contests Committee while it is still dealing with the backlog of 1971. How do its members operate? Their philosophy may be expressed thus: "The whole aim of the adjudication process is to produce a fair and accurate results table as quickly as possible".

As soon as a contest entry is received, the adjudicator for the particular event deals with any requests for acknowledgment or for stationery, and when sufficient logs have come in he begins to cross-check them. Distance scores are corrected as necessary (remember that contacts on the boundaries between scoring zones score *low*). If a discrepancy occurs between transmitted and received information, points are deducted on the basis of one radial zone per error; only the offending station is penalized. The total score of a station which transmits a wildly incorrect QTH or QRA Locator, transmits more than one QTH, or uses a QTH which cannot be found on the O.S. 10-mile map may be docked by 10 per cent.

Always the adjudicator tries to be fair. He learns to accept imprecise spelling, but a log entry of "10 km N of Illegible" hardly invites the benefit of the doubt; nor for that matter does a log accompanied by an ancient hf bands contest cover sheet or a "declaration" written on the last logsheet; nor yet does an entry posted on the last possible day with a slow speed 2½p stamp. And in view of the time factor occasioned by press deadlines, entries posted to the wrong address just cannot be accepted. The correct address appears as Rule 2 of every contest.

When the adjudicator has compiled the table of results and written the covering story, he presents his report to the committee at its next meeting. Any proposed disqualifications under the rules covering violation of terms of licence, poor quality signals, or phone in cw sub-bands are considered by the whole committee, and must usually be backed by two or more complaints and evidence that the station was advised of his possible error but nonetheless persisted.

After a report has been approved, three things happen: the typescript goes to the editor for publication; the list of winners and runners-up is carried by GB2RS; and award recommendations are made to Council. If the recommendations are approved, certificates are made out, signed by the President and posted off. Three trophies are associated with vhf contests, and these are presented at the Society's Annual General Meeting in December each year.

Finally, a word or two about Form 427, the contest cover sheet for "Four", "Two" and "Seventy" (get it?). This was designed to help entrants and adjudicators to produce accurate results tables and interesting narratives in the shortest possible time. A new version of Form 427 is now available, together with a special logsheet for VHF NFD contests. It has a separate column for the QRA Locator, plenty of room for the QTH and is compatible with most typewriters. Contestants are strongly recommended (have you read the General Rules?) to use this stationery, supplies of which are available from headquarters or from a contest adjudicator (who preferably lives within reach of London and so can personally replenish his stocks) on receipt of an sae. The larger the envelope and the more the return postage, the more you get. The whole of the back of the cover sheet is reserved for contestants' comments; some people use even more than this. All observations received help to shape the rules for future contests. —G5UM (not a member of the VHF Contests Committee).

YOUR OPINION

The Editor
Radio Communication
Sir—I would like to pay tribute to Space Mark Ltd and particularly their Mr Owen for their quite remarkable service.

A few weeks ago I ordered from them an ETM3 Squeeze Keyer. I was aware that this keyer was fitted with a single make and break reed relay and I asked Space Mark Ltd if it was possible to replace this relay to give change-over facilities so that I had bk operation on a Sommerkamp FL200B transmitter. Within two days Space Mark provided me with full details of how to use the side tone output on the ETM3 to give this bk facility and thus there was no need to modify the relay.

A fault developed in the keyer and on learning of this Space Mark made arrangements for a replacement pc board to be despatched from the manufacturers and this was received within two days. Mr Owen in particular was tremendously helpful, even to the extent of telephoning me to find out if the replacement pc board had arrived and was satisfactory.

In these days of almost universal criticism of service from suppliers I think it only fair that this refreshing approach should be publicized.

Yours faithfully,
S. Poole, G3IMP

The Editor
Radio Communication
Sir—I have read the report of G3PSM, C. J. Thomas, on the Intruder Watch in the November issue of *Radio Communication*, and wish to comment that it is not much use including stations that are currently listed in *Wireless World Guide to Broadcasting Stations*, 15th edition, published by Iliffe Books Ltd. If one refers to page 31 therein one will find that the list of stations is compiled from information obtained from broadcasting authorities and the Tatsfield receiving station of the BBC. Among those listed by your member it lists these:

7,010 42·79m, 12kW Hanoi, Vietnam (North), not as shown by Mr Thomas;
7,035 42·65m, 15/240kW. Peking, China;
7,075 42·40m, 50/100kW. Cairo, Egypt;
7,080 42·37m, 15/240kW. Peking, China;
7,095 42·28m, no details of power, Urumchi, China.

Seeing that these stations are authorized ones, as I see it, I fail to see what little can be done by the Intruder Watch to stop them though I readily agree that if we are to have 40m (7MHz) then it is time internationally that these stations were stopped, but until the station plan is altered there is nothing one can do about it.

While they are listed in a radio book as apparently official and given in good faith I fail to see that anything can be done to stop them. I wonder what would happen if the reverse was the case where the BBC was the interfering station on what is an amateur frequency? In other words it might happen to us, so why pick on these stations

Yours faithfully,
H. A. J. Gray, FRMetS, BRS23279

Mr C. J. Thomas replies as follows:

In answer to Mr Gray's comments I would point out the following:

(1) Publication of broadcast station details in the book mentioned together with similar publications does not mean that recognition of legal operation has been afforded these stations. As an example, at least one publication lists a number of "pirate" broadcast stations which are of course, not recognized by any legal government or by the International Telecommunications Union. Examination of the International Frequency List which is published by the International Frequency Registrations Board of the ITU and lists all officially registered stations, does not list one of the stations Mr Gray mentions on the frequencies quoted. Therefore, if these stations are listed in the various commercial frequency guides, the case for the radio amateur is strengthened.

(2) Mr Gray mentioned that Radio Hanoi is the station operating on 7,010kHz. While not denying that this station may use this frequency from time to time, the station heard on this frequency throughout Africa and Europe (which ITU Region 1 embraces) is most certainly Radio Peking. This may be confirmed merely by listening to the station in question which identifies approximately every 15 minutes. I mention ITU Region 1 as the heading of the summary states that the stations listed are those heard *in Region 1*. Radio Hanoi, which also identifies as "The Voice of Vietnam", was last reported as being on 7,038kHz by observers in south-east Asia (ITU Region 3).

(3) Instances of interference being caused to the amateur service by the BBC have occurred and where these violations have been promptly reported the problem has been rectified. The Society enjoys a very close liaison with the BBC.

In short, 7,000kHz to 7,100kHz is an exclusive amateur service allocation within Region 1 as laid down in Radio Regulations Article 5 with the addition of paragraph 212, and any non-amateur station should be treated as an intruder and as such should be reported.

Yours faithfully
Colin J. Thomas, G3PSM
(Hon. Organiser, RSGB Intruder Watch),
(Co-ordinator IARU Region 1 IW)

The Editor
Radio Communication
Sir—Being active on 20m now for almost a year, I am surprised at the number of "G" stations that can be heard on 20m. During the height of summer I worked over 200 Gs by means of "short skip" conditions. A large number of Gs and GMs can be heard, however, just above the noise level (which I am led to believe is due to "scatter-back" propagation).

In fact I have worked GM3UCI (Glasgow), GM5ATK (Edzell), GM3VEY (Dundee) and GM3DZB (Banff) by means of this unusual propagation. One station that I hear regularly from this QTH is G3DTJ (Wigan). I wonder if any RSGB members would like to arrange schedules with me on 20m so that I might investigate this type of propagation further.

Yours faithfully,
Leslie Anderson GM3ZXH/A,
c/o 252 Holborn Street, Aberdeen.

The Editor
Radio Communication
Sir—I read with surprise and dismay the letter from MPT on the proposed increase in Morse Test fee in your December issue.

My surprise was occasioned by the suggestion that the fee should be doubled yet again, less than six months after the last doubling.

My dismay was caused by the absence of any comment on the RSGB attitude to the proposal.

As the custodian of the interests of your members may I urge you to fight this proposal unceasingly until it is dropped. You will agree that such a percentage increase is hard to justify at any time, but is totally indefensible at a time when the Government is urging price restraints.

If carried through, this increase would seriously limit the number of amateurs obtaining Class A licences in future years. This in turn would lose us occupancy of the hf bands which are already hemmed in by commercial stations.

You therefore owe it to all RSGB members, whether Class A, Class B or BRS, to show your opposition to this proposal and induce the Ministry to think again.

Yours faithfully,
C. G. McGee, G8BYT

Looking ahead

7 January—Presidential Installation; Bonnington Hotel, Southampton Row, London WC1.
22 February—RSGB lecture at the IEE.
22 April—VHF Convention.
20 May—BARTG Convention.

Mobile Rallies Calendar

25 June	University of Lancaster ARC, in Lancaster area.
25 June	Bristol City & County RSGB Group, at Longleat Warminster, Wilts.
2 July	South Shields & DARC.
16 July	Worcester & DARC, at Hill County Secondary School, Upton-on-Severn, Worcs.
24 September	Harlow & DARS.

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

THIS is the time of year when many of us take stock of our habits and resolve to try to do better! After tuning across the bands your scribe has decided that there is one step which a small minority could take to make life easier for the majority (and themselves) in 1972—namely to observe the **Region 1 Band Plan.** This "gentleman's agreement" divides the hf bands into segments, some of which are reserved for exclusive cw use, and consists of the following allocations:

3,500–3,600kHz, telegraphy only.
3,600–3,800kHz, telegraphy and telephony.
7,000–7,040kHz, telegraphy only.
7,040–7,100kHz, telegraphy and telephony.
14,000–14,100kHz, telegraphy only.
14,090kHz—rtty.
14,100–14,350kHz, telegraphy and telephony.
21,000–21,150kHz, telegraphy only.
21,150–21,450kHz, telegraphy and telephony.
28,000–28,200kHz, telegraphy only.
28,200–29,700kHz, telegraphy and telephony.

On the 80m band it is recommended that the segments 3,500–3,510kHz and 3,790–3,800kHz be reserved for intercontinental contacts when the band is open for dx working.

A reminder that photographs of amateur radio interest are always welcome for possible publication in *MOTA*—black and white prints are preferable. Every effort will be made to return such items to their owners, but no guarantee can be given.

News from overseas

Don Rayner, W3CTR (formerly G3BSY), has sent along the latest news of the Ex-G-Radio Club. Following the recent elections Will Schuman, WA6GLF, has become president, Les McGlade, VE7HN, vice-president, and Don himself is now secretary/treasurer. Reg Cherrill, W3HQO, remains as editor of the club bulletin. The club meets at 1900 on Sundays on 14,346kHz and W4RP acts as net control station, assisted by WA0VJO and WA6GLF. G4HW helps out on this side of the Atlantic. Among new members are 5N2ABG, HP1XIS, 9H1BX and VK2AKV—as the club bulletin caption says it is for "radio amateurs born in the UK and domiciled abroad".

The position in Nigeria concerning new amateur licences seems to be as unsatisfactory as ever. In *NARS News* Eric Lomax, 5N2ABG, regretfully reports that the situation is as it was in 1967 when things were shelved until after the national emergency. Although the war is now over the state of emergency still exists and will continue to do so until 1974. However, the Nigerian Ministry of Communications is to become a public corporation in April and it is hoped that this may result in a change of attitude. Our sympathy should be extended to those waiting for 5N2 licences, and our congratulations to 5N2ABG and the handful of other existing licence holders who keep NARS running and produce a first-class monthly bulletin.

JOTA 1971

Preliminary reports of this event indicate that it was as well supported and successful as usual. 248 UK stations took part and they contacted 398 Scout stations overseas in 52 different countries (including Nepal, French Somaliland, Japan, Okinawa, Muscat, the Netherlands West Indies and the Faeroe Is). Les Mitchell, the UK organizer, says that despite moans concerning dx conditions during the weekend (16–17 October) six ZLs, 16 VKs, 18 VEs, 41 Ws and seven PYs were worked!

The 2MT transmitter

The note in the October issue as to the whereabouts of the PCGG (The Hague) and 2MT (Writtle) transmitters, which were in operation before regular broadcasting began from London on 14 November 1922, brought forth a number of letters. First, BRS29857 (Ipswich) forwarded a photograph of the PCGG transmitter—now in the Postal Museum at The Hague. Then Mr L. W. Turner, Head of Engineering Information Department of the BBC, provided a photocopy of the history and demise of 2MT from the pen of B. N. MacLarty in 1963. This gives many interesting facts and states that when the Writtle Experimental Establishment of the Marconi Company was requested to produce a transmitter they used the standard Marconi radiotelephone circuit of those days. On 14 February 1922 transmissions began on 700m with an input power of 200W, but on 29 May the wavelength was changed to 400m. "It is unfortunate," concludes the document, "that on the cessation of transmission in January 1923 the equipment was dismantled and the parts returned for normal experimental work. All has been lost with the exception of the 6kW motor generator which the writer found under a tarpaulin in a field at Writtle a few years ago. This he purchased from the company and renovated. In due course it will be presented to the Marconi Museum. Mr MacLarty was Engineer-in-Chief, Marconi's Wireless Telegraph Co Ltd.

Mr Turner in a covering letter adds that the hut in which the transmitter was installed is now used by a school on its playing fields and that the Marconi Company provided a commemorative plaque.

Thanks are also due to G5IC, who was with the BBC from 1928–64, for kindly putting G2NJ in touch with Mr Turner; to G3CRP (Bexley Heath) who sent a press cutting showing a picture of the 2MT transmitter; and to BRS31871 who also provided information.

* 10 Knightlow Road, Birmingham B17 8QB.

Contests

Results of the **1970 VK-ZL-Oceania DX Contests** were as follows: (Phone section) **G3PHO** (1,980 points), G6XN (1,456 points). (CW section) **G5RP** (2,424), **GM3CFS** (1,512), G6XL (1,332), G2DC (828) and G3VW (396). UK scores in the receiving section were: **BRS26431** (7,412), BRS31976 (7,186), BRS32525 (2,772), A5032 (1,800), BRS26870 (1,560), BRS27880 (1,216).

Detailed results of the cw section of the **1970 CQ WW DX Contest** were as follows:

Callsign	Points	Band	Callsign	Points	Band
G3FXB	**1,121,445**	**All bands**	G3WYX	7,436	14MHz
G2DC	261,820		G2HDR	4,375	
G3ESF	223,839		**G3KDB**	**64,042**	**7MHz**
G3RUX	134,640		G3CXX	39,370	
G2AJB	114,660		G3KMA	33,098	
GD3AIM	**41,216**		G3XAP	30,488	
G2BOZ	**100,596**	**28MHz**	G3TVW	21,594	
G3CWL	1,955		**GM3JDR**	**20,655**	
G3HCT	**317,312**	**21MHz**	G5AQO	8,160	
GW3NJW	**109,600**		**G5ATD**	**10,280**	**3·5MHz**
GM3CFS	**93,786**		**GM3YCB**	**4,540**	**1·8MHz**
G8DI	14,130		GM3YOR	1,116	
G3JKY	**22,620**	**14MHz**	**G3NT**	**648**	

Certificate winners are listed in bold type.

The CQ WW DX 160 Contest

2200 28 January to 1500 30 January.

Exchanges consist of QSO number and RST. USA/Canadian stations will also give state or province. Contacts with stations in one's own country count two points, with those in other countries five points (except for those with W/VE/VO which count 10). The multiplier consists of the total number of DXCC countries, USA states and Canadian provinces worked. Note that QSOs with USA or Canada count as state/province multipliers only and not as countries as well. A plaque will be awarded to the station with top world score and certificates to other top scores in each country. Log and summary sheets may be obtained by sending a large sae (with IRCs) to CQ 160 Contest, 14 Vanderventer Ave, Port Washington, LI, NY, 11050, USA. Completed logs should be mailed before 29 February to this address.

The 80m YU Contest 1972

2100 8 January to 2100 9 January.

80m cw only. Exchange QSO number/RST. QSOs with stations in own country one point, in same continent (other countries) two points, in other continents five points, and with YU stations 10 points. Multiplier is number of YU prefixes and DXCC countries worked. Send log and summary sheet (before 15 March) to SRJ Contest Committee, PO Box 48, 11001 Belgrade, Yugoslavia.

1972 French Contest

1400 29 January–2200 30 January (CW).

1400 26 February–2200 27 February (Phone).

Exchange RS/T and serial QSO number. QSOs with France or DUF countries (HB, 4U1, LX, ON, 9Q, 9U, 9X) count three points. The multiplier is one point per band for each French department, Swiss canton, and Belgian province, 4U1, LX, 9Q, 9U, and 9X also counts as a multiplier. Contacts in this contest can be used when claiming the DUF, DPF, DDFM and DTA awards within the following two years. Logs should be sent to Lucien Aubry, F8TM, rue Marceau 53, 91 Palaiseau, France. In the 1970 event UK scores were as follows:

G3TXF	**(Phone)**	**103,632 points**	G3GJQ	(Phone)	3,240 points
G3YDX	(Phone)	70,840 points	**G3ESF**	**(CW)**	**40,950 points**
G3RAA	(Phone)	65,448 points	**GM2HCZ**	**(CW)**	**5,439 points**
GM3ZXH	**(Phone)**	**22,860 points**	G3GJQ	(CW)	675 points

The ARRL International DX Competition

0000 5 February–2400 6 February and same times 4/5 March (phone).

0000 19 February–2400 20 February and same times 18/19 March (cw). DX stations QSO as many stations in the 48 contiguous United States and the Canadian call areas as possible. Each QSO counts three points and the multiplier is the total number of USA states, plus VO and VE1-VE7 worked on each band totalled together. Log sheets (please state how many) and summary sheets are available from G3FKM in exchange for an sae (large).

Top Band news

G3WRF reports a contact with VS6DO on 18 November at around 2300, and has since received written confirmation of the QSO. This is the first time VS6DO has worked into the UK on 160m, and he will continue to be active throughout the winter months. The G3WRF contact took place on 1,830kHz and the VS6 signals peaked at S8. VS6DO uses 10W to a modified TCS13 and has an end-fed 240ft long-wire aerial about 180ft above ground, 3WRF has a 130ft vertical aerial with a poor earthing system.

8P6DR has been received in Holland on 1,803kHz at around 0400. He is willing to arrange skeds. WA4PXP, in the *DXers Magazine*, says that conditions are improving on the North Atlantic path with Europeans coming through well between 2245 and 0030, and again from 0300 to 0630. KG4EQ is now very active, as is CO2QR, and there is a possibility that WA4DRU and others will be in VP2S or VP2D in January.

Awards

The Ex-G Certificate

Awarded to non-USA stations who have proof of contact with at least six members of the Ex-G Radio Club. Not more than four may be from any one country or more than one from any one USA call area. Applications should be sent to the Awards Secretary, Lt Cdr H. Cunningham, G8FG, 235 Station Road, West Moors, Dorset.

The DDFM (French Departments) Award

For confirmed QSOs since 1 July 1957 on cw or phone (but not mixed) with 50 departments (30 on one band and 20 on another—in the case of European applicants these bands must be 80/40m or 40/80m) for DDFM-1. DDFM-2 is for 75 (50 and 25), and DDFM-3 for all 90 (60 and 30). Send certified list of QSLs plus six IRCs to F3JI, rue Pierre-de-Blois 11, Blois, Le-et-C, France. Credits for contacts with stations in the REF contest may be claimed if within two years of the event.

The DPF (French Provinces Award).

For contacting all 17 provinces since 1 January 1951. All cw or all phone. Send six IRCs with application to F3ZU, ave Gallieni 21, Viroflay, S-et-O, France. Contest credits count as for the DDFM.

DX news

The annual changeover of operators in the Kerguelen Is has taken place and F6APG and F6BPS are the new FB8XX callsign users. They are often to be found near 14,030 or 14,120kHz after 1430, especially on Mondays, Wednesdays, Thursdays, Saturdays and Sundays. QSLs will continue to be sent out via F2MO. FB8ZZ also favours 14,120kHz and still QSLs via F8US.

Readers who have noted the absence of TJ1AW from the bands will be sorry to learn that his tower crashed as he was working on it, resulting in him sustaining severe injuries. He returned to Europe for treatment, but should be back in Cameroun soon. Other African news is that there is a new station on the air from Upper Volta—this is XT2AE who is said to have a sked with his QSL manager (DJ9KR) on or near 14,209kHz at 1700 on Wednesdays. "601KN"s quoted QSL manager says that he has no knowledge of any such station.

HZ1GM made only 143 contacts before his licence was revoked, but Iain hopes to be back on the air with a 7Z3 call soon.

Bob Snyder, LA0AD, has left Norway and is now in Argentina. Bob just completed his five-band WAS before closing down.

There is considerable activity from the Antarctic area at present. VK0CC and VK0MX are located at the Australian base at Mawson, VK0JM is at Davis, and VK0PF at Casey. According to *DXpress* QSL cards from UA1KAE/7 indicate that this station is in the South Shetland Is.

CR9AK is reported to have a regular assignment with CT1BH (his QSL manager) at 1230 every Wednesday on either 14,235 or 21,235kHz.

Readers still awaiting QSLs from KM6DX are advised to re-apply to the address in *QTH Corner*—with sae and IRCs—as many cards directed to him by other routes were not received.

The past month's crop of peculiar prefixes included WC4BCC (Birmingham Centennial Celebration, Alabama), WY3MCA (National YMCA Week, Md), and WM1NSA (Nu Sigma Alpha Week, Mass).

VQ9WF will remain on Chagos until February and will not have any QSLs printed until his return to the USA. Another station who is closing down at any time now is 3V8AH, who is the only active amateur in Tunisia.

FG7TG is asking that all QSLs should be sent only via REF.

GC3APA closed down his station in Sark on 11 November and has now returned to Coventry; there is no resident amateur on the island. All contacts have been QSLd, mostly direct within a few days of the QSO.

Expeditions

Members of the Cambridge University Wireless Society, G6UW, will this year be making their expedition to Liechtenstein and Switzerland between 12 and 24 March.

1971 Countries Table

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3YHB	—	31	39	117	119	65	371
G8VG	1	19	41	45	62	35	203
G3YWX	—	14	19	86	26	—	145
BRS27263	—	94	80	213	156	109	652
BRS25429	—	124	108	175	145	97	649
A7450	9	61	41	125	92	51	379
A6220	11	53	57	141	88	20	370
BRS27880	6	41	46	102	101	71	367
A7531	1	30	24	112	115	65	347
A7082	12	29	52	91	105	37	326
BRS30694	5	11	17	83	72	35	223
A7681	5	28	14	67	45	—	159
A7511	3	38	15	35	32	3	126

The final table will appear in February *MOTA*. There will be no table in 1972.

QTH Corner

CR5XX	(ssb QSOs) via WA3HUP, 105 June Drive, Camp Hill Pa, 17011 USA. (cw QSOs) via CR6NN, PO Box 268, Luso, Angola.
HB0XIC	via VE6AKV, 7612 23rd St SE, Calgary, Alberta, Canada.
W4KPH/HK0	PO Box 160, San Andres Is, Colombia.
KC6BK	Box "C", Ponape, Eastern Caroline Is, 96941.
KM6DX	L. R. Collins, Box 100, NAVSTA, FPO, San Francisco, Calif, 96614, USA.
KS4CJ	PO Box 717, Christiansted, St Croix, US Virgin Is, 00820.
MP4MBN	via G8DXE, G. R. Thomas, "Crofters Cot", Highcroft Cresc Heathfield, Sussex.
MP4MBM	Box 14, Muscat.
PJ4HT	via PJ2HT, PO Box 879, Curacao, Netherlands Antilles.
PJ9JT	via W1BIH, John Thompson, PO Box 1, Torrington, Ct, 06791, USA.
TU4AA	VE7BWG, 488 E 4th St, North Vancouver, BC, Canada.
VK0PF	via VK3ATL, Geelong AR-TV Club, PO Box 520, Geelong, 3220, Vic, Australia.
VP2DAE	via INDXA (see K4AEB/5T5).
VQ9WF	via W4NJF, 1416 Rutland Drive, Virginia Beach, Va, 23454, USA.
VR1W	via W6CUF, Box 473, Redwood Estates, Calif, 95044, USA.
VU2AAA	N. R. Duxbury, New Delhi, Dept of State, Washington, DC, 20521, USA.
XT2AE	via DJ9KR, Ulrich Bihimayer, Schulweg 16, 7451 Rangendingen, Germany.
ZC4BI	R. Robson, Civilian Wing, 9 Sig Rgt, BFPO 53.
ZD3Q	via OZ3PO, Hasselwej 8, 4000 Roskilde, Denmark.
3D6AF	via K6KII, Clifford Moore, Box 1338, Arcadia, Calif, 91006, USA.
3D6AX	via WA5IEV, Louis Levy, 5642 Marcia Av, New Orleans, La, 70124, USA.
4M0LM	via YV1LA, J. Grzesiowski, Urb Casacoima, Qta Maryla, Punto Fijo, Venezuela.
K4AEB/5T5	via INDXA, Box 125, Simpsonville, Md, 21150, USA.
9L1VW	via W9FIU, Roger Ries 1707 W. Clark St, Champaign, Ill, 61820, USA.
9M2AA	(New QTH) L. L. L. Lyman, 5 Jalan Kenny Tengah, Kenny Hill, Kuala Lumpur, Malaysia.

RSGB QSL Bureau, G2MI, Bromley, Kent, BR2 7NH.

They hope to be on the air every evening during this period on 160m from either HB9 or HB0. Their original intention was to visit Luxembourg, but 160m operating permission was not obtained. HF band operation will take place during the daytime. At the time of going to press their callsigns were not known.

Signal One is thinking of sponsoring some dxpeditions and is looking into the possibility of action from AC3, AC5, CE0X, YI and FO8 (Clipperton) during 1972. *West Coast DX Bulletin* says that permission is "pretty well to hand" for all except Clipperton Is. The trips will not be prolonged but should consist of several days' operation from each place. The first may be undertaken by K2IXP/6, who may be in Bhutan during February.

Odds and ends

It seems that some of the earlier VS6 callsigns are being reissued. There is a new VS6AA—he is not a pirate, but Maurice Caplan (the former VS6AA) is now in Germany. It is difficult to see why such calls need to be used more than once in an area with so few licensees.

Previous reference to the DXCC status of VK3UV/9 has been noted by WA8VRB/1 of ARRL DXCC administration. Rick wishes to make it clear that Bougainville Is counts as VK9—New Guinea although it is actually one of the islands in the Solomon group.

Swan Is is shortly to be returned to Honduras and as it is only some 100 miles from the mainland may well lose its DXCC status with the change in ownership.

David Wilcock, G2FKS, of Cambridge, now returned from Nigeria as sole operator of 5N2KPT (Kaduna Polytechnic), tells us that all contacts with 5N2KPT have been QSLd as

have all correct listeners reports received. Although 5N2KPT remains in existence and some gear (including an HW32A) is still there there is no one to operate it. David cannot check any further reports against the log which remains in Nigeria.

Previous reference to the DXCC status of VK3UV/9 has been noted by WA8VRB/1 of ARRL DXCC administration. Rick wishes to make it clear that Bougainville Is counts as VK9—New Guinea, although it is actually one of the islands in the Solomon group.

Band reports

Fewer reports have been received this month due to the early deadline, but indications are that the emphasis has shifted to the lower frequency bands. As usual *QUAX* gives a detailed summary of 28MHz activity which seems to have reached its autumn peak at the end of October at which time all W districts except the sixth and seventh were in evidence and all continents were worked. At the other end of the spectrum 1·8MHz seems to be really good for dx and reports are to hand of G3TR's signal being heard in Australia.

Very many thanks are due to all correspondents, and especially to the following for the information contained in this section of *MOTA*: G2BJY, G2HKU, G3GVV, G3ORP, G3UKH, G3UYM, G3YHB, G4ANH, G5JL, G6GH, G8VG and BRS 17567.

Stations listed were on ssb except those in italics which were on cw.

1·8MHz. 0000 *KV4FZ, W1BB/1, K1PBW, ZD8AY.* **0100** *VE5XO, W2s IU, EQS, W3GM.* **0200** *W1WQC, W2UEZ, W4IKB, WA4PXP, K4IXC.* **2300** *PE2EVO.*

3·5MHz. 0000 YN3AAA. **0600** *VR1AA, XE1IEJ.* **0700** *YV5AW, ZL4IE.* **0800** *LU6FEB,* ZLs, 3LE, 4IE. **2000** VB1MSA, ZC4RS. **2100** EA8HA, OD5HB, OX3WX, VO1s, 3A0FN, 4X4AO. **2200** JY1, VE1s, ZC4BT, ZD3Q, 9H1K. **2300** EQ2DX, *UA9CM,* VS6DO, 9M2DQ, 9Y4VU.

7MHz. 0000 *YV7GN.* **0100** *FY0BE, UL7AA.* **0200** *KV4FZ.* **0300** *VP2A.* **0500** *CM8RC, JX2HK, PJ9JT, PYs, ZS6XQ, 9E3USA.* **0600** *KL7s HCN, HEE, PZ1AH, VP2ES, K6OS, W7s NQ, JLU.* **0700** *VA2UN,* ZLs. **1900** *EA6BN, 3B8CR, 4W1AF, G3UAR/4X, 5X5NK.* **2000** DJ6QT/CT3, JAs, *ZD3Q,* 9G1DY. **2100** PJ2CW, PZ1CU, 4Z4LF (QSL to WB2WOU). **2200** CT3AS, EA8HA, YV5UF, ZS5LB.

14MHz. 0000 TU4AA, ZD8AY. **0100** W6 and VE6. **0700** HB0XIC, YJ8BL, ZD7SD. **0900** FY0GW, *KW6EG, UA0YAE.* **1000** *HS5ABD* (good signal on LP). **1200** JY1FB. **1300** VK6s. **1400** FR7ZG, HS0UDN. **1500** VK0PF. **1600** VQ9WF. **1700** 5R8AP, ZD3Q. **1800** KH6BB, ZLs. **1900** VP2VV/FS7, VP8KF, ZD7SD. **2100** OB4YJ. **2200** KC4USV, VK6RU, 5VZYH.

21MHz. 0700 JAs. **0800** *ET3USC* (QSL via WA4AGT), *ET3USE* (QSL via K8IRC), M1D, *SV0WOO,* ZLs, ZD3Q. **0900** MP4TDA, VS6DO, *5Z4LW.* **1000** FL8MM, PZ5CW, VKs, *VU2AAA,* 9G1FF, 9N1MM. **1100** AP2ZR, CR8AI, 6W8BD. **1200** HC8MJ, MP4MBM, VP2A, VU2IE (via LP), ZS3XQ. **1300** FP8CS, TJ1AR, VK8JH, 5X5NK, 9K2CR. **1400** *FP0RT,* FR7AN, YS1FEA, 6D1AA. **1500** CE6CA/CE0 (Easter Is), W6s, *3B8CR.* **1600** *FY0HE,* **1700** VE5, VE6, VE7.

28MHz. 0900 ZEs, *7Q7AA.* **1000** VK6LK, 9J2DT. **1100** ZC4EJ. **1200** KV4AD, ZD3Q. **1300** FG7XT, ST2AA, *3B8CR,* 5V8CZ. **1400** KG4AN, W1-W5, W8-W0, 9E3USA, ZS1KZ. **1500** CX7CO. **1700** VO1HI.

Many thanks to the authors of the following for material reproduced in *MOTA*: **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6PG*), **QUAX** (*G3DME*), the **DXers Magazine** (*W4BPD*), **NARS Newsletter** (*5N2ABG*), **Long Skip** (*Nick Sawchuk*), **CARS Newsletter** (*ZC4RS*), the **West Coast DX Bulletin** (*WA6AUD*), the **Ex-G Radio Club Bulletin** (*W3HQO*), and **DX'press** (*PA0TO*).

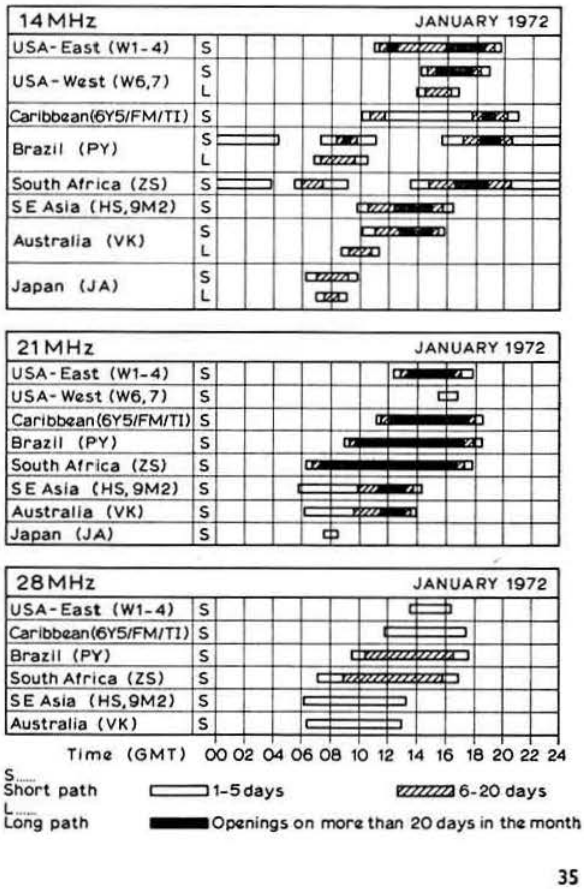
Please send all news for the **February** issue **to reach G3FKM no later than 5 January,** for **March** by **9 February,** and for **April** by **6 March.**

Propagation Predictions

Conditions in January will differ little from those of the previous month. The hf bands should remain open a little longer towards the end of the month. Otherwise the forecast given in the December issue will hold good for all the bands mentioned.

Sun activity has declined rapidly during 1971, and as a result conditions have deteriorated a great deal compared to January 1971. It is again pointed out that the time in the tables is given in gmt. This is done to facilitate conversion into local time of various dx countries such as east and west USA, Asia and Australia.

The provisional sunspot number for November 1971 was 60·5 with the period of greatest activity occurring during the last week of the month. The variation of the daily figure was between 26 on 16 November and 102 on 27 November. The predicted smoothed sunspot numbers for March, April and May 1972 are 43, 42 and 41 respectively.



The 1971 AGM

The Royal Society of Arts in John Adam Street, 50 yards from the Strand in London's West End, was once again the venue for the Society's annual general meeting on 3 December. After a preliminary encounter with tea and cakes in what was the library of the Royal Society, but which now seems to have lost the books, the members signed the register and assembled in the main hall. (*Note for next year . . .* can we have the register available for signature as members enter the library for tea and thus avoid the subsequent queue.)

The President, Mr F. C. Ward, G2CVV, opened the meeting and welcomed all those present. The minutes of the 1970 AGM were approved and the report for the year ended 30 June 1971 was the second agenda item. After questions concerning the TVI, Exhibition and HF Contests committees this report was approved.

Mr. A. C. Morris, G3SWT, retiring Treasurer, then provided some explanations of the various items appearing in the accounts of the Society. It was pointed out that the occurrence of the postal strike shortly after the increase in subscriptions had become effective had badly affected both book orders and subsequent income. This, coupled with spiralling inflation in the cost of materials and services purchased by the Society, meant that expenditure still exceeded income. Notwithstanding this, it was hoped that economies could produce a small surplus at the end of the current financial year. There was no intention of raising subscription rates to the ceiling figure allowed by the Articles of Association. It was stated that the increase in postal rates proposed by the Post Office would, in a full year, add £2,000 to the cost of distributing *Radio Communication*. After questions concerning advertisement rates and creditors the accounts were approved.

G3SWT announced that due to pressure of business he could no longer satisfactorily fulfil the duties of Treasurer to the Society. After thanking Mr Morris for his valuable help to the Society at a particularly difficult time, the President announced that Mr J. O. Brown, G3DVV, had agreed to accept the office of Treasurer.

The HW101 presented to RSGB HQ by Heath (Gloucester) Ltd being accepted by President F. C. Ward, G2CVV, from Mr S. R. Boakes, G3HXN

The fourth agenda item brought the announcement that in the recent election for members of Council G. R. Jessop, G6JP, and G. M. C. Stone, G3FZL, had been the successful candidates. The President expressed the thanks of the Society to the retiring member, Dr J. A. Saxton, who had carried out much valuable work on behalf of the RSGB.

After formally reappointing the auditors, the special resolution dealing with amendments to the Articles of Association were considered. After an initial explanation of some points by G3DVV several members raised pertinent points. G2UV strongly opposed the flat rate of life membership, proposing that there should be a differential rate according to age. G2FNK questioned the adequacy of the time allowed for delivery of notices to members saying that one week would be more appropriate in view of the present performance of the Post Office. G3RZP raised points concerning the number of meetings to be held by Council and the subscription for affiliated societies. After G3VZV had asked for assurance that the Society was considering ways of *making* money, the agenda item was put to the vote and passed unanimously.

The conclusion of the formal business of the meeting came after the President had read a short report mentioning the activities of the Society since 30 June 1971.

* * *

The first item of the informal meeting was the presentation to the Society by Mr S. R. Boakes, G3HXN, of Heath (Gloucester) Ltd, of a fully-built HW101 transceiver and power supply. This equipment is destined for the headquarters station at 35 Doughty Street. After the presentation of a number of Society awards the meeting recessed for ten minutes. A hearty vote of thanks is due to the Society's trophies manager, Mr P. Carey, G3UXH, for his efficient marshalling of the many awards. Certainly they showed a rare degree of lustre implying much hard polishing.

With only some 30 minutes available for informal discussion, a number of members were obviously going to be disappointed. However, the asking rate was high with co-operation from all concerned. After G3VZV had lamented the lack of attention by HQ to correspondence, G2FNK queried the delay in acknowledging contest entries. After suitable replies by HF Contests Committee members G3TR, G6LX and G3HCT, we heard comments by G3HWR regarding disqualification of a station from VHF–UHF Field Day. G8ATK made further points on this subject which were answered by Geoff Stone, G3FZL.

G8ASP queried the state of the negotiations concerning the 70cm band and was advised that no final decision was yet available. G2IY, while appreciating the pressure of work at headquarters, urged that due attention be given to visitors, particularly those from overseas, and that the visitors' book should always be available for signature.

The amount of the new family subscription (£3) was a subject for comment by several members who felt that it was too high.

Mr J. Skidmore, BRS26431, received the Metcalfe Trophy, for the third successive year, from G2CVV at his home after the AGM, (*Photo: G3SZJ*)

Recipients of awards after the presentation

Gravesend Trophy to Norfolk ARS; Leading 3·5MHz station certificate to Loughton Group received by Mr M. A. C. MacBrayne, G3KGM; Edgware Trophy to Mid-Sussex ARS

RAEN Trophy received by Mr A. W. Smith, GM3AEL, on behalf of Glasgow Raynet Group; Whitworth Trophy to Mr J. Graham, G3TR; 1951 Council Cup to Mr A. W. Russell, G8AWS

G3SWT pointed out that the cost of administering the new membership category was high and that there were notices that the Society was compelled to send to all members.

G3PSM said, with some vigour, that in his opinion too much attention was being paid to minor points and insufficient regard to the vast amount of work carried on by the Society, Council and Committees which was for the benefit of amateur radio in its entirety. This point was taken further by G2FKZ who drew attention to the profit from the sale of Society publications which subsidizes subscriptions.

With the time approaching 9pm, the President reluctantly applied the closure and in so doing expressed his pleasure that the meeting had attracted such a good attendance leading to a worthwhile discussion.

G2BVN

The minutes of the AGM will appear later in Radio Communication and this informal account is intended for the information of those members who could not attend the meeting.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held at Society HQ on 8 November 1971

Present: *Mr F. C. Ward (President, in the Chair), Dr E. J. Allaway, Dr J. A. Saxton, Messrs B. D. A. Armstrong, J. Bazley, R. J. Hughes, J. O. Brown, E. G. Ingram, G. R. Jessop, W. F. McGonigle, A. C. Morris, C. H. Parsons, J. R. Petty, W. A. Scarr, A. W. Smith, R. F. Stevens, G. M. C. Stone, E. W. Yeomanson (members of Council), D. A. Findlay, general manager, A. W. Hutchinson, editor.*

An apology for absence was received from Mr L. E. Newnham.

VHF UHF Field Day

The VHF Manager reported that a number of complaints of interference from stations operating on VHF UHF Field Day had been received.

Correspondence

A letter from Mr Lumley, East London Group, was read to the meeting. He asked that the Council should support any suggestions from the MPT that members who had reached retirement age should not be required to pass the Radio Amateurs' Examination. Council agreed that this matter would be considered if any suggestions were made by the MPT.

A letter from the East London Group was read. Council noted that at a meeting of the group on 17 October a resolution was passed for the attention of RSGB Council "That in the event of the Council considering any increase of output power by amateurs, any support by the Council to this end would be considered a retrograde step."

Accounts

The Income and Expenditure Account for the three months to 30 September 1971 and the statement of net assets at that date were considered.

Membership and affiliation

It was resolved:

(i) to elect 160 corporate members and 30 associates;
(ii) to waive the subscriptions of 11 members on the grounds of blindness or other disability;
(iii) to accept reduced subscriptions from five members;
(iv) to grant life membership to one member;
(v) to grant affiliation to the Northumbria Radio Club, Morpeth, and the Easington Amateur Radio and Electronics Club.

"Radio Communication"—Members' Ads

It had been suggested that a flat charge of 25p should be made for each member's advertisement at present accepted free of charge.

After considerable discussion it was proposed and agreed "That a flat charge of 25p for each advertisement should be made; the charge would become effective three months after an explanatory note had appeared in *Radio Communication*."

Family Membership

It was agreed that the subscription to be paid for family membership would be £3 for the second and each subsequent member provided the amendment to the Articles of Association was passed at the AGM on 3 December 1971.

Trophies

Council approved the award of the Milne Trophy to R. Jones, GW3JI, and the Braaten Trophy to A. J. Slater, G3FXB.

VHF repeater stations

Mr Stone reported on the meeting held at Society headquarters on Saturday 16 October 1971 to consider whether Council should be asked to accept in principle the use of repeater stations on VHF. It was reported that the Pye Telecommunications Amateur Radio Group had produced proposals for setting up a repeater station and that these would be submitted to the MPT Committee and to members of Council.

It was agreed that Mr Stone and Mr Stevens should consider the proposals and submit a report to Council.

70cm band

Mr Stevens reported that he had attended a meeting at the MPT at which the revised limits of the 70cm band had been discussed. The MPT was aware of the conflicting interests of amateur users and looked to the Society to devise a band plan that would be for the benefit of all users.

It was agreed that the VHF Committee should formulate a band plan and then ask other interested users to a meeting so that the committee's proposals could be considered.

Constitution of committees and appointments for 1972

Council agreed to invite members to serve on committees for 1972 as shown below. In considering the constitution of committees, Council noted the following points:

Mobile Committee

Mr Yeomanson reported that the Mobile Committee, which at present only deals with the Woburn Rally, was anxious to consider matters relating to mobile operating generally.

Exhibition Committee

It was agreed that the Mobile and Exhibition Committees should be amalgamated under the title of "Mobile and Exhibition Committee".

Technical Committee

In view of the responsibilities of the Technical Committee for matters relating to publications, it was decided that the title be changed to "Technical and Publications Committee".

The names of members appointed to various Society offices are listed on page 7.

Constitution of committees for 1972

Contests (HF)

Council members:	Dr E. J. Allaway, J. Bazley.
Other members:	D. Andrews, R. S. Biggs, R. L. Glaisher, J. C. Graham, M. Harrington, S. V. Knowles, G. T. Peck*, R. Polley, D. Thom, R. G. B. Vaughan.

*Corresponding member df events.

Contests (VHF)

Council member:	G. M. C. Stone
Other members:	R. G. Brade, J. Butcher, M. T. Deacon, F. Mathews, W. J. McClintock, C. Sharpe, M. J. Street, I. F. White

Diamond Jubilee

Council members:	J. Bazley, L. E. Newnham, W. A. Scarr, F. C. Ward, E. W. Yeomanson.
Other member:	D. A. Findlay.

Education

Council members:	L. E. Newnham, F. C. Ward.
Other members:	G. L. Benbow, D. M. Pratt, J. W. Swinnerton R. Walwork.

Finance and Staff

Council members:	B. D. A. Armstrong, J. Bazley, J. O. Brown G. R. Jessop, A. C. Morris, L. E. Newnham, W. A. Scarr, R. F. Stevens,
Other member:	D. A. Findlay.

MPT Liaison

Council members:	Dr E. J. Allaway, G. R. Jessop, L. E. Newnham, R. F. Stevens, F. C. Ward,
Other member:	D. A. Findlay.

Membership and Representation

Council members:	J. Bazley, E. G. Ingram, W. F. McGonigle, C. H. Parsons, J. R. Petty, W. A. Scarr, A. W. Smith, F. C. Ward.
Other member:	D. A. Findlay.

Mobile and Exhibition

Council members:	L. E. Newnham, J. R. Petty*, E. W. Yeomanson.

Other members: W. R. Andrews, P. Balestrini, D. C. French, T. I. Lundegard, M. E. Livermore, M. A. C. McBrayne, W. J. McClintock, G. W. Morris, N. O. Miller, J. G. Pierce, G. P. Shirville, P. A. Thorogood, R. G. B. Vaughan, M. G. Wallace.

*Corresponding member

Raynet

Council member: E. W. Yeomanson.

Other members: P. Balestrini, E. R. L. Bassett, R. Ferguson, Mrs. J. Balestrini, Dr A. C. Gee, A. F. Hunter, S. W. Law, R. A. Ledgerton, T. I. Lundegard, S. J. Scarborough.

Scientific Studies

Council member: G. M. C. Stone,

Other members: R. G. Flavell, R. A. Ham*, Prof. M. Harrison*, D. Hayter, A. Law*, C. E. Newton G. Mills*, A. J. Oliphant*, A. Taylor, G. C. Roast*, J. Spurling*.

*Corresponding members

Technical and Publications

Council members: B. D. A. Armstrong, G. R. Jessop, R. F. Stevens.

Other members: W. H. Allen, R. J. Baker, D. N. Corfield*, J. P. Hawker, T. L. Herdman, P. J. Horwood, J. W. Mathews, H. W. Rees.

*Corresponding member

TVI

Council members: None.

Other members: D. G. Alexander, J. W. Hill, P. F. Jobson, D. G. Pinnock, B. Priestley, Mrs. K. Priestley, G. Slaughter E. Swayne*, J. W. Swinnerton, D. M. Thomas, P. W. Waters, D. A. Findlay, A. M. B. Holloway, I. Jackson.

*Corresponding member

VHF

Council member: G. M. C. Stone.

Other members: W. H. Allen, P. Balestrini, A. H. Bower, Dr D. S. Evans, D. Hayter, J. Hum, A. L. Mynett* M. Wallace.

*Corresponding member

IARU Working Group

Council members: E. G. Ingram, L. E. Newnham, R. F. Stevens G. M. C. Stone, E. W. Yeomanson,

Other members: J. C. Graham, D. A. Findlay.

The President of RSGB will be an ex-officio member of all the above committees.

Committee minutes and recommendations

Council approved the minutes of the Raynet Committee (4. 9. 71), Mobile Committee (14. 9. 71), VHF Contests Committee (6. 10. 71), VHF Committee (special meeting) (16. 10. 71), Scientific Studies Committee (18. 10. 71), MPT Liaison Committee (19. 10. 71), and the VHF Committee (27. 10. 71).

Scientific Studies

It was reported that a number of serviceable hf transmitters were being made available to the Society, free of charge, for use as beacon transmitters.

Zonal boundaries

Mr Ingram pointed out that any national reorganization of county boundaries would have to be reflected in alterations to the Society Zonal boundaries.

Mobile operation/Raynet frequencies

Mr Jessop asked that there should be a note in *Radio Communication* as to the bandwidth of the net calling frequency of 145MHz. At the same time it would be worth commenting on the need for better operating practices.

Mr Parsons asked that members be reminded that the published list of Raynet frequencies were for information only and that they must not be considered as a right.

Ballot for Council members

The names of Messrs Broadbent, Corsham and Walker were drawn by lot to act as scrutineers for the election of Council members for 1972.

RAYNET

by S. W. LAW, G3PAZ*

The advent of another year traditionally calls for new resolutions. Since our service is continually alert to progress in our particular sphere it is sufficient to convey the good wishes of the Raynet Committee to all groups for a successful and paradoxically disaster-free 1972.

There is still much that we would like to see in the way of expansion, particularly when we hear of the great work carried out in other countries, such as our opposite numbers in Australia where AREC has full liaison with all rescue services and full government co-operation. On the other side of the coin, we should provide all available assistance and advice to those who are working so hard to gain official recognition for radio emergency operation in their particular country, for the Raynet set-up in the UK is greatly admired and respected far beyond our shores. Let us take pride in the reputation we have earned and keep it that way.

The function of Raynet

To satisfy questions which have arisen we must again make it clear that, although the police are one of our user services, the passing of messages in connection with crime is to be avoided at all cost. Our function is the safety of life only. Where borderline cases arise, the greatest discretion should be exercised to ensure that this criterion is applied; criminal activity and its suppression is a job strictly for the professionals. As law-abiding citizens our duties are clear and we should abide by the normally accepted procedure should the occasion arise.

Southern news

We are sorry to learn of the apparent disbandment of the East Sussex group. Meanwhile, steps are being taken to ensure that Raynet equipment from this area is re-distributed to the best advantage. There also seems to be silence from Harlow at the time of writing. Fortunately this area could be covered by NE London/SW Essex (G8ALM) in case of need; their control caravan in Epping has excellent coverage. West Sussex has no fewer than 12 mobiles on 2m with another three to cover their 4m channel. No doubt they will benefit from the now unused East Sussex gear mentioned above. The 25 members will lose no time expanding the excellent service which they already operate in close liaison with all three user services, not to mention the North Sussex group which is as active as ever.

SE London (G3FZL) is now closely liaising with NW Kent (G3GJW) and some good work has resulted. We await reports on the trials of the walkie-talkies on 432·5MHz in the NW Kent area. Mid-Kent (G3YCN) is still finding the going difficult with user services in the district but will no doubt win its point eventually. Kent controller, G3GGH, has been busy with lectures in Thanet and Canterbury and has initiated some activity around these parts.

Broadcast publicity

Those who listened to Radio London on the afternoon of 7 November will have noted that Raynet was not forgotten in the "Don't Call Us Hams" item, thanks to the programme compiler.

Crystals

Investigations are in hand to find a source for the supply of competitively priced Raynet crystals. Suggestions and information please to G3IIR or G3FZL.

Honorary registrations secretary: **Mrs Jane Balestrini, "Merrivale", Willow Walk, Culverstone, Gravesend, Kent.**

Honorary secretary, RAEN Committee: **Mr E. R. L. Bassett, 57 Upper St Helen's Road, Hedge End, Southampton, SO34LG. Tel Botley 4462**

* 130 Alexandra Road, Croydon, Surrey CRO 6EW

CONTEST NEWS

80m Field Day 1971 Results

The excellent weather encouraged a good entry for this year's event and in spite of a lack of /P activity many QSOs were to be had, resulting in some high scores. Conditions were fairly good with a number of stations working into Europe.

G3KAP operating from Longfield, Kent, keyed 90 QSOs to win this event using a modified KW2000 (2E26 pa), a dc psu, and an inverted-V dipole. Second place was taken by G4ALE/P operated by G3SJX and G3VYI from Oakham in Rutland. They used a Sommerkamp FT101 driving a BDY91 pa with a dipole at 50ft and made 83 contacts.

Comments included: "50ft mast fell over . . . but the two of us managed to get it up again!" G4ALE. " Glad to see the scoring system published again!" G3JKY.

Subject to Council approval the Houston Fergus Trophy will be presented to G3KAP, and Certificates of Merit will be sent to G4ALE, G3LHJ and G8GF.

Check logs from G3BY, G3OGY, G3XOQ and BRS30033 are acknowledged with thanks. The latter's comprehensive submission was of considerable assistance.

D.T.

Posn	Callsign	Points	Posn	Callsign	Points
1	G3KAP/P	602	9	G3ZOT/P	440
2	G4ALE/P	585	10	G3VMO/P	435
3	G3LHJ/P	542	11	G3IGU/P	415
	G8GF/P	542	12	G3RQZ/P	390
5	G3JKY/P	525	13	G3ZHZ/P	315
6	G3VOC/P	515	14	G3ZDZ/P	255
7	G3VW/P	505	15	G3LMG/P	200
8	G3WTJ/P	475	16	G3BXS/P	185

November 144/432MHz CW Contest Results

There were a total of 22 entries for this contest held on 6—7 November. The winners of the three sections were: (A) G3IMV with 353 points, (B) G3OXD/A with 358 points, and the only entry in Section (C) was G3XAC/P with 491 points, who incidentally wondered if it was too cold for all the other portable stations. What other portables ?

Many entrants would like to see a bonus for 70cm QSOs and several also stated that they would like only one section to this contest.

Check logs are gratefully acknowledged from G3GNS, G2UJ, GC2FZC and BRS15822 (whose score will be credited for the Listeners Championship).

R.G.B.

Posn	Callsign	Points	144MHz QSOs	144MHz Pts	432MHz QSOs	432MHz Pts	County
			SECTION "A"				
1	G3IMV	353	60	353	—	—	BS
2	G3POI	336	60	336	—	—	LD
3	G3NNG	329	52	278	10	51	BE
4	GW3MFY	230	34	230	—	—	—
5	G3WSN	203	40	191	4	12	EX
6	G2WS	200	37	199	1	1	ST
7	G3FYX	186	39	186	—	—	GR
8	G5UM	179	34	146	11	33	LR
9	G3AKF	171	41	171	—	—	OX
10	G3BPM	121	31	121	—	—	—
11	G3FIJ	119	21	108	3	11	EX
12	G3ILO	118	29	117	1	1	GR
13	G2HH	83	20	83	—	—	WE
14	G3LCH	37	11	37	—	—	—
15	G3YYF	20	6	20	—	—	SX
16	G4AGQ	16	5	13	1	3	—
			SECTION "B"				
1	G3OXD/A	358	56	326	8	32	WR
2	G3MCS	281	51	266	5	15	—
3	G3ZSS/A	85	22	85	—	—	LE
4	G3UHF	81	25	81	—	—	LE
5	G3OTK/A	36	13	36	—	—	GR
			SECTION "C"				
1	G3XAC/P	491	69	485	2		SD

432MHz Fixed Station Contest Results

The splitting of this contest into a Saturday evening and a Sunday morning session, thus allowing contestants a well-earned rest and sleep, was most favourably received.

That man from Faringdon, G3NNG, led a tightly bunched pack in pursuit of the winner, G8BBB, and the runner up, G3ZYC. The winner used a 4CX250B power amplifier running 150W input on A3 and 200W output on A3J, to a pair of 46-element Multibeams.

The best dx recorded was between G3NNG and PA0EZ. The QSO was made over 471km on cw during Sunday morning. Generally this session provided the majority of the stations with their best dx, despite the lower activity, as compared to Saturday evening.

Certificates of merit go to G8BBB and G3ZYC.

M. D.

Posn	Callsign	Points	QSOs	County	Best dx	Km
1	G8BBB	300	59	CE	GD2HDZ	365
2	G3ZYC	241	55	DY	GD2HDZ	233
3	G3NNG	185	38	BE	PA0EZ	471
4	G8ACB	155	50	SD	GD2HDZ	
5	G3PMX	145	32	EX	PA0EZ	340
6	G5DF	125	38	BE	PA0EZ	410
7	G4AGE	115	33	DY	GD2HDZ	230
*	G3MAR/A	96	38	SD	G3PMX	185
8	G8BAV	90	38	DY	G8BYV	165
9	G3WSN	88	23	EX	PA0EZ	333
10	G8CIT	82	45	MX	G3ZYC	207
11	G8BIL	79	25	WX	G3KEQ	165
12	G3UBX	78	33	SD	GD2HDZ	239
13	G3COJ	71	21	BS	PA0EZ	395
14	G8CTT	68	33	KT	G3ZYC	215
15	G3OHH	66	24	SD	GD2HDZ	195
16	G8ABI	61	27	WR		
	G5UM	61	26	LR	G3DOV	112
18	G8DKK	60	30	OX		
19	G3ZGQ	51	37	LD	G6GN	
20	G8DKN	44	12	GR	G3KMS	195
	G8BHL	44	19	YS	G8BBB	
	G8AZU	44	32	MX	G8BBB	111
23	G8BQH	33	25	BS	G8BBB	108
24	G2WS	31	12	ST	G3KEQ	202
25	G8DAZ	29	17	ND	G8ACB	135
26	G3WJG	28	24	MX	G3NNG	90
27	G8VN	15	13	DY	G3SHY	52
28	G4AEQ	14	8	LE	G3OXD/A	115
	G8BKR	14	10	GR	G8ACB	122
30	G8BDO	12	10	NM	G3EHM	60
31	G4AGQ	11	9		G3ZYC	56
32	G8DXS	9	7	YS	G3ZYC	52

* G3MAR/A—eliminated under rule 8b.

2nd World SSTV Contest Rules

Sponsored by *cq elettronica* magazine, the purpose of this contest is to promote increased interest in the sstv mode of operation as used by radio amateurs.

1. **Periods of contest.**
   1st 1500–2200gmt 5 February 1972.
   2nd 0700–1400gmt 13 February 1972.
2. **Bands.** All authorized frequencies.
3. **Messages.** Exchange of pictures and number of the message.
4. **Exchange points.**
   (a) A two-way contact with a station receives one point (tota points will be the number of individual stations contacted).
   (b) No extra points for the same station contacted on different bands.
   (c) A multiplier of 10 points for each continent and of 5 points for each country (ARRL list) worked is given.
5. **Scoring.** Total exchange points times the total of the multipliers.
6. **Logs.** Log will contain: date, time gmt, band, callsign, message number and received, points.
7. **Prizes.**
   1st. A free 12-months subscription to *cq elettronica* magazine
   2nd. A free 6-months subscription to *cq elettronica* magazine
   3rd. A free 6-months subscription to *cq elettronica* magazine.
   Special swl prize
8. All logs must be received by 20 March 1972. Send them to: Prof Franco Fanti, via A. Dallolio 19, 40139, BOLOGNA, Italy.

First 1·8MHz Contest 1972 Rules

1. The General Rules for RSGB HF Contests, published in this issue of *Radio Communication*, will apply.
2. When. 2100gmt on Saturday 12 February 1972 to 0200gmt on Sunday 13 February 1972.
3. Contacts. CW (A1) only in the 1·8–2·0MHz band. County code letters, as published on this page of *Radio Communication*, must be sent after the report—serial number group, eg for a contact from Rutland, 569001 RD.
4. Scoring. Six points for each of the first six contacts with stations in any one county; three points for the seventh and subsequent contacts with stations in that county. Six points for each contact with a station outside the British Isles.
5. Logs. Column (5) must be headed "County Code Letters Received." Entries must be addressed to D. J. Andrews, G3MXJ, 54 Roman Way, Thatcham, Newbury, Berks.
6. Trophies. The Somerset Trophy will be awarded to the winning station. The Maitland Trophy will be awarded to the Scottish member with the highest aggregate number of points in this contest combined with the Second 1·8MHz Contest 1971.

70MHz CW Contest Rules

Date: Sunday 13 February 1972.
Times: 0900–1300 and 1400–1700gmt.

All entries and check logs must be sent to: VHF Contests Committee, c/o G3JKX, 8 Devon Close, RAF Benson, Oxfordshire.

The following General Rules, published in this issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9b, 10a, 11–24.

432MHz Cumulative Activity Contest Rules

Dates: 14, 22, 30 January; 7, 15, 23 February; 2 March.
Times: 2000–2200gmt.

All entries and check logs must be sent to: VHF Contests Committee, c/o G2HIF, 20 Harcourt Road, Wantage, Berks.

The following General Rules, published in this issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9a, 10b, 11–24.

BERU 1971

The HF Contests Committee regrets that Mr F. W. Garnett, G6XL, was not listed in the BERU results.

G6XL had a checked score of 2,225 points which puts him in 26th place. All those who were shown as 26th and lower should be moved down one place.

The committee apologises to all for the omission.

General Rules for RSGB HF Receiving Contests

The general rules for all RSGB hf receiving contests are given below. For each contest held, a supplementary set of rules will be set out which should be read in conjunction with these general rules.

1. All entrants operating from the British Isles must be fully paid-up members of the RSGB.
2. Single-operator entries only will be accepted.
3. To claim for points, a station may be logged once only on each band, whether fixed address, portable, mobile or alternative address.
4. A receiving station log must show in columns: date/time, callsign of station heard, report and serial number sent by station heard, callsign of station worked, band in megahertz, bonus points, total points.
5. Where two or more bands are in use, separate log sheets must be submitted for each band.
6. In the column designated for "station worked", the same callsign shall not appear more than 20 times on each band throughout the contest.
7. A cover sheet shall be submitted with a contest log as under transmitting section General Rule 8(d) except that the last sentence of the declaration shall read: "I certify that I do not hold a transmitting licence."
8. The following rules from the transmitting section general rules also apply to receiving contests: 5(a), 8(e), 8(f), 8(g), 9, 10(a), 10(b), 11(a) 11(d) 11(e).

County Code Letters for RSGB Contests

County Code Letters	County	County Code Letters	County	County Code Letters	County	County Code Letters	County
AD	Alderney	DN	Devonshire	KS	Kinross	RD	Rutland
AG	Anglesey	DT	Dorset	KT	Kent	RH	Roxburghshire
AL	Argyllshire	DU	Dunbartonshire			RN	Radnorshire
AM	Antrim	DW	Down	LD	London (Postal District)	RW	Renfrewshire
AN	Aberdeenshire	DY	Derbyshire	LE	Lancashire	RY	Ross & Cromarty
AR	Armagh			LK	Lanarkshire		
AS	Angus	EL	East Lothian	LN	Lincolnshire	SD	Staffordshire
AY	Ayrshire	EX	Essex	LR	Leicestershire	SE	Shropshire
				LY	Londonderry	SF	Suffolk
BD	Bedfordshire	FE	Fifeshire			SG	Stirlingshire
BE	Berkshire	FH	Fermanagh	MG	Montgomeryshire	SK	Selkirk
BF	Banffshire	FT	Flintshire	MH	Monmouthshire	SL	Shetland
BR	Brecknockshire			MN	Midlothian	SR	Sark
BS	Buckinghamshire	GN	Glamorgan	MR	Merioneth	ST	Somerset
BU	Bute	GR	Gloucestershire	MX	Middlesex	SU	Sutherland
BW	Berwick	GY	Guernsey	MY	Moray	SX	Sussex
						SY	Surrey
CA	Cardiganshire	HD	Herefordshire	ND	Northumberland		
CD	Cumberland	HE	Hampshire	NK	Norfolk	TE	Tyrone
CE	Cambridgeshire	HF	Hertfordshire	NM	Nottinghamshire		
CH	Cheshire	HN	Huntingdonshire	NN	Nairn	WD	Westmorland
CL	Cornwall			NR	Northamptonshire	WE	Wiltshire
CN	Clackmannanshire	IM	Isle of Man			WG	Wigtownshire
CR	Carmarthenshire	IS	Inverness	OX	Oxfordshire	WK	Warwickshire
CT	Caithness			OY	Orkney	WN	West Lothian
CV	Caernarvonshire	JY	Jersey			WR	Worcestershire
				PB	Peebles		
DB	Denbighshire	KB	Kirkcudbrightshire	PH	Perth	YS	Yorkshire
DF	Dumfriesshire	KE	Kincardine	PK	Pembrokeshire		
DH	Durham						

General Rules for RSGB HF Contests

The general rules for all RSGB hf contests are given below. For each contest throughout the year a short supplementary set of rules will be published which must be read in conjunction with the general rules.

Reprints of these general rules will be available from HQ upon request.

1 Entrants must operate in accordance with the terms of their licence.

2 Contacts with unlicensed stations will not count for points.

3 Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Cross-band contacts may not be claimed. Proof of contact may be required. Simultaneous operation on more than one band is not permitted.

4 (a) A **fixed station** must operate from the address shown on the licence.

(b) A **portable station** must operate from the same site for the duration of the contest and may not be located in a permanent building or use public mains. Power for all equipment may be derived only from a portable generator on the site, accumulators or batteries. No equipment or aerials may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to the storage of equipment.

(c) A **mobile station** is a station installed in a motor vehicle, or vessel on an inland waterway, so equipped that the station may be operated in motion without alteration.

(d) An **alternative address station** is a station at a location not named on the licence, other than a portable or mobile station.

5 Unless otherwise stated, single-operator entries only will be accepted.

(a) A **single-operator station** is one manned by an individual operator who receives no assistance whatsoever in operating, log keeping or checking etc from other persons during the contest period.

(b) A **multi-operator station** is one which does not conform to the definition of a single-operator station given above. In those contests where multi-operator entries are allowed, such entries will only be accepted provided that:

(i) The declaration is signed by only one operator, who will be regarded as the entrant,

(ii) The callsign of the operator concerned is indicated for each contact,

(iii) The names and callsigns of all operators are listed on the cover sheet, and

(iv) For stations located in the British Isles, all operators must be fully paid-up members of the RSGB.

6 Eligible entrants. Unless otherwise stated, only fully paid-up members of the RSGB resident in G, GC, GD, GI, GM and GW may enter. In those contests which are open to radio amateurs elsewhere, British Isles entrants (as defined above) must be members of the RSGB. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.

7 A **contact** consists of an exchange and acknowledgement of contest information. This consists of an RS report on telephony, or an RST report on telegraphy, and a three-figure serial number starting with 001 for the first contact and increasing by one for each successive contact throughout the contest, irrespective of the band or mode in use. The supplementary rules for specific contests may call for additional information to be exchanged.

8 Form of entry.

(a) Entries must be clearly written or typed on one side only of RSGB Contest Log Sheets or International A4 size paper. Columns must be headed as shown in the example below.

(b) *Separate log sheets must be used for each band.*

(c) Logs must be kept, and entries submitted, in gmt.

(d) Each entry must include a cover sheet in the form shown below incorporating a signed declaration.

HF Contest Entry Cover Sheet

Contest ..... Date ..... Score .....
Section (if any) ..... Callsign .....
Name .....
Home address .....
.....
Name of club or group (if applicable) .....
.....
Address of station, or portable location (if other than home address above) .....
National Grid six-figure reference, county code letters, or other co-ordinates (see contest details) .....
Transmitter ..... Input power .....
Receiver .....
Aerial(s) .....

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

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

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

RSGB Contest Log Sheets and Cover Sheets may be obtained from HQ upon request. The request must be accompanied by a large sae.

(e) All entries become the property of the Radio Society of Great Britain. In the event of any dispute the ruling of the Council of the RSGB shall be final.

(f) All entries must be postmarked not later than 15 days following the contest. If acknowledgement of receipt is required, British Isles entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged.

(g) Unless otherwise stated, entries must be addressed to the HF Contests Committee, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE, England.

9 For scoring purposes, aeronautical mobile and maritime mobile stations will count as mobile stations in the country of origin.

10 Awards

(a) Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates. Awards are, where possible, presented at the Annual General Meeting following the contest.

(b) The standard award format for contests is as follows: Some winners and section leaders will be the holders of particular trophies, and these will also receive a special framed certificate. Certificates of Merit will be awarded to the entrants placed first, second and third in each section of the contest, from (i) the British Isles and (ii) overseas.

11 Disqualification. Entrants may be disqualified on any one of the following counts:

(a) Failure to complete and sign the declaration.

(b) Frequent tone reports of T8 or less.

(c) Failure to record operators' callsigns against log entries (multi-operator entries only).

(d) Failure to use separate log sheets for each band.

(e) If log entries contain unmarked duplicate contacts for which points have been claimed.

(f) Failure to observe the terms of the entrant's licence.

Failure to observe and comply with other rules may also entail disqualification.

RSGB CONTEST LOG SHEET Band .....

Contest ..... Sheet No. ..... Callsign .....

Date and time (gmt)	Callsign of station worked	My report on his signals and serial No. SENT	His report on my signals and serial No. RECEIVED	(5)	(6)	(7)	Points claimed
					Total from	previous sheet	.....

General Rules for VHF/UHF/SHF Contests 1972

The following are the general rules for all RSGB vhf/uhf/shf contests during 1972, excepting VHF Field Day and the October UHF Contest, the rules for which will be published separately. The rules for any vhf/uhf/shf contest will be made up from the general rules, which will be referred to by number.

Only two changes have been made to the rules this year: the scoring system has been slightly modified, so that all radial rings are 50km wide; and events are either "Open", with no sub-sections, or there are two sections, "F" and "P", for fixed and for portable and temporary stations.

Supplies of log-sheets specially designed for vhf contest use are now available, together with a revised version of Form 427, from RSGB HQ or from adjudicators. Please enclose a large, strong sae. The attention of entrants who persistently use old hf cover sheets, no cover sheets at all, and/or odd types of log-sheets, is drawn to Rules 13 and 14(ii).

1 Date and time. See individual contest details.

2 All entries must be sent to the adjudicator at the address given with the rules of the contest. Entries that are sent elsewhere will be disqualified.

3 All operators must be fully paid-up members of the RSGB.

4 Awards

(a) In each section of the contest there will be an award to the highest scoring station. An award will be made to the runner-up in each section in which there are 10 or more entries.

(b) Awards will be made to the highest scoring station and the runner-up.

N.B. All awards are certificates. In addition, trophies will be awarded to the highest scoring stations in the following contests.

Trophy	Contest
VHF Manager's Trophy	June 70MHz Contest
Mitchell Milling Trophy	July 144MHz Contest
The Council Cup	May 432MHz Contest

5 Scoring system

(a) Contacts made between the distances shown in the table will score as indicated. Contacts on borders between scoring rings score **low.**

Km	Points	Km	Points
0–50	1	250–300	11
50–100	3	300–350	13
100–150	5	350–400	15
150–200	7	400–450	17
200–250	9	and pro rata	

Note that, (i) all radial rings are 50km wide, (ii) all possible scores are **odd** numbers.

(b) Contacts will be scored at one point per kilometre.

6 Location

(a) Entrants may not change the location of their stations during the contest.

(b) Entrants may change the location of their stations during the contest on one occasion provided that only the highest scoring contact with a given station is claimed in the event of a repeat contact. Repeat contacts must be clearly marked as such in the contest log.

7 Cross-band contacts

(a) Cross-band contacts do not count for points.

(b) On each band to be used for scoring in the contest, half points may be claimed for a cross-band contact by transmitting to, or receiving from, a station where two-way communication cannot be established. (Points may not be claimed on the same band for a further cross-band contact with the same station with the transmitting and receiving roles reversed, see Rule 10a)

8 Sections

(a) There are two sections:
Section F—fixed stations.
Section P—portable and temporary stations.
/A stations in which the equipment is a permanent installation enter Section F. /A stations in which the equipment has been installed for the contest enter Section P.

(b) All classes of station with no separate sections.

9 Modes

(a) Contacts may be made on all permitted modes.

(b) Entrants may transmit only A1 (cw) or F1 (fsk) and contact only other stations transmitting these modes.

(c) Entrants must make 2-way A3j (ssb) contacts only.

10 Repeat contacts

(a) Only one scoring contact may be made with a given station on each band covered by the contest. (ie callsigns that are fixed, /A, /P or /M or the same set of equipment used under a different callsign all count as one station.) If a station that has moved location is contacted a second time, only the higher scoring contact may be claimed.

(b) One contact may be made with a given station (as defined in 10a) during each activity period. Only three out of seven activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purposes of checking. To be eligible for an award, an entrant must take part in a minimum of three activity periods.

11 Stations using telephony in the recognized cw sub-bands 70·025–70·1MHz, 144·0–144·15MHz, 432·0–432·10MHz and 1,296·0–1,296·15 MHz are liable to disqualification.

12 Contest exchange

The contest exchange shall consist of:
(i) RS or RST report followed by serial number
(ii) Both QRA Locator and QTH.
No points will be lost where an entrant is unable to obtain a serial number or complete location information from a station not taking part in the contest.

13 Entries

Logs must be made out on RSGB Contest Log Sheets and tabulated as follows:

(i) Date and time (gmt).
(ii) Callsign of station worked.
(iii) My report on his signals and serial number sent.
(iv) His report on my signals and serial number received.
(v) QRA Locator received.
(vi) QTH received.
(vii) Points claimed.

14 (i) Entries must be postmarked not later than 15 days following the termination of the contest.
(ii) The RSGB VHF/UHF Contest Cover Sheet (Form 427) enclosed with the log must be correctly made out and the declaration signed.

15 An entrant must operate within the terms of his or her licence.

16 Special event callsigns (eg GB) may not be used.

17 Stations that persistently overmodulate, or radiate key clicks or poor quality signals, render themselves liable to disqualification.

18 Contacts with unlicensed stations will not count for points.

19 All entries become the property of the RSGB and will not be returned. Entrants must keep their own log records in accordance with licence requirements.

20 Contacts made by EME reflection, man-made satellites (active or passive) or any relaying device will not count for points.

21 Proof of contact may be required.

22 Gross errors in claimed score render the entrant liable to disqualification.

23 Failure to comply with any of the rules given for a particular contest will result in disqualification.

24 The ruling of the Council of the RSGB shall be final in all cases of dispute.

Definitions

All equipment, including aerials, for stations entering Section P must be installed on the site within the 24 hours preceding the contest or during the contest itself. This does not apply to storage of equipment. "Site" is defined as a circle of 1km radius centred on the operating position during the contest.

Club, /A and multi-operator stations may enter either Section F or Section P, according to their status under Rule 8(a).

QRA Locator is the standard five-symbol location system.

QTH must be given as a point identifiable on the Ordnance Survey 10-mile map, or as a bearing and distance in kilometres (not more than 25km) from such a point, to the nearest kilometre.

Serial numbers start at 001 for each band and advance by one for each contact. In cumulative activity contests the serial commences at 001 for each activity period.

CLUB NEWS

Items for inclusion in this section should be sent to regional representatives on the first of each month for inclusion in the following month's issue. They should not be sent direct to the editor.

The date of publication of the following month's issue, first Tuesday in the month, should be borne in mind so that events are not, in fact, history when the details are published. While regional representatives are pleased to receive club's events calendars for several months ahead, they still require monthly events lists so that entries can be confirmed or amended.

REGION 1 — RR B. O'Brien, G2AMV

Merseyside Luncheon Club—First Monday each month, 1230 for 1245, HMS *Landfall*. Please advise G3VQT or G2AMV if you wish to attend.

Ainsdale (ARC)—Members should contact N. Horrocks, G2CUZ, QTHR, for details of the changed meeting arrangements.

Allerton (Liverpool) Scout Amateur Radio Society—North West Region—Thursdays, 8pm, 1st Allerton Group Headquarters, Aigburth Vale, Liverpool 17. All Scouts interested in amateur radio are welcome.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Further details from G4JS.

Blackpool (B & FARS)—Mondays, 8pm, Pontins Holiday Camp, Squires Gate. Morse tuition, 7.30pm.

Bolton (B & DARS)—First and third Wednesdays in each month at Bolton Recreation Club, Kensington Place. Full details from G3ZQS.

Bury (B & RRS)—11 January (Constructional competition, there could possibly be a junior section—nothing too small to enter), 8pm, George Hotel, Market Street, Bury. There is now a club net on 145·8MHz on Sunday at approximately 1045gmt, following the 2m news bulletin. The Silver Jubilee Dinner Dance, celebrating the 25th birthday of the callsign G3BRS, takes place on 19 January. Tickets obtainable from G3RSM.

Carlisle (C & DARS)—Mondays, 7.30pm, Currock House, Lediard Avenue, Currock. Secretary A. R. Harper, 23 Roman Way, Stanwix.

Cheshire (Mid-Cheshire ARC)—Wednesdays, 7pm, Technical Activities Centre, Winsford Verdin Comprehensive School, Grange Lane, Winsford. Morse practice from 1900 to 2000gmt and on the air, working 160 and 2m, extending later to 80m. Main activities, 2000 to 2130gmt. Net nights: Mondays starting at 1900gmt on 160m, Tuesdays on 2m at the same time. Full details from G3JWK.

Chester (C & DARS)—Tuesdays except for the first Tuesday in each month which is net night, 8pm, YMCA, Chester. Further details from G8AYW, QTHR.

Crewe—Local members continue to meet at the QTH of R. Owen, 10 Circle Avenue, Willaston, Nantwich, from whom further details may be obtained.

Douglas (IOM) (D & DARS)—Every Monday and Thursday, 7.30pm, rear of Douglas Holiday Centre, Victoria Road, Douglas. Club callsign is GD3ZCM. Secretary J. Parnell, Cronkbane, Quines Hill, Port Soderick, IOM.

Eccles (E & DRC)—Tuesdays, 8pm, Bridgewater School, Worsley, Lancs. Thursdays, club top band net, 2030gmt.

Leyland Hundred Amateur Radio Group—Net nights: Thursdays at 2000gmt on 1915kHz, Saturdays at 1900gmt on 145·8MHz.

Liverpool (L & DARS)—Tuesdays, 8pm, Conservative Association Rooms, Church Road, Wavertree. Secretary K. Wood, G3WCS, 90 Childwall Valley Road, Liverpool 16.

Liverpool (NLRC)—14, 28 January, 11 February, 8pm, Labour Party Headquarters, 13 Crosby Road South, Liverpool 22. Secretary M. Graham, G3XMG, 14 Albert Road, Waterloo, Liverpool 22.

Manchester (M & DARS)—Wednesdays, 7.30pm, 203 Droylesden Road, Newton Heath, Manchester 10. Secretary G3IOA, QTHR.

Manchester (SMRC)—Fridays, 7 January (Two films: "Voices under the sea" and "Call the world"—colour. Both with sound), 14 January (Eric Mollart's tape talk on df, followed by a general discussion on df. (It is quite a lengthy tape and members are advised to come early)), 21 January ("Variations on a square wave", by R. J. Slatter, G8EXF), 28 January (Surplus equipment sale—non-members also welcome), 4 February ("Aerials", by E. Taylor, G2ALN), 8pm, Sale Moor Community Centre, Norris Road, Sale, Cheshire. Vhf/uhf activity night is Monday, with operation of G3UHF at 8pm from the club shack, "Greeba", Shady Lane, Manchester 23. Visitors are welcome on Mondays and Fridays. Secretary G3WFT.

Manchester University (ARS)—This club runs a series of visits and lectures, including tuition for the RAE and morse test. Further information from G8BVF, G3ZNS or GM3YOK, University Union, Oxford Road. G3VUM is now operating on all hf bands with a KW2000A into a 6 element beam. G5RV on 160m with a dipole at 100ft. G8FUM operates on 144MHz with 40W to a 6/6 at 100ft.

Preston (PARS)—6, 20 January, 3 February, 7.30pm, Windsor Castle (private room), St Paul's Square. Secretary G. Windsor, 26 St Gregory's Road, Preston.

Salford (Dial House RS)—A society of PO Engineers who meet on Wednesdays at 6pm, 8th floor (river end) Dial House, Chapel Street, Salford 3. Further details from the secretary at same address.

Stockport (SRS)—Second Wednesday in each month (Discussion night), fourth Wednesday in each month (Lecture night), 8pm, Blossoms Hotel, Buxton Road, Stockport. Secretary G8BCG.

Thornton Cleveleys (TCARS)—First and third Wednesdays, St John Ambulance Brigade Headquarters, Fleetwood Road North, Thornton. The club now hold the callsign G4ATH and a regular Sunday net at 1100gmt on 1·850kHz will be held with G4ATH as net controller.

The Leeds club, **G3BEW**, are to visit the Fylde coast during January/February (date to be announced) to lecture on their 2m portable gear. All will be welcome at the lecture, sae to G3ZYE for details.

TCARS and **Rossall School ARS** now have reciprocal memberships. The Rossall group are active on lf and hf with a KW2000A and various receivers for SWLs, their aerial farm includes dipoles for 160, 80 and 40m, a 14 AVQ and a 3 band G3IMX cubical quad. Both the TCARS and the Blackpool and Fylde clubs have provided help and additional operators for the school station, and the reciprocal membership is a move to cement the good relationship between the clubs.

Warrington (Culcheth) (CARS)—Fridays, 7.30pm, Chat Moss Hotel, Glazebury. All visitors welcome. Secretary K. Bulgess, 32 Hendon Street, Leigh, Lancs.

Westmorland (WRS)—First Monday in each month at the New Allen Technical College, Room 377 (top floor), Milnthorpe Road, Kendal. All visitors welcome. Secretary is E. P. Goonan, Jnr, "Longridge", Storth, nr Milnthorpe, Westmorland.

Windscale (Cumberland) (WAR & ES)—Fridays, 7pm, c/o Falcon Club, Falcon Field, Egremont. Further details from N. Ramsden, G3RHE.

Wirral (WARS)—First and third Wednesdays in each month, 7.45pm, Sport and Indoor Recreation Centre (Old Drill Hall), Grange Road West, Claughton, Birkenhead. Secretary G3WDS, 34 Glenmore Road, Oxton, Birkenhead.

Wirral (Wirral DX Association)—Last Thursday in each month. January meeting at the QTH of G3VVA for the Annual General Meeting. February meeting at the QTH of G3VUY. During December G3XAR (VP2GAM) was home on leave and operated on the dx bands with his NCX5 and linear. In the club's capacity as QSL Manager for G3XAR (Lands End) all QSL cards have now been sent for the entire operation via the Bureau. Anyone wanting a card in haste may send sae to the secretary for instant attention. Secretary, G3OKA, 219 Prenton Dell Road, Prenton, Birkenhead.

REGION 2 — RR (*For election*)

Barnsley (B & DARC)—14, 28 January, 7.30pm, King George Hotel, Peel Street, Barnsley. *G3LRP.*

Bradford (BRS)—4 January ("Electronic organs", by P. F. Allen, G3USH), 18 January ("Shack ergonomics", by G. Theasley, G8BMI), 1 February (Film and slide show—bring yours), 7.30pm, 10 Southbrook Terrace, Great Horton Road, Bradford 7.

Fulford (York) (FARS)—Tuesdays, 7.30pm, Scout HQ, 31 George Street, York. *G5KC.*

Halifax (NHARS)—5 January ("Lightning and its effects", by K. Walton, G3IKS), 12 January (Committee meeting), 19 January ("Measuring equipment", by L. M. Dougherty), 7.45pm, Peat Pitts Inn, Ogden.

North Riding (NRARG)—Meets at the Railway Hotel, Seamer Road, Scarborough. Details from the secretary J. E. Ager, G8AZA, 88 Rothbury Street, Scarborough, Yorks. *G8AZA.*

Scarborough (SARS)—Thursdays, 7.30pm, c/o RAF Association, 3 Westover Road, Scarborough. Club callsign G4BP. Secretary J. Cutler, G3VAN. *G8KU.*

Sheffield (SARC)—Meetings on the third Monday in each month at the Sheaf House Hotel, Bramall Lane. January ("Slides—New Zealand", by G3PHO). All communications to G8NN or G3JMV, QTHR. *G8NN.*

South Shields (SS & DARC)—Fridays 8pm, Trinity House Social Centre, Laygate, South Shields.

Spen Valley (SVARS)—Thursdays. 6 January ("Amateur tv", by R. Harrison, G6AAS/T/G8AYI), 13 January ("Crystal calibration", by I. Lamb, G6LD), 20 January ("Table top transmitter", by W. Ripley, G4AD), 27 January ("Ssb", by I. Lamb, G6LD), 7.30pm, Club HQ, The Grammar School, High Street, Heckmondwike.

Sunderland (SARS)—Meetings on the first and third Tuesdays in each month, 7pm, Sunderland Polytechnic. *G3XID.*

York (YARS)—Thursdays, 7.30pm, British Legion, 61 Micklegate, York. *J. Rainbow.*

REGION 3

RR *(For election)*

Birmingham (MARS)—No information received. Club meets at the Birmingham & Midland Institute, Margaret Street, Birmingham 2. *G8BHE.*

(Slade)—14 January (Inquest on VHF NFD), 28 January (Df evening by Mr Drakley), 8pm, The Church House, High Street, Erdington, Birmingham 23. *G8EYL.*

(South)—5 January ("The most northerly station in Britain", by G4ABX), 8pm, Hampstead House, Fairfax Road, Birmingham 31.

Bromsgrove (B & DARC)—No information received. Club meets at the Royal Oak, Barley Mow Lane, Catshill.

Cannock (CCARS)—No information received. Club meets at the Bridgtown Social Club, Walsall Road, Bridgtown.

Coventry (CARS)—7 January (Night on the air), 14 January (Slide night), 21 January (Night on the air), 28 January (President's quiz), 8pm, Coventry Scout HQ, 121 St Nicholas Street, Radford Road, Coventry.

Dudley (DARC)—4, 18 January, Central Library, St James' Road, Dudley. *G3PWJ.*

Hereford (HARS) 7 January (Lecture), 12 January (Social evening), 21 January (Component and equipment sale), 4 February (AGM), 8pm, Civil Defence HQ, Gaol Street, Hereford.

Leamington Spa (MWAE & RS)—Every Monday, 8pm, 28 Hamilton Terrace, Leamington.

Lichfield (LARS)—No information received. Club meets at the Swan Hotel, Lichfield. *G8CNB.*

Nuneaton (NARS)—No information received. Club meets at Caldecote Grange, *G8ERM.*

Redditch (RRC)—13 January (Films and talk on visit to Bermuda—G3LNS, G3HCT), 27 January (Night on the air), 8pm, Old People's Centre, Park Road, Redditch.

Shrewsbury (SARS)—Every Thursday, 7.30pm, Harlescott Youth Centre, Sundorne Road, Shrewsbury. *G3VZG.*

Stoke (NSARS)—No information received. Club meets at Harold Clowes Community Association Centre.

(SoTARS)—No information received. Club meets at 2a Race Course Road, Oakhill, Stoke.

Solihull (SARS)—18 January ("Life in Fiji", by G3HZG/VR2FT), 7.30pm, Manor House, High Street, Solihull. 1 February (Informal meeting), 9pm, Malt Shovel, High Street, Solihull. *G3XPY.*

Stourbridge (STARS)—4 January, 8pm, Longlands School, Stourbridge.

Stratford (SuA & DARC)—7 January (RSGB tape lecture), 7.30pm, Halls Croft, Old Town, Stratford. *G3OOQ.*

Sutton Coldfield (SCRS)—10 January ("The Swindon project", by John Broomhead, G3NCX), 8pm, Clubhouse, Sutton Town, Football Club, Coles Lane. *G8AVH.*

Telford (WARS)—Every Wednesday, 8pm, Ketley Bank Youth Club, Main Road.

Wolverhampton (WARS)—11 January (Natternight), 18 January (Discussion on vhf ssb), 1 February (to be announced), 8pm, Neachells Cottage, Stockwell End, Tettenhall, Wolverhampton. *G3UBX.*

Worcester (W & DARC)—Meetings are now being arranged for the first Monday and the third Saturday in each month. 15 January, 7 February (Post Office telecommunication developments), 7.30pm, Crown Hotel, Broad Street, Worcester. G8ASO, telephone Worcester 29208.

REGION 4

RR T. Darn, G3FGY

Chesterfield (CDRS)—Meetings held every Wednesday evening, 7.30pm, Mount Zion Methodist Church, Chatsworth Road, Chesterfield. A formal meeting is held on the second Wednesday in each month. *G3ZLF.*

Derby (DADARS)—5 January (Surplus sale), 12 January (Communication receivers, past and present), 19 January (Film show), 26 January (Visit to Radio Derby—limited to 15), 2 February (Surplus sale). Meetings held at 7.30pm in the clubroom, 119 Green Lane, Derby. Visitors always welcome. *G2CVV.*

Grimsby (GARS)—6 January (General discussion and old timers' night), 20 January (Films). Meetings are now held at 7.30pm, at the Red Cross Rooms, Rowston Street, Cleethorpes. *G8EDK.*

Heanor (SEDARS)—4 January (Simple mains receiver), 11 January (Low ohm meter (part 2)), 18 January (Talk on components), 25 January (Forum), 1 February (AGM). *W. Clarke.*

Melton Mowbray (MMARS)—15 January ("Construction techniques", by D. Fisher). All meetings commence 7.30pm, St John Ambulance Hall, Ashfordby Hill, Melton Mowbray.

REGION 5

RR P. J. Simpson, G3GGK

Bedford (B & DARC)—At the AGM the chairman, G3UQR, reported a successful and active year for the club, with a wide range of interests and visits. The financial situation was also satisfactory. 6 January (CW Frolix—G3XNG), 13 January (The simple way to ssb—Eric Elsley), 20 January (G3WTP on the air—G4ABQ), 27 January (Demonstration of receivers—Eddystone EC10 and Heathkit GR78 by Cyril and Ken, G3XKB). Hon sec, John Bennett, G3FWA, 47 Ibbett Close, Kempston, Bedford. Meetings at the Dolphin, The Broadway, Bedford.

Cambridge (C & DARC)—7 January (Quiz—G3NIE), 14 January (Junk sale), 21 January (Informal), 28 January (Film show), 4 February (Film). Hon sec, C. Powlesland, G8CQZ, 341 Cherryhinton Road, Cambridge. Meetings at Club HQ, Corporation Yard, Victoria Road, Cambridge.

Dunstable Downs (DDRC)—14 January (Printed circuit techniques—G8BBO), 28 January (Annual dinner and dance—Contact G8CGX for tickets). Hon sec, A. C. Don, 51 Manor Park, Houghton Regis, Dunstable, Bedfordshire.

Shefford (S & DRS)—6 January (More "old versus new"), 13 January (AGM), 20 January (Teleprinters), 27 January (Morse Quiz—G3VMI).

The former RR would like to take this opportunity of thanking all club secretaries for their kind co-operation in the past, and of wishing all members in Region 5 a very happy and successful 1972.

REGION 6

RR *(Post vacant)*

Cheltenham (RSGB Group)—First Thursday in each month, 8pm, "Royal Crescent", Clarence Street, Cheltenham. *G2FWA.*

Gloucester (GRS)—First Thursday in each month, 7.30pm, RAFA Club, Spa Road, Gloucester, and each following Wednesday at the Drill Hall, Chequers Road, Gloucester. *G3MA.*

High Wycombe (Chiltern ARC)—11 January (Informal), 8pm. 26 January (Lecture "Maritime radio and navigation aids", by G8ADT), 7.45pm. Club meets at canteen of Ernest Turner Electrical Instruments Ltd, Totteridge Avenue, High Wycombe. Please park cars in Turner's Car Park—entrance in Gordon Road. *G3IQF.*

North Bucks (ARS)—Meetings on the second and fourth Wednesdays in each month. 12 January (Equipment night—members are invited to bring along equipment they think may be of interest), 8pm, Wolverton and New Bradwell Youth Club. *G3WXO.*

REGION 7

RR R. S. Hewes, G3TDR

Hear Ye! Hear Ye! My last report as RR, for I am retiring and your new RR now takes over. I will see he gets old and any new information. Many thanks for past invitations and co-operation and I hope to have a chat with old and new timers on 70cm to 160m. 73 and good luck for the future. *G4KD.*

Acton, Brentford & Chiswick (ABCRC)—18 January (AGM), 7.30pm, Chiswick Trades & Social Club, 66 High Road, Chiswick.

Addiscombe (AARC)—Second and fourth Tuesdays, 7.30pm, Prince George Hotel, High Street, Thornton Heath.

Ashford, Echelford (ARS)—Second Monday and last Thursday in each month. 7.30pm, St Martin's Court, Kingston Crescent, Ashford. The inter-club quiz held at Ealing on 9 November resulted in a draw and the winning club was decided by adding the total points gained in all three matches. Echelford came second and another event is proposed for 1972.

Barking (BR & ES)—Thursdays. 27 January (AGM), 10 February (Film show), 7.30pm, Gascoigne Recreation Centre, Gascoigne School, Morley Road, Barking.

Bexleyheath (NKRS)—Second and fourth Thursdays. 14 January (Amateur wine making by Len Randall), 27 January (Field Day organization, part 1), 10 February (Talk by G3RPE on 3cm), 7.30pm, Congregational Church Hall, Chapel Road, Bexleyheath. G3NPA gave an excellent account of the activities at the Goonhilly Down Research Station at the last meeting. As Len Randall, G4ACQ, is moving QTH the position of secretary is open.

Cheshunt (CDRC)—First Friday in each month, 7.30pm, Methodist Church Hall, opp Theobalds Station, Cheshunt.

Chingford (RSGB Group)—Fridays, telephone 01-524 0308.

Chingford (SRC)—Fridays, 8pm, Friday Hill House, Simmons Lane, Chingford E4.

Croydon (SRCC)—Third Tuesday in each month, 7.30pm, Swan & Sugarloaf, South Croydon.

Crystal Palace (CP & DRC)—Third Saturday in each month. 15 January (Projects evening, arranged by Tim Knappett, G3XFT), 8pm, Emmanuel Church Hall, Barry Road, SE22.

Dartford Heath DF Club—Fridays, 8pm, Scout Hut, Broomhill Road.

Dorking (DR & DRS)—Second and Fourth Tuesdays, "Wheatsheaf", Dorking.

Ealing (E & DARS)—Tuesdays, 7.30pm, Northfields Community Centre, Northcroft Road, W13.

East London—16 January ("Mobile operating", by G. Wakefield G5WG), 2.30pm, Wanstead House, The Green, London E11.

Edgware & Hendon (E & DRS)—Second and fourth Mondays in each month, 8pm, St Georges' Hall, 51 Flower Lane, Mill Hill, NW7.

Farnham, Bucks (Burnham Beeches RC)—Fortnightly on Mondays, 7.30pm, Buffaloes Hall, Victoria Public House, Victoria Road, Farnham Common.

Gravesend (GRS)—Mondays, 8pm, Northfleet Recreation Centre, Springhill Road, Northfleet, Kent.

Guildford (G & DRS)—Second and fourth Fridays, 8 January (Annual dinner to be held at the Wooden Bridge Hotel. Tickets obtainable from G3VIR.) Club meets at 8pm, Guildford Engineering Society, Stoke Park.

Greenford (GARS)—Alternate Fridays, Greenford Community Centre, Oldfield Lane. Next meetings on 7 and 21 January. Contact the secretary, G3OHX, telephone Uxbridge 33861, for further details.

Hampton Court (TVARTS)—First Wednesday in each month, 8pm, The Three Pigeons, Portsmouth Road, Long Ditton.

Harlow (DRS)—Tuesdays (General and cw practice), Fridays (Junior), 8pm, Mark Hall Barn, First Avenue.

Harrow (RSH)—Every Friday. 7 January (Talk by G4GB of his own choice on radio), 8pm, Harrow County School for Boys, Sheepcote Road, Harrow.

Havering (H & DARC)—Fortnightly, 8pm, British Legion House, Western Road, Romford.

Hemel Hempstead (HH & DARS)—First and third Fridays 7.30pm, "Addmull" Sports Club, Hemel Hempstead.

Holloway (GRS)—Mondays (RAE), 7pm; Fridays (Club—morse practice and lectures), 7.30pm, Monten School, Hornsey Road.

Hounslow (BEAARS)—Last Wednesday in each month, 7pm, BEA Training Centre, Southall Lane, Heston, Hounslow. (This club is open to non-BEA employees by invitation—contact David Evans, G3OUF, telephone Amersham 3257 for details.)

Ilford—Every Thursday, 8pm, 50 Mortlake Road, (off Ilford Lane), Ilford.

Kingston (K & DARS)—Second Wednesday in each month. 12 January ("Receivers"), 9 February ("Aerials"), 8pm, Penguin Lounge, 37 Brighton Road, Surbiton.

Loughton—Fortnightly on Fridays, Loughton Hall, Rectory Lane (nr Debden Station).

New Cross (CARS)—Wednesday and Fridays, 8pm, 225 New Cross Road, SE14.

Paddington (P & DARS)—Wednesdays, 8pm, Beauchamp Lodge, 2 Warwick Crescent, W2.

Purley (P & DRS)—First and third Fridays, 8pm, Railwaymens Hall, side entrance, 58 Whytecliffe Road, Purley.

Reigate (RATS)—First Wednesday in each month, 8pm. Club now meets at new venue, Nutley Hall, Nutley Lane, Redhill (200 yards to NW of the Red Cross—behind public house and car park). Other informal meetings are held on the third Wednesday in each month. Contact G3NKS, telephone Copthorne 2165, for venue.

Romford (R & DRS)—Tuesdays, 8.15pm, RAFTA House, 18 Carlton Road.

Scouts (ARS)—Third Thursday in each month, 7.30pm, Baden Powell House, Queensgate, South Kensington, SW7.

Sidcup (CVRS)—First and third Thursdays in each month. 6 January ("Integrated circuits and their application", by Ken Ide), Congregational Church Hall, Court Road, Eltham, SE9. The club celebrated its 25th anniversary in November. The club is indebted to G2ZI, G3MZ and G3ANK for their demonstrations of amateur radio used around 1946, illustrated with old newsletters and home-brew gear.

Southgate (SRC)—Second Thursday in each month, 7.30pm, Civil Defence Hut, Bowes Road, N11.

St Albans (Verulam ARC)—7.30pm, Town Hall, St Peter's Street, St Albans.

Sutton & Cheam (SCRS)—Third Tuesday in each month. 18 January ("Hi-fix direction finding system", by John Rose, G3OGE), 8pm, The Harrow Inn, High Street, Cheam. A new Contests Committee has been formed with Mike Pharaoh, G3LCH, as Chairman. Other members are Ron McDonald, G3DCZ and Andrew Maish, G4ADM.

Welwyn (Mid-Herts ARS)—Second Thursday in each month, 8pm, Welwyn Civic Centre, Welwyn.

Wimbledon (W & DRS)—Second and last Fridays in each month, 8pm, St John Hall, 124 Kingston Road, South Wimbledon, SW19.

Wembley (GECARS)—Thursdays, 7pm, Sports Club, St Augustin Avenue, North Wembley. (This club is open to non-GEC employees by invitation, contact Dain Evans, G3RPE, telephone 904 1262, for details.)

Woolwich—Contact G3ZOJ—reforming this society.

REGION 8 — RR D. N. T. Williams, G3MDO

Brighton (BTCARC)—Details of future meetings from G2CMH.

Canterbury (EKRS)—20 January ("Electronic organ", by G4AJC). Meetings held every month at "Westgate Hall", Canterbury. Further details from G3MDO, QTHR.

Dover (SEKYMCAARC —Meetings held every Thursday, YMCA Leybourne Road, Dover.

Eastbourne (SARS)—Meetings held on the first Monday in each month at the "Victoria" Hotel, Latimer Road, Eastbourne.

Horsham (HARC)—Formal meetings held on the first Wednesday in each month, 7.30pm, "Swan", West Street. Informal meetings held on the third Wednesday in each month, 8pm, "Star", Roffey.

Maidstone (MYMCAARS)—Meetings held every Friday. The first and third Fridays in the month are devoted primarily to the beginner. Classes in the club room and 80m "on the air" sessions in the club shack. 14 January ("Testing of transmitters", G3ORP), 28 January ("Delta loop aerials", G3ORP).

Mid-Sussex (MSARS)—Meetings held at Marle Place, Leylands Road, Burgess Hill. Further details from G3RXJ.

Thanet (TRS)—Meetings held every Friday at Hilderstone House, Broadstairs.

Worthing (W & DARC)—Meetings held every Tuesday, 8pm, "Rose Wilmot" Youth Centre, Littlehampton Road, Worthing. Further details of meetings from G6KFH/T.

REGION 9 — RR H. W. Leonard, G4UZ

Bristol (City & County RSGB Group)—24 January (Annual reports from the chairman, treasurer and secretary, followed by a members' auction with G3ULJ as auctioneer), 7.30pm, Becket Hall, St Thomas Street, Bristol 1. *G3ULJ.*

(University RS)—Saturdays, 2.30pm, Royal Fort, Dept of Physics, Tyndall Park Road, Bristol. *G8ADP.*

Burnham-on-Sea (BoSRC)—Contact J. Robertson, G3ZOR, telephone 2333.

Cornish (CRAC)—First Thursday in each month. 6 January (Films—G3UCQ), 7.30pm SW Electricity Board Social Centre, Pool, Camborne. *G3NKE.*

(Newquay)—12, 26 January, 7.30pm, Treviglas School. *G3THT.*

Exeter (EARS)—11 January (Lecture on first aid by St John Ambulance Brigade), Club HQ, Community Centre, St David's Hill. Club callsign G4ARE, operation each Tuesday from 1930 to 2230gmt.

North Devon (NDRC)—12, 26 January (Talks), Club HQ, Virginia House, Batter Street, Bretonside, Plymouth.

Some of those who attended the Region 9 ORM in September; present were 114 licensed amateurs and many associates. In the front row (l to r): J. Thorn, G3PQE; W. A. Scarr, G2WS; G. M. C. Stone, G3FZL; F. C. Ward, G2CVV; L. E. Newnham, G6NZ; and C. H. Parsons, GW8NP. Photo by Sid Boakes.

Saltash (S & DARC)—2, 16 January (Talks arranged), 7.30pm, Burraton Toc H, Warraton Road. At the recent AGM the following officers were elected: chairman, G3ZHM; secretary, G4AJU. Club activities are well supported from the membership of 35, 27 licensed. *G4AJU.*
Torbay (TARS)—Every Tuesday and Friday, also 29 January. Club HQ, rear of 94 Belgrave Road (Bath Lane), Torquay. *G3NQD.*
Weston-super-Mare (WsMRS)—14 January (Technical talk and general discussion), 7.30pm, Room 2, Lecture Theatre, Technical College. *G3GNS.*
Yeovil (YARS)—Thursdays, 7.30pm, Youth Centre, Park Lodge, The Park, Yeovil. *G3NOF.*

REGION 10 **RR D. M. Thomas, GW3RWX**

Blackwood (ARC)—Fridays, 7.30pm, (except school vacations), Oakdale Community Centre, Oakdale, Mon. *GW3TUG.*
Barry College of Further Education (ARS)—Thursdays, 7pm, College of Further Education, Colcot Road, Barry, Glam. *GW3VKL.*
Cardiff (RSGB Group)—Monday 10 January (Symposium on recording of weather satellites), 7.30pm, BBC Club, BBC Headquarters, Llandaff. *GW3GHC.*
Glamorgan Raynet Group—Details of meetings and activities from GW3ZEG, telephone Cardiff 62411.
Haverfordwest (ARS)—Tuesdays, 7.30pm, HQ Rosemary Lane, Haverfordwest, Pembs. *GW3YBB.*
Hoover (ARC)—Mondays, 7.30pm, Hoover Social Club, Hoover Works, Pentrebach, nr Merthyr, Glam. Secretary Mr F. E. Tribe.
Port Talbot (ARC)—Second Tuesday in each month, 7.30pm, Trefelin Club & Institute, Trefelin, Port Talbot, Glam. *GW5VX.*
Pontypool (ARC)—Tuesdays, 7pm (school vacations excepted), Educational Settlement, Rockhill Road, Pontypool, Mon. *GW3JBH.*
Pembroke (ARC)—Last Friday in each month, 7.30pm, Defensible Barracks, Pembroke Dock, Pembs. *GW3LXI.*
Sully & District Shortwave Club—Tuesdays, 7pm, The Annexe, Sully Bowls and Social Club, 59 South Road, Sully, Glam. *GW3ZSV.*
Rhondda (ARS)—Meets at Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. *GW3PHH.*
Swansea Telephone Area (ARS)—Tuesdays, 7.30pm, Telephone Engineering Centre, Gors Road, Swansea. Secretary Mr D. E. Connor, 7 Glanmon Road, Sketty, Swansea, Glam.
University College Cardiff (ARS)—From a somewhat unpromising start this society is now growing into a very enthusiastic group, and is widening its interests into the general field of electronics. Details from the secretary, c/o Students Union, Dumfries Place, Cardiff.

University College of Wales, Aberstwyth Radio & Electronics Society—Reports indicate that the level of activity is high, and the Zonal and possibly Regional Representatives will be able to attend the combined Welsh University Radio Society's meeting in the New Year. Secretary, Miss Ruth Bury, c/o Students Union, University College of Wales, Aberystwyth, Cardiganshire.

REGION 11 **RR** *(Post vacant)*

Bangor (B & DARC)—13 January (Junk sale), 27 January ("Radar navigation", by D. Last, GW3MZY), 10 February (Film night), 24 February (Talk—to be arranged), The Drill Hall, Bangor.
Bangor (UCNWARC)—Anyone interested in radio coming to the University is invited to get in touch with the secretary of the radio club.
Conway Valley (CVARC)—Second Thursday in each month, Parade Hotel, Llandudno.
Rhyl (R & DARS)—11 January (Talk on industrial electronics by D. Little), 7.45pm, Mona Hotel, Market Street, Rhyl. The annual junk sale held on 9 November was a huge success with a large party from the UCNWARC swelling the already large numbers present. On 23 November a party of members spent a most interesting evening at the Wales Gas Board telemetry station at Rhyl. Club callsign GW4ARC.

REGION 12 **RR** *(For election)*

Region 12 ORM report

During the weekend 23-24 October an ORM and exhibition was held in the Beach Ballroom in Aberdeen, commencing with the exhibition which was opened by the Lord Provost of Aberdeen, Mr Smith. Among the exhibitors were Aberdeen University TV Group, Aberdeen University Astronomy Group, and pupils of the Old Aberdeen School whose exhibits included a piano converted to an electric organ; the Aberdeen ARS had a station (GM3BSQ/A) on the hf bands, and the Moray Firth ARS were on 144MHz using GM3TKV/A. Mr. M. C. Hately, BSc, MIEE, of Robert Gordon Technical College gave a demonstration of weather satellite pictures which he had recorded.

A lecture on oscillators was also given by Mr Hately, after which there was a break for tea and a last chance to see the exhibition.

The ladies went on a tour of Aberdeen during the afternoon, with a break for afternoon tea.

About 50 members were present at the ORM, when a wide variety of subjects was discussed. The RSGB was represented by Mr F. C. Ward, President; Mr A. W. Smith, Zone G Council member; and Mr E. G. Ingram, Council member. Chairman of the meeting was Mr G. M. Grant, regional representative.

In the evening a dinner attended by 84 people had as its principal guests Mr Morrison, a senior baillie of Aberdeen, and Mrs Morrison, and Mr and Mrs Ward. This was followed by a social and dancing at the Star Ballroom.

On Sunday morning a group of about 20 who had stayed overnight in Aberdeen went on a tour of the Post Office microwave relay station at Granite Hill, Aberdeen, where the staff explained how the station relayed and switched tv programmes for the north of Scotland.

Aberdeen (AARS)—Fridays, 7.30pm, 6 Blenheim Lane, Aberdeen. *GM3HGA*, telephone Aberdeen 33838. The Aberdeen ARS Annual Dinner and Dance will take place at the Queen Hotel, Aberdeen, on Friday 14 January.
Dundee (Kingsway Technical College ARC)—Wednesdays, 7pm prompt, Kingsway Technical College, Old Glams Road, Dundee.
Inverness (IRS)—Thursdays, 7.30pm, Clubroom, 4 Falcon Square, (nr railway station), Inverness. Miss A. Veitch, telephone Drumnadrochit 266.
Lerwick (LRS)—Tuesdays and Thursdays, 8pm, Annsbrae House, Lerwick, GM3XPO, telephone Bixter 249.
Lhanbryde (MFARS)—Wednesdays, 7.45pm, St Andrew's School, nr Lhanbryde, Elgin, Morayshire. *GM3UKG*, telephone Clochan 225.
Thurso (CARS)—Second Tuesday in each month, 7.30pm, Scapa House, Thurso. *GM3JUD*.

REGION 13 **RR V. W. Stewart, GM3OWU**

Berwick (BARS)—First Sunday in each month, 3pm Tweed View Hotel. Further details from C. H. Crook, G3YOG, 19 Hatters Lane, Berwick on Tweed or from the AR, G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.
Dunfermline (DRS)—Second Wednesday in each month, 7.30pm, Abbot House, Dunfermline. Further details from G. Martin, GM3NVQ, 42 Rose Street, Dunfermline.
Edinburgh (LRS)—Second and fourth Thursdays, 7.30pm, 66 Hanover Street, Edinburgh. Further details from R. Manners, GM3ZVL, 165 Mayfield Road, Edinburgh.
Glenrothes (GDARC)—First Sunday in each month, 7.30pm, Old Nursery Buildings, Leslie, Fife. Further details from K. Home, GM3YBQ, 14 Liss Way, Kirkcaldy.

REGION 14 **RR** *(Post vacant)*

Ayrshire (AARG)—16, 30 January, 7.30pm, YMCA Howard Street, Kilmarnock.
Ayrshire (ARC)—4, 6, 11, 13, 18, 20, 25, 27 January, 7.30pm, Ardeer Recreation Club, Amateur Radio Section, Stevenston. Details from J. F. McCreight, GM3DJS 10 Auchenharvie Road, Stevenston, Ayrshire.
Falkirk & District RSGB Group—14 January, 7.30pm, Temperance Cafe, Lint Riggs, Falkirk.
Glasgow University (GURC)—13, 27 January, 7.30pm, George Service House, University Gardens, Glasgow W2.
Greenock & District (G & DARC)—7, 14, 21, 28 January, 7.30pm, James Watt Library, Union Street, Greenock.
Mid-Lanark RSGB Group—21 January, 7.30pm, YMCA, Brandon Street, Motherwell.
West Scotland (ARS)—7, 14, 21, 28 January, 7.30pm, 81 Virginia Street, Glasgow.

REGION 15 **RR** *(Post vacant)*

Belfast (B & DRG)—Club meets on the third Wednesday in each month, 8pm, 90 Belmont Road, Belfast 4.

REGION 16 **RR D. F. Beattie, G3OZF**

Colchester (CARS)—Wednesdays, 7.30pm, North East Technical College, Sheepen Road, Colchester. Chairman, G5YK; secretary E. Jacobs, 26 Pondfield Road, Colchester, Essex.
Ipswich (IRS)—Last Wednesday in each month. 26 January ("Time domain reflectometry", by G4AJX), 7.30pm, Gippeswyk Hall, Gippeswyk Avenue, Ipswich. Secretary G3YWM.
Norwich (NARC)—Wednesdays. 19 January (Winter sale), 7.30pm, Crome Community Centre. *G3XLL*.

REGION 17 **RR** *(For election)*

Basingstoke (BARC)—Meetings on the first and third Saturday in each month, 7pm, Chineham House, Shakespeare Road, Basingstoke, Hants. *G3CBU*.
Harwell (AERE ARC)—Meetings on the third Tuesday in each month. Also informal gatherings and junk sales every Friday lunchtime. 7.30pm, Social Club, AERE, Harwell, Berks. *G3NNG*.
Reading (ARC)—4 January (Project evening), 18 January (Winding transformers etc), 1 February (Frequency measurement). 7.45pm for 8pm, Ashmead School, Northumberland Avenue, Reading. Hon sec, D. M. King, 34 Crawshay Drive, Reading.
Swindon (SDARC)—5 January (Informal), 19 January ("2m ssb", by G3NNG), 7.30pm, Penhill Junior School, Penhill, Swindon, Wilts.
Maidenhead (M & DRC)—17 January (VCT-digital frequency meter), 7 February (Informal), 7.30pm, Victory Hall, Cox Green, Maidenhead. *G3VMR*.

OBITUARIES

Mr D. E. Tomkinson, G3IIE
Doug Tomkinson died on 28 October 1971 aged 52. He was a competent cw operator and for many years was a valuable member of the Coulsdon NFD Group. From his home station he was mainly active on the lf bands.

We have also been advised of the death of:
Mr J. P. L. Stueber, G5AHI, of Ashtead, Surrey, on 29 November 1971.

MEMBERS' ADS

These advertisements are accepted free of charge as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership.

The closing date for each issue is the 4th of the preceding month, but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue and should not be resubmitted.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

No correspondence concerning this free service can be entered into.

See the current order form for further details.

FOR SALE

G2DAF rx, fine specimen, engraved front panel, linear vfo, £45. Reason for sale, cnstrctn of SIC tx/rx. GW3GRY, QTHR. Tel Colwyn Bay 56135.

Labgear LG300 tx with high power modulator/psu, exc cond, £32 Creed 6S.5, 230V ac, exc cond, £10ea. G8BMQ, 2A Convent Hill, Upper Norwood, SE19. Tel 01-653 8489.

Valves: 5763, 807, 12AX7, ECC91, X79, 12AT7, 13p ea. E88CC, 20p post free. Transistors OC45, 7p. MacDonald, 11 Berrington Road, Swindon.

Philips /P tape recorder type EL3586, £12 ono. Will cons exch for Ezee Match. GW3ZTH, 1 Maes Glas, Cefn Cribbwr, Bridgend, Glam. Tel Kenfig Hill 561.

HRO + psu and 5in spkr, 8 coils, bndsprd 80, 40, 20, 10m, exc wkng cond + appearance, £30. G3KUG, QTHR.

DL6SW 2m cnvtr, 1·8/3·8 i.f., £7. 4m tx, 829 pa, £5.50. 2m/M tx/rx with halo, £15. *Radio Designers Handbook*, £1. 150W 2m pa with spare valves, £7.50. 832A, 75p. TT21, £1. G6NB, QTHR. Tel Whitchurch 508.

KW Valiant tx with psu. Copyrapid photo copier, odd uniselectors. Encapsulated reed switches in banks of 4. 24V dc plug-in relays, lots of meters etc, no rsnble offer refused. G3SJR, 29 Elm Walk, Stevenage, Herts.

Sommerkamp FTDX150, 160m—10m, /M or fixed stn, coll and test or + pp, £160. G3TFN, QTHR.

Eddystone EA12, vgc, £125 no offers, or exch 8516L. 100kHz calib transistor, £2.50. Low impedance phones, £1.50 or exch high impedance. Westwood, 114 Pettits Lane, Romford. Tel 47577.

Codar CR70/A, hardly used mint cond, still under guarantee with spkr etc, £18. Pryce, 2 Seven Sisters Road, Lower Willingdon, Eastbourne, Sussex. Tel 53476.

Low band Murphy Rover, 6 channel, £25. Single channel, £20. Marconi HP112, £12. High band Ranger, £8. All dash mount, offers. Wanted: G2DAF Mk 2 tx or exch G2DAF rx for tx/rx, cash adjustment. G3WR, 17 Tongdean Rise, Brighton.

Codar CR45 rx, trf mains type, fully wkng all band cov, output 3W, minus spkr, will accept £6 ono. Buyer coll, size 12 by 5 by 7. Leask, "Baytna", The Avenue, Bletsoe, Beds. Tel Sharnbrook 634.

Homebrew tx, 160m, £10. G3XQW, 160 Eastcombe Avenue, Charlton, London SE7. Tel 01-858 9858.

Trio tx/rx TS500 + PS500 psu + spkr, vfo 5 remote vfo, £120. 4m Emsac cnvtr, little used, i.f. 28MHz, £7. 4m Pye Ranger tx, wkng on 4m with 70·32 xtal, £8.50. Psu for tx, £5, carr extra. G3VOF, 64 Station Road, Over, Cambs. Tel Swavesey 588.

Eddystone EB35 case. resprayed grey, surplus to reqmnts, best offer secures. Wanted: circ and dets of xtal calib No 10. G3PGX, QTHR.

Collins R390A rx, 500kHz-32MHz, digital readout, calibrtd every 200kHz, £150. TW 2m nuvistor cnvtr, i.f. 2-4MHz, £5. G8BBB, QTHR. Tel Haddenham (Cambs) 355.

FTDX150 tx/rx, immac 1970 model, 3 extra spot freq xtals, spkr, mic, £155. G3CDE, QTHR. Tel Guildford 75236.

Labgear E5121 transistor tester sig injections probe, brand new boxed, pnp-npn, list price £17·30 sell £4·85. G3CJY, Whiteroses, Reach, Cambridge. Tel Newmarket 741428.

Codar CR45RB all band rx, coils for 1·6-30MHz, exc cond, one yr old, £10 ono. Benham, 15 South Lodge Drive, Southgate, London N14 4XD. Tel 01-360 5221.

Marconi CR100/8, mint cond, new valves, realigned, noise limiter, unmodded, spares kit, manual, can be deld rsnble dist, £17 ono. G3JBU, QTHR. Tel 0604 43020.

821, £11. Tx + rx xtals for 144·486MHz, £2. New Bantex, £3.95. Pair new xtals 12·0405MHz, £3, or £15 the lot. G8CEZ, QTHR.

Avo CT38 electronic multimeter, 96 ranges, gd cond, £15 ono. 19 Set Mk 3 unmodded with mains psu, all wiring pvc, £5 ono. US Navy oscilloscope approx 9in by 9in by 14in with auto trnsfmr, £7 ono. G3ZNY, 11 Kingston Avenue, Stony Stratford, Wolverton, Bucks. Tel Stony Stratford 2382.

AR88 lf communication rx, very sensitive, adjustable sensitivity, tone control and noise limiter, ideal for swl, needs new output valve otherwise perf, with circ diag and aligning dets, £20. Callers only by apptmnt. A7747 Tel 01-203 2814.

HRO rx, comp with 4 gen cov and 2 bndsprd coil packs, not working and reqs rebuild, insp and coll only, £5. G8COL, QTHR.

Trio 9R59DE comm rx, unused and in mint cond still under guarantee, supplied comp with instrctn hndbk, ldspkr and other accessories, £35 ono. Hunter, 110 Devonshire Way, Shirley, Croydon CRO 8BS. Tel 01-777 1024.

Trio JR500SE comm rx + SP-5D spkr and HS4 headset. Also Joymatch L0-2 atu, £50 the lot, will split, del up to 30 miles or post extra. Dingley, 14 North Down Road, Chalfont St Peter, Gerrards Cross, Bucks SL9 0LQ.

Rtty gear as follows: Creed 7B, Creed auto tx printset, tu and printset, afsk unit, comp psu and leads. Offers, pref buyer coll. G8DDW, QTHR. Tel 01-858 3921.

Burns xtal calib CC-10, recently checked to within ½Hz accuracy, mint cond, £15 ono. Pref buyer coll. G8ACC, QTHR. Tel Rugby 71287.

Solarscope CD643·5 calib scope, £40. Cossor DB1035 Mk 2 scope, £16, Circular chart recorder, 50μA movement with charts, £5. All vgc. R209 rx needs attntn, £4. All carr extra. Brash, 5 Hillview Drive, Edinburgh, EH12 8QW. Tel 031-334 7152.

STC floor cab 26in by 19in panel space, dual power pack 450/350V. Elliott base station, 95MHz-5MHz stable source stc 3 units. 12V scope unit. Vhf cnvtrs, valves, offers. GM3BCD, QTHR. Tel 031-447 5059.

Trio 9R59DE, exc cond, with fitted voltage stab valve, little used and less than 1½ yrs old, comp with manual and box, £28 ono. Hurrell, 63 Tennyson Avenue, Kings Lynn, Norfolk.

CR100, fair cond, spares, manual, £8. 10W amp, £4. TRIX T613 amp, £5. BC454B rx, £3. Dartronic scope, £3. 150 assorted valves, £5. 3 tv sets, £1 ea. Carr extra. Keymer, Kevockbank, Lasswade, Midlothian. Tel Lasswade 3205.

22 Set tx/rx, mains psu, mint cond, many gd mods, phones, mic, spkr £10. Yeaman, 5 Chartwell Road, Bishopton, Renfrewshire. Tel Bishopton 2941.

Uhf nbfm strips, approx 5W output, uses E90F, 6AK5, E810F, two QQE02-5s, some with valves, £4 ea. A few vhf tx strips also. 5W /M uhf r/t 12V transistor psu, £15. Buyer coll. G8AKA, 2 Orchard Road, Mortimer, Reading. Tel Mortimer 332582.

Creed 7B, vy clean, 1st class print, £13. Swop Leak TL25 and pre-amp, why? QQVO3-10, used but all OK, 3 for 50p, post free. Pye eqpmnt manuals, £1 ea. Phone for dets. G3MOU, QTHR. Tel 01-570 6181.

New unused prof built DX100 with SB10, immac, coll only, £80 ono. Mosley V4/6 with guys and heavy timber base, £10. Woden UM1 modulation trnsfmr, £3.50. G8SP, QTHR. Tel Silchester 513.

Creed 7B teleprinter, terminal unit FS10, printing reperf, perf 44, auto tx, psu, all above eqmnt comp, £65. G3WMM, QTHR. Tel Colchester 42453.

Offers for comp parts to make G2DAF or grounded grid 600W p.e.p. linear with all necessary psus. Buyer must coll. G3RFG, QTHR

Heathkit S33 stereo amp, 3W per channel, as new, £8 ono. G3UYM, QTHR. Tel Hitchin 55312.

/M 2m tx/rx, 12in by 8in by 4½in, inc transistorized rx, psu, modulator, 26 transistors + 14 diodes. Tx 6BH6, 6BH6, QQVO3/10, QQV03/10, xtal for 145MHz. Remote rx tuner covers band, £30. Jeapes, 165 Cambridge Road, Gt Shelford, Cambridge.

Hallicrafters SX100, mint cond, £85. Eddystone 740, gd cond, £18. Many *Bulletins, SWMs, QST, CQ,* state wants with offers. Space needed. Andrews, 12 Malton Way, Clipton, York. Tel York 59035.

Eddystone 750 rx, ssb/cw/a.m. gen cov double superhet, variable selectivity, rf/i.f./af, gains inc 500kHz distress freq, int psu, £45 ono. Bruce, 437 Helmshore Road, Rossendale, Lancs. BB4 4JR. Tel Rossendale 4620.

Collins M.F. F250Z4 + carrier xtal. Collins M.F. F455J21, offers. G3SYC, 49 Park Avenue, Normanton, Yorks.

Selling dx package comprising KW2000A, mic, homebrew linear, KW lpf swr bridge, connecting cables, manual, £190. G2FLK, QTHR. Tel 015511473 (evening).

KW Vespa Mk 2, 6LQ6, alg psu, 1st class cond, del by Securicor, £90. G3YBK, QTHR. Tel Exeter 78710.

Black crackle cab 19in by 9in by 9in, £1.50. Grey hammered (undrilled) front panel, £2. Valves QQVO6/40A, new boxed, £2. QVOV /7, 6AG7, VR105/30, VR/150, 25p. 5763, RG1-240A, 50p. Mastercraft electric 24hr clock, £5. G3AIZ, QTHR. Tel 554 0984.

Compact 2m tx, 30W rf 3-20A pa, EL34 pp modulator 19in by 12in 7in, £40 ono. 70 + 23cm varactor triplers, £10 ea ono. Parry, Chadwich Heights, Chadwich, Bromsgrove, Worcs. Tel 021-453 3693.

Eddystone 888A, S meter, spkr, exc cond, £58 ono. Wanted: 2m cnvtr, valve or semi-conductor. G3PLR, 16 Pie Gardens, Flamstead, Herts. Tel 01-866 5641 extn 8 (day) or 058-289 328 (evening).

Miniature ex-eqpmnt xtals: 70·425MHz (1); 72·3MHz (2); 72·735MHz (1); 72·8MHz (2); 60·75MHz (1). 75p ea + sae. Many tx/rx valves, trnsfmrs, sae list. Wanted: 12MHz/8MHz xtals for 70cm below 432·9MHz (not 10X/10XJ). Unused 7in/3,600ft tape, £2.75 post free. G8BUR, QTHR. Tel Knebworth 2229.

Cw tx, 807 pa, Franklin vfo, WBCs gb keying, sep mod + psus, 160-10m, spare valves, £8. Also linear parts—1,750V psu, case, 813 with base and filament trnsfmr, £10. G3RUG. QTHR. Tel 061-439 7183.

8A Zenith variac on chassis, £7 ono + carr. Dix, 7 Peplins Way, Brookmans Park, Hatfield, Herts. Tel Potters Bar 56735.

Rtty 7B printer, 240V ac, silence cab, reperf 240V ac psu, Governors 45 and 50 bauds, 80-0-80 twice commercial loop supply, polar relay, all prof maintained, spares, new 813, £15. Dexion rack, wood bench. G2UD, 44 Lenham Avenue, Saltdean, Brighton. Tel Brighton 34924.

Dc psu KW2000 almost unused, £20 ono. Large number of obsolete valves, suit vintage collector. Sae for details. Dunn, 106 Everest Road, Scunthorpe, Lincs.

AR88D, 2m cnvtr, 70cm Garex 28-30MHz type 234A psu, 70cm tripler, pa + psu, 70cm beam, Joystick, 600-0-600 trnsfmr, + more bits. Sae for dets. G8BEI, 119 Horsa House, Middle Wallop, Hants.

Pair 4CX250Bs, as new, £6 post pd. G3VAG, QTHR. Tel Wivenhoe 2243.

Heathkit HW178A perfect cond, £45. Trio 9R59DS very stable, £25. G8EKA, 1 Shenstone Close, Crayford, Kent. Tel Crayford 28915.

Comp 2m stn: QQVO3-10 tx, Eddystone EC10, fet cnvtr, 6 ele beam, all batt operated, £55 or will split. Compact marine tx for top band /P, £8.50. Wanted: NCX3 or NCX5 mains psu. G3PZF, 16 Palfrey Close, St Albans, Herts. Tel St Albans 57665.

Rf ammeters 0-500mA 0-1A, £1.50. 0-3A 0-2·5A 0-3·5A 0-4A, £1.25 post pd. Nicholls, Ancoats Hospital, Manchester 4. Tel 061-205 2204.

Codar T28, unused, exchange for low band Pye Cambridge or low band Pye base stn. G3XGZ, 62 Mayfield Avenue, Wantage, Berks. Tel Wantage 4004.

Valve tester Taylor 45C, £15. TF144G, £13. Kelvin & Hughes 4 channel paper tape recorder CPS50, £15. Furzehill vtvm378B2 100μV-100V, £5. RCA audio freq meter 5Hz-50kHz, £12. Can del. Homer, 32 Iron Mill Lane, Crayford, Kent. DA1 4RR. Tel Crayford 24625.

Pye PTC116 tx/rx with manual. Cnvrtd 240V operation suitable for cnvrsn 4m or 2m (little more difficult), £10 ono. Low voltage psu, transistor regulated various outputs, £3 ono. Ross, 16 Glebe Crescent, Airdrie, Lanarkshire ML6 7DH.

1150 rx, psu, S meter, £7 ono. 1155 rx, mains psu, built-in spkr, £7 ono. Downey, 19 Wellington Avenue, Chingford E4.

Unused HC6/U xtals 83·5MHz, 86·5MHz, £4.75 ea. Two 0A210s, 15p ea. AD140, OC35, 45p ea. Matched OC81D, two OC81s, 55p. MAT120, 2N1304, 20p ea. 2N3707, 10p. Miniature 3 lead AF115, 20p. AF117, 15p. Slattery, 67 Abbey Lane, Sheffield S8 OBN, Yorkshire. Tel 0742 45850.

Drake TR3 tx/rx, RV-4 remote vfo, ac-4 psu, mint, £250. G2DAF tx, psu, outstanding audio, fb performance, 160-10m, £52. QRO comps: four 400As, 805s, PL-504s, eht trnsfmrs, high voltage capacitors etc. Sae list. G3XTN, 55 Fishponds Road, Kenilworth. Tel Kenilworth 56828.

National SW54 rx, 500kHz-30MHz, built-in spkr + psu, £11. Heathkit Q mult QPM1, 450-470kHz, £6. G3YFI, QTHR. Tel Leeds 664823. 150W a.m. tx, sae for dets. G3ZQB, QTHR.

Comp set *Radio Communication* Vol 46 1970 + *Practical Wireless* 1970. Also miscellaneous *SWM* 1969-71, £1 per set inc pp ono. Thomas, "Braeside", Ffordd-y-Graig, Llanddulas, Abergele, Denbighshire.

Set of transistorized oscillators for electronic organ. Also keys etc. £17.50 ono or exch for 2m 25W am tx or tx/rx. G8EVE, 24 Coleman Road, Belvedere, Kent. Tel ET 37025.

Carbon film resistors ⅛, ¼ + ½W unused, mixed values, 500 for £4. Metal oxide ½W unused, mixed values, 100 for £2. G3YOA, QTHR. Tel Rayleigh 3102.

30m 12-core cable, will take 1A per core, £10. Buyer coll. Mortimer, c/o Tower 14.21, Owens Park, 293 Wilmslow Road, Manchester M14 6HD.

Comp set manufacturers (Murphy) service manuals vhf/rt base/M, also large quantity Mullard Texas Data Books, application reports for ICs, transistors, photo/elects, lot £10 ono. Coll or pp extra. G8BI, QTHR. Tel Welwyn Garden 23676.

HA600 gen cov rx, 10 hours use, with Trio SP5D spkr, £35. Also 12AVQ, new in box, £10. HRO powerpack, no case, £1.50. All carr extra. G3HQH, QTHR. Tel Disley 4897 (after 8pm).

Radio tv service sheets by Trader. 229 in gd cond with two hard covers, offers? G8ERQ, 13 Wharfedale Place, Harrogate, Yorks. Tel 69801.

KW Vanguard tx, 160-10m, £20. Collins ex-army rx, 1·5-12MHz, £7. Can del Manchester area. Wanted: KW Valiant tx. G3YSE, QTHR.

Clavioline concert organ, imitates many solo instruments, ideal for pop group, £20 ono. Also Vox T60 transistor amp and spkrs, 18in and 12in units in cab, £60 ono. G3UKW, QTHR. Tel Garforth 5165.

150pF 10kV Jennings vacuum, £3 ea. Used OK OC2Os 35p. 35Ts, 75p. 5B/251M, four for £1. Gardners 400V ct 250mA + 5V 3A, £3. Parmeko 620-550-375V ct 200/250mA 5V 3A twice, £5. GW3HEU, QTHR. Tel Wrexham (0978) 4507.

3 band 3 ele G4ZU/Panda beam comp with tuning unit full tech and erecting instrctns, £15 + carr. G5ND, 23 George Avenue, Marton, Blackpool, Lancs. Tel 64508 (after 8.30pm).

G5RV aerial with steel masts and stanchions, 15W cw tx, 80/40/20, phones, key, relays, mags, offers. G3VDG, QTHR. Tel Aldridge 51377.

AR88D manual + spare valves, £35 or part exch for smaller rx of sim coverage. TR1986 tx strip, less valves 25p. TR1986 modulator with valves, 75p. TA12 aerial c/o relay, 40p. Post extra. G3WQM, QTHR. Tel York 73672.

Codar CR70A rx with manual, vgc, no mods, £18 + carr. Robertson, 6 Gordon Terrace, Edinburgh EH16 5QH.

R220 in gd cond, wkng on 4m, with circ and modded for tunable operation, £3. Wanted: 70cm valved tx in wkng order. GW8EQJ, 14 Park Side, Park Road, Buckley, Flints CH7 2HB.

KW Viceroy 3A, exc cond, £75. Mohican Mk 2, gd cond, £18. KW Valiant, 160-10m, gd cond, no psu, £20. UM3 modulation trnsfmr with driver trnsfmr, £3. G3RZJ, QTHR. Tel 061-483 8035.

QST 1963 to 1970 inc. Best offer over £1.50 per year, post free. G3EDD, 39 Angle End, Great Wilbraham, Cambridge.

Eddystone EA12 with manual in orig packing, £150. Solarton CD711S scope with manual, £80. Prices inc del, straight or part exchs welcome. GW3UCJ, QTHR. Tel Briton Ferry 2376.

Drake MN4 matching network, £38. No 7 xtal calib, 1MHz 100kHz, 10kHz with modulation. £5. Gdo, £8. 2 new boxed QV08-100, offers.

Johnson 250pF tx condensers, will gang for Z match, £2 ea. G3VKC, 178 Park Street Lane, Bricket Wood, St Albans, Herts. Tel Park Street 3638.

KW Vespa Mk 2 ac psu, 6LQ6, pa, 18 mnths old, mint cond, £80. G3YMW, QTHR. Tel 01-590 5280.

Three 20As, £1 ea. G3WMS, 266 Brockles Mead, Harlow, Essex.

Prof case and chassis for modern miniature vhf aircraft rx, perspex illuminated panel with mtchng knobs and xtal and valve sockets, £1. Mann, 45 Old School Lane, Milton, Cambridge. Tel 0223 824150.

Core store, comp with driving circs, psu, circ diag, 4K words, 6 bit, offers. 8 hole 25 cps papertape punch. £8. Delay line sections, 560Ω 100ns delay, five for £1. G3UUU QTHR. Tel 0533 872525.

Harvey-Wells (USA) tx, 10-80m comp with psu, cables and ptt mike + instrctn hndbk, exc cond, little used, £25 ono. G3VRT, 59 Newtown, Trowbridge, Wilts.

Marconi 52 Set, comp stn, fb perfmnce, inc xtal calib, hdphns, key mains psu, atu, Shure 444T mike, ptt, spare valves, manual. Buyer coll, £40 the lot. Other items, pse phone. G3UVE, QTHR. Tel 01-398 2220.

High power 2m tx 6/40A 55W approx with high level a.m. 3-channel switching in two rack-mounting units, £60. Sked by arrangement. G3OWB, QTHR.

Vfo section of LM freq meter, £3. 6V ac, coaxial relay, suit PL259, £3. All parts for tx/rx psu, £6.50. G3UBL. Tel 01-950 3443.

R209 Mk 2 rx, 1-20MHz in 4 bands, cw/a.m./fm, gd cond, £10 ono + post. Mason, 34 Central Park Avenue, Wallasey.

Creed desk, grey steel, chrome trim, drawer for psu, vgc, £10 LM 14 freq meter, mains psu, £17. Tech TE65 vtvm, as new, £13. G3UFU, QTHR. Tel 01-994 6931.

KW Viceroy 3, extra fltr. Dowkey relay ptt, gd cond, £80. Eddystone 888A, £50. Insp/coll. G3WVP, 78 Hurst Road, Sidcup, Kent. Tel 01-300 5891.

DX4OU + VF1U, built-in psu, £20. B40/B + manual, £20. 1131 modulator + psu, £7. VCR97, chassis + eht, £1. Tubes, 50p. Mullard 5-10 + pre-amp, £5. BC624 rx + psu, £1. Numerous valves. Sae list. G3JIZ, QTHR. Tel Bramdean 263.

Minimitter 150W cw, 120W fone, perf wkng order, £35 ono. G2DZN, QTHR.

Two Pye RTs type PTC113 fitted with 2m xtals. Comp with circ diag and technical instrctn manual, £8 for both + any carr charge. G3THD, 63a Church Street, Sutton, Hull, Yorkshire. Tel 76153.

Heathkit GC-1U Mk 2, £17. SSM 2m cnvtr 4-6MHz i.f., £7. SSM fet 2m preamp, £3.50. Xtal 32MHz HC18/U, unused, £1 or swap 24MHz. Wanted: gd AVO 8 or 9. G8AYY, QTHR.

R1155A psu, CRT monitor, £7. Buyer coll. Several 1W transistor af amp kits, comp excluding batt and spkr, £1 post pd. Air-spaced miniature 15pF trimmers, 10p ea. G8ALB, 104 The Drive, Feltham, Middlesex.

CR100, exc cond, £18. Also Heathkit oscilloscope 10-18U with af and rf probes + hndbk, as new, £32. Buyer coll. G8EEN, 77 Chichester Park, Westbury, Wilts.

Many items of surplus eqpmnt and comps, all at give-away prices Sae pse for comp item and prices list. G3UAX, QTHR.

National NCX5 Mk 2 tx/rx. TX unused, rx little used, £200 ono. Psu incd. £100 Lambda stock at par. Cnvtr 12V dc to 230V ac 50Hz, 250W, £5 inc carr UK. Some CRTs, state needs. G8CV, QTHR. Tel 0228 72225.

Base for 813, 23MHz wideband i.f. strip suit microwave rx. Instant heat soldering iron, saves current, mains trnsfmr, secondary 110V ¼A. GPO jacks with plugs. Wanted: new 4CX250B. G3KH, 133 Station Road, Cropston, Leics LE7 7HH.

HRO b/s coils, psu, £12. TCS rx, stab psu, £5. BC221, no charts, £4. BC454, 3-6 MHz, £2. Command tx, 3-6MHz modded, £1. Pair 4CX300A with holders (new), £10. G3TIK, QTHR.

Eddystone 888A with spkr and S meter, vgc, £55. G3LHM, QTHR.

Heavy super low-loss silver plated coaxial feeder bght for abandoned project, 100 yd in 25-35yd lengths. Will send sample for 5p or sell 12½p yd, ie ½ cost. G3PBU, 9 Hollin Drive, Chapel-en-le-Frith, via Stockport, Cheshire.

AR88 users. 36 spare valves, new and i.f. trnsfmrs, £2. Buyer coll. GW3SQP, 22 Wood Green, Mold, Flints. Tel Mold 3379.

80m dipole, 60yds low-loss coaxial, Class D wavemeter, comp unmodded, any offers. Buyer coll. G3XGN, 856 Pershore Road, Selly Park, Birmingham.

Eddystone S750 rx, grey finish, gd cond, + matching diecast ls, £37. Panda Cub 160-10m tx phone + cw, 807 pa, 2X6L6, modulator, aerial relay, £20. Both items del Lincs, otherwise carr extra. G3THX, QTHR.

Digital readout tubes (Nixie), small quantity at £1 ea with decimal points, also some ICs, all unused. Roche, 66 Howard Road, Kings Heath, Birmingham B14 7PQ.

Creed 54 teleprinter with reperf attachment, £18. Creed 6S/5M tape reader, £12. G6JF, QTHR. Tel Loddiswell 324.

Xtals: 11105kHz, 11906·8kHz, 12575kHz, 14041·66kHz, 36950kHz, B7G, 50p ea. 1·6214MHz, 1·6197MHz, £1.50. 2X 450kHz, 50p. Two 813 bases, £1. G8CUO, QTHR.

TW2 communicator tx/rx, 1st class cond, best offer over £40 secures. G6XD, QTHR. Tel Teignmouth 2611.

Pye Swordfish, ac psu, input 100-240V, output 500V 750mA 300V 250mA-50V bias-50V relay control, 6·3V 3A, £10. Pye Marine rx, S meter, rf stage, bfo, 160kHz-12·5MHz, 4 bands rack mounting, £8. GM3TBV, 52 Urrdale Road, Glasgow S1. Tel 041-427 1337.

2000B, £150. AT5, £12. Swan 20m tx/rx. £40, ac/dc psus extra. Panda atu, £5. T28, £12. 9R59D, £30. 160/M rig, £10. SX28, £12. NCX dc/psu, £20. Marine rx, faulty, £5. G3MXO, 433 Bordesley Green, Birmingham 9. Tel 021-772 5409.

Tx, 2m, 25W, QQVO3/20A pa, £12. 2m tx, ECF80, 5763, QVO320, mod trans, 15W, £6.75. Marconi tx, 4m, No 9, £5. Unused ex army tx/rx 6-9MHz, key, phones, mic, vibrator, £3.50. Seymour, 25 Ryde Buildings, Webb Street, London SE1 4RX.

LG300 150W tx with mtchng psu, £35. DX40U tx + vfo, £25, both in vgc. G3UPI, 21 Willow Close, Saxilby, Lincoln. Tel 052-275 482.

Creed 75 teleprinter fitted perfrtr, vgc, mains motor, £45. Tape readers 6S5, mains, £10 ea. Labgear LG300 with psu and modulator, £30. Wanted: two Maenetron magnets, gd price pd. G8BMQ, "Cedarville" Convent Hill, Upper Norwood, London SE19. Tel 01-653 8489.

Beginners 10W cw tx xtal control, 20, 40, 80, 160m with psu, £8. Considerable number early wireless books circa 1918/1947, sae for list. Pettman, 1 Mymms Close, Whitstable, Kent.

Samson ETM1 electronic keyer, optional batt or int mains psu, sidetone, extnl Baur keying lever, £10. KW E-zee match, £7. VF1U vfo, £4. KW aerial switch, £2. Speech-clipper (low level), £2. Carr extra. G3PVA, QTHR.

2m base stn comp except xtals, £20. Leak TL25 +, £15. 4m mains tx/rx, £10. Smiths rev counter, 4 cyl 12V, as new, £10 ono. G3KTL, QTHR.

2m/M, fully modded with remotely tuneable rx, comp with mike + tx xtal for 145MHz. Sae for dets, £30. Jeapes, 165 Cambridge Road, Great Shelford, Cambridge.

KW2000, alc mod, ac psu, £115. Shure 201 mike, £3. Codar Q mult, £4. KW lpf, CH 1 75Ω, £2.50. 600W linear, psu, ae c/o, all in black cab with "KW grey" front panel, £30. Together with all connecting cables, £150. G3YJP, QTHR. Tel Letchworth 6392

Hamgear PM1 preselector, 19 Set 12V psu, MES bulb holders, offers pse. G3YQV, QTHR. Tel Brighton 735 694.

Pulse gnrtr down to 3ns, incorporates 5in scope, 800MHz bndwdth, also 800MHz 60dB step attenuator, modern, manuals, £75. Buyer coll. Cook, Old Lodge, Seven Hills Road, Cobham, Surrey. Tel Cobham 3117.

Heath SB301, £85. BXI 50ft crank-up tilt-over tower, £95. KW p.e.p. meter, £10. Thurlow, 25 Sandilands, Croydon. Tel 01-654 2761.

HRO manual info, also 160, 80, 40 bndsprd coils. B2 tx/rx comp with carrying case. Also spare B2 tx with coils. Ldspkr for AR88/HRO. Sae for dets. G3ANK, 62 Sidcup Hill, Sidcup, Kent. Tel 302 0865.

SX28 product detector calib spare valves, oscillator needs rebuild, £8. Delta relay unit, £3. KW 52Ω lpf, £4. Heath RF1U, factory built, £15. Ceramic wafer switch (large), £1.50. Airspaced presets, 50pF, 25p. G3OCS, QTHR.

R107 output stage faulty but wkng, with modified psu and RF24, £7. Buyer coll. Cull, "Balmoral", High Street, Swanage, Dorset.

Trio 9R59DE gen cov rx and SP5D spkr, £35 ono, carr pd. G8FKM, 66 Buttermere Road, Stourport, Worcs. Tel Stourport 4877.

QST 1952 to 1966, offers or would donate school club library. G3DTB, QTHR. Tel Ilminster 2797.

RCA AR88D rx, S meter, spkr, spare valves, manual, £32 ono. Class D No 2 wavemeter, ac mains or 12V dc, charts, manual, £9 ono. Buyer coll. Wanted: Dec 1959 *QST*. Richardson, 2 Edna Road, Maidstone, Kent.

KW2000A with mtchng ac psu + hndbk, perfect, £142. Heathkit OS-2 scope in mint cond with hndbk, £24. G3TYJ, QTHR.

Hammarlund super-pro rx, psu + hndbk, in gd cond, £26. Imhof table cab also available. Pye reporter PTC116, 12V, + hndbk in gd order, offers. G3DJK, 31 Croindene Road, Norbury SW16. Tel 01-653 5528.

Exch 8X30 Halina binoculars for 2m a.m. tx. G3SQM, QTHR. Tel Hambleden 443 (Bucks).

HRO psu, spkr, all rack mounted, 4 gc coils, one bndsprd, £20 or exch for B40 or sim rx. Buyer coll. Hughes, 81 Hawarden Road, Pen-y-ffordd, Chester CH4 OJD.

CW fltr for TS510, new, unused, £10. 4CX250B, £3. Two 5B255Ms, £2. Richardson, Chyngton, Winchester Road, Ropley, Nr Alresford, Hants. Tel Ropley 3260.

Comp stn: KW Vespa Mk 2 with psu. KW201 with xtal calib and Q mult, £180 ono. G3XTU, 10 Northampton Road, Bromham, Beds.

AR88D S meter, mtchng spkr, vgc, £35. Ssb tx, sep vfo, 2 TT21s, 1500V, psu, 80-10m, £45 ono. G3JWK, QTHR. Tel Winsford, Cheshire 2466.

Japanese semi-automatic bug key, £2 ono. Medco hpf, £2. Revill, 46 Abbey Road, Witney, Oxon.

HRO-MX with ac psu, 9 gc coils + 80m b/s, new valves, £23 ono. G3ZYN, 9 Quendon Drive, Waltham Abbey, Essex. Tel 97 23820.

Modern Pye vhf base tx (with QQVO6-40A pa), wkng on 2m with mtchng rx and full hndbk, vgc, £35. Carr extra. Heseldine, 31 Ellesmere Road, West Bridgford, Nottingham NG2 7DE. Tel N'ham 23 1933 (after 6pm).

120W a.m./cw Minimitter tx, vgc, £15. Will del rsnble dist at cost. G3YPS, QTHR.

Desk top projector, ideal for club, £22. 7W transistor modulator, £2. Fm tuner, £2.30. Temp cntrl unit in diecast box, 75p. Dalo 33 pens, contain etchant resist, for making pc boards, 60p. G8AWV, QTHR. Tel 01-794 9934.

B40 rx, £18. 19 Set with trnsfmr, £4. RAE course, £3. Bound copies of *Practical Wireless, Electronics* and *Radio Communication* (1968-70). Also parts for junk box. Buyer coll. A5531, 14 Brackendale Grove, Harpenden, Herts. Tel Harpenden 5657.

Xtals, FT243—4m, 10XJ—2m, assortment, 60p ea inc post, cons exch other freqs. 2m beam, 6/6 Yagi, £5. Large quantity pre-war valves, suit antique radio sets. Wanted: Fm tuner. Walsh, Ballylynch, Carrick-on-Suir, Ireland.

CRTs, 1-3AP1, 1-3EP1, offers? Wanted: type F field telephones, KW77 or sim i.f., u/s must be repairable. Cheap a.m. tx with psu for overhaul, repair/mod, pref KW make. G6QI, QTHR. Tel 01-284 3106.

WANTED

Heathkit HW17A or sim tx/rx and wavemeter covering 2m, at rsnble price for sixth former. Laver, 22 Vicarage Wood, Harlow, Essex. Tel Harlow 34549 (after 6pm).

March 1971 *Practical Wireless*. Surplus wkng xtals with holders in 1MHz and 100kHz freq. Kell, 38 North Lane, Seahouses, Northumberland.

Replacement input trnsfmr for Lafayette 10AZ27 mech fltr or info on same. Jenkins, 2 Dunvegan Close, West Molesey, Surrey. Tel 01-979 3591.

2m /P /M tx/rx. Also hf /M ssb rig. G3MWZ, 31 Fiskerton Road, Cherry Willingham, Lincoln.

Heathkit RA1 instrctn manual, pse state price. Rogers, "Walney", 36 Goodacre Road, Ullesthorpe, Rugby, Warks. Tel Leire 209648.

Joystick aerial and atu. Sharp, 1 Linnell Close, London NW11. Tel 01-458 3937.

Gd wkng scope, price up to £25 consd. Also Hams Interpreter or sim. G8EIS, 50 The Mall, Faversham, Kent. Tel Faversham 2162.

2-3 speed tape deck to take 7½in spools, 230V, operation heads immaterial, also spkr for Heath RA1. Ellis, Pierrepont School, Frensham, Farnham, Surrey.

Leather case + batt pack for Pye Bantam. G3TGF, QTHR. Tel Orpington 26802.

Vry cheap aerial mast for schoolboy G4, 40—50ft high with or without rigging, Telomast or sim. G4APV, 6 Chestnut Avenue, Lutterworth, Rugby, Warks. Tel Lutterworth 2284.

R107 rf unit, i.f./af unit or comp R107 with hndbk and SC522 mod trans. G3IZK, QTHR.

Hndbk and/or mods + circ for Pye PCR2 rx. Browne, School House, Monkton Combe School, nr Bath.

Schoolboy listener, just starting, req vry cheap ex gvrnmnt or sim rx, wkng order pse, can pay £4-5. Whatton, 82 Dairsie Road, Eltham, London SE9 1XJ. Tel 01-850 9418.

Service manuals for Canadian rx VRL250 (1945) and Teleton rx TF-182. Buy or borrow. Also one each of 6C8G, 6K6GT, 6K7 valves. Simmons, 267 Central Avenue, Southend on Sea, Essex SS2 4ED. Tel 65608.

Donations of back issues of *RADCOM* needed for University Radio Club library. Post refunded for surface mail. Price to W4DQD, Box 2067. Statesboro, Georgia 30458, USA.

TW communicator, 4m. FET 2m cnvtr, i.f. 28MHz. Richardson, 32 Elliott Road, Chiswick, London W4. Tel 01-994 6976.

Gd price offered for circ diag and/or instrctn manual, perhaps copymate prints, of the USA naval modulated freq meter LM14. All letters answered, post paid. Charles, 49 Whidborne Avenue, Kilmorie, Torquay, Devon. TQ1 2PG. Tel Torquay 27095.

B40 maintenance manual with full alignment and calib procedure for B40 51740C rx. Goad, 15 Cleveland Road, Southsea, Hants P05 1SF.

Radio Laboratory Handbook by Scroggie, *The Technique of Radio Design* by Zepler. *Television Servicing Handbook* by King. Handbooks on telequipment tv pattern generator WG44 and Boulton Paul stabilized psu A32. Meek, 39 Horsebrook Lane, Brewood, Staffs. Tel Brewood 850760.

Wireless World Vols 3-10. *RSGB Annual Log Book* 1928. T & R *Bulletins* July 1933 (with covers), May and August 1929, Jan 1930, August 1937 (covers unnecessary). *Television & SW World* 1935-37. G3IDG, 96 George Street, Basingstoke, Hants.

6-12V motor, 35-70mhp, about 9,000 rpm running free. Munns, 2 Field Lane, Letchworth, Herts SG6 3LE. Tel Letchworth 5047.

Info on where to obtain single pole six way switch of 360° rotation, each position 60°, current 500mA, fitted 4 wafers. Reqd for FRY/1/1 rtty tu. Reed, 158 Uttoxeter Road, Mickleover, Derby.

Gd 2m and 4m rig, rx only, any gd rig consd pse reply stating price, make, cond, etc. A7857, 8 Cheyne Walk, London NW4.

No 24 psu for R216 Bird wattmeter dummy load. HCU xtal 9101·60kHz. 2m aerial. Aerial rotator. Haycock, 178 Park Street Lane, Bricket Wood, St Albans, Herts,. Tel Park Street 3638.

Davco tx to match Davco DR30 rx or knowledge of whereabouts of one. Selling: Pye Vanguard highband, £12. G3UGF, QTHR. Tel Halifax 21885.

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PYE RANGER 15 2202 ready modified for 2m AM, 12volt+ or— earth, boot mounting with cables, control unit, mic and crystals for one channel (our choice). Carr. £1.50 ..... **£28**

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We are pleased to announce that J. H. ASSOCIATES LTD have been appointed as our Agents for London and the Home Counties for the purpose of demonstrating and delivering equipment and they are empowered to purchase all classes of communications gear on our behalf. To those readers in the area who are contemplating the purchase and/or the disposal of equipment please contact Jeff Harris G3LWM J. H. ASSOCIATES LTD., Cricket Field Lane, Bishops Stortford, Herts. *Phone 0279 56347 (24 hour answering service) Telex 81553.

This month we have an excellent selection of quality used equipment on offer and all items listed below are actually in stock at the time of going to press. Many other equipments, however, are en route to us which are not included and details of which we should gladly supply on request. New additions to our range are Copal Digital clocks and the range of Shure Microphones details of which are shown below and we are pleased to announce the arrival of a large consignment of the now well-known Osker Block Power Meter, which again appears below.

COLLINS 75S-1 RECEIVER. Exceptional condition **£180.00**
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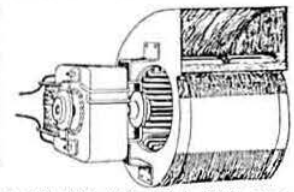

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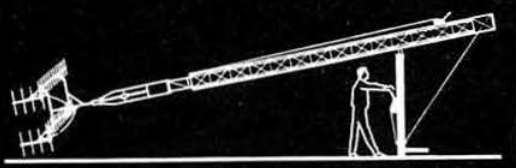

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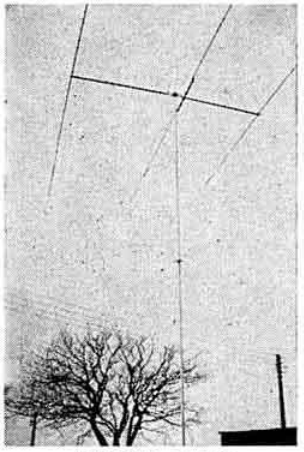

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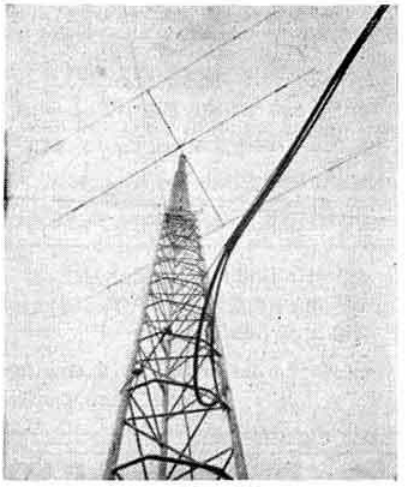

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