radio communication

January 1974

SOUTH-EAST COUNTIES HF CONVENTION

Left: Dr J. A. Saxton addressing the convention

Below: Lecturers and officers of the organizing committee (l to r) G3NKS (secretary), G4BKG (treasurer), G6XN, Dr J. A. Saxton, G3DME, G8ABC (chairman), G3TR and G6NZ
(Photos: D. Thorn, G3NKS)

(See p 34 for convention report)

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radio communication

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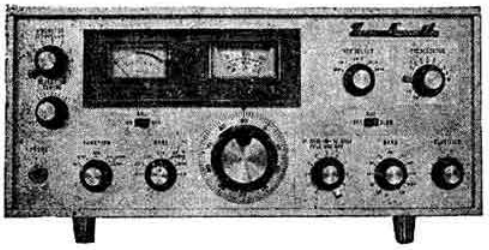
FR400 SDX (Ex-stock)



160m, 80-10m	√
Full coverage of 10m. 28-30MHz	√
70-72MHz (4m.)	√
144-146MHz (2m.)	√
REJECTION TUNING	√
AM/CW/SSB/FM FILTERS	√
FM discriminator	√
1 KHz Readout	√
TRANSCEIVES (with FL400)	√
SUPERB PERFORMANCE	√
(ALL ADDS UP TO)	FR400SDX

+ 1 YR. GUARANTEE
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+ 24/48 HR. SECURICOR DELIVERY
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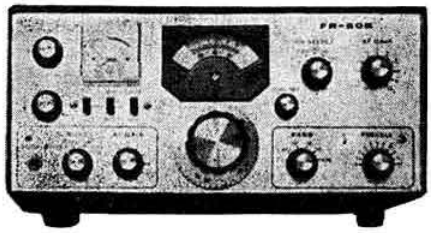
FR-50B (Ex-stock)



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SPECIFICATION
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Selectivity: 3·6kHz 6dB.; 10kHz 50dB.
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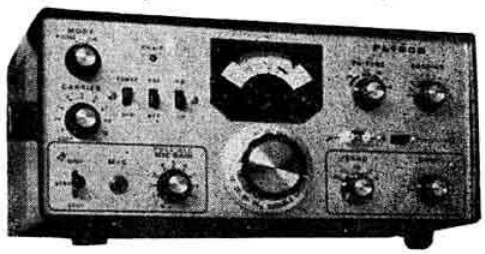

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Hallicrafters HT32B 10-80m	**£79.00**	Heath SB620.. ..	**£59.00**	Racal MA150 synthesiser (for RA17/117)	**£89.00**	Trio 310	**£65.00**
Hallicrafter SX101 plus autotran ..	**£55.00**	Heath SB303 very good	**£150.00**	Racal MA197 preselector 1-30Mc/s ..	**£65.00**	Yaesu FT-2FB and AM	**£75.00**
Hammarlund HX50 10-160m	**£79.00**	Heath HM102 mint ..	**£18.00**	Sommerkamp FL-500 very good	**£105.00**	Yaesu FT-2FB as new	**£89.00**
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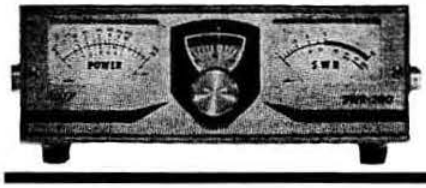

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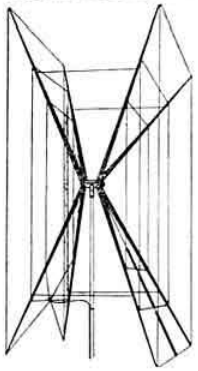

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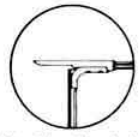

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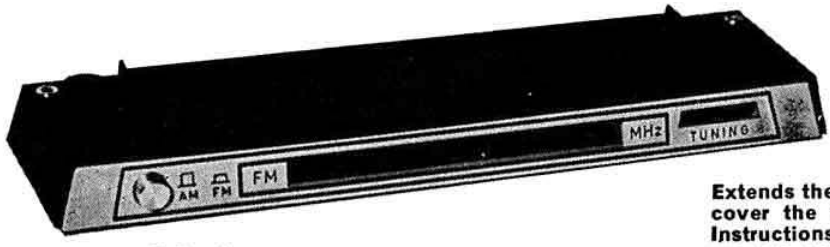

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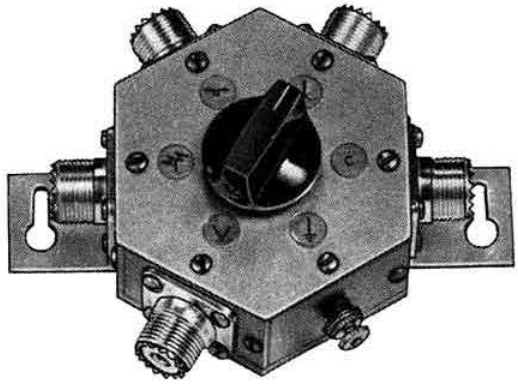

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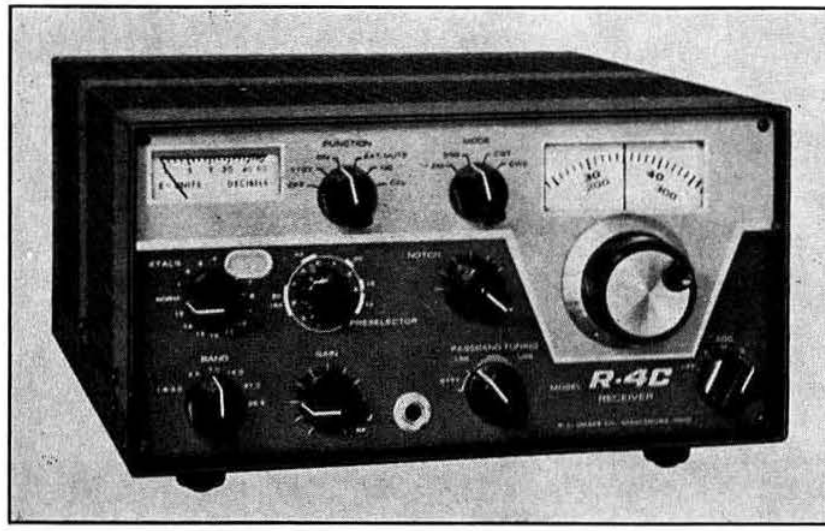

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8947 8953 8956 8961 8967 8971 8973 8983 322 324 329 338 339 342 kHz 2184 2638
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A message from the new President

It is a great honour to be President of your Society, which is now entering its 61st year. Starting as the London Wireless Club in 1913, to become the London Wireless Society later in that year and finally the Radio Society of Great Britain in November 1922, the Society has always been ready to act on behalf of radio amateurs, nationally and internationally. During the 40 years that I have been a member I have known many occasions on which the Society has acted in defence of the amateur service.

I am aware, however, that the problems of conserving our band allocations are becoming much more acute. In 1979 there will be a World Administrative Radio Conference during which there will be many additional claims for a share of the frequency spectrum.

The Society is already making preparations by discussions with our administration, the Ministry of Posts and Telecommunications, and we are supporting the IARU Region 1 Division in its efforts to convince other member societies of the need for the closest liaison with national administrations.

For our own part we need the support of every amateur, and we must show that we are a responsible body of enthusiasts engaged in a progressive and useful hobby.

G. R. Jessop, G6JP

QTC AMATEUR RADIO NEWS

20th VHF/UHF Convention, 6-7 April

The 20th International VHF/UHF Convention, to be held once again at the "Winning Post", Whitton, Twickenham, will, as last year, be a two-day event, from 1100 to 2359 on the Saturday and from 1100 to 1500 on the Sunday.

Additional space for lectures has been made available in a nearby secondary school, thus reducing the crush in the "Winning Post" itself. By popular request the traditional dinner on the Saturday evening is being extended to include a dance, with licensed bar, until midnight.

Further details will be published later.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at 31 October 1973:

Class A	14,894	Class B/M	1,161
Class B	4,328	Television	253
Class A/M	3,083		

G3HRH

Ray Hills, a former member of the Council of the Society and at one time VHF Manager, has been appointed Chief Engineer (Transmitters) with responsibility for the Station Design and Construction Department and the Station Operations and Maintenance Department of the Independent Broadcasting Authority. Changes in the management structure of the IBA have coincided with a move to the new Engineering and Administrative Centre at Crawley Court, near Winchester, Hampshire.

GB3VHF

The Ministry of Posts and Telecommunications has approved a proposed change of frequency of GB3VHF from 144·5 to 144·15MHz to take effect from 1 February 1974.

Pirates prosecuted

The latest MPT list of successful prosecutions for using wireless transmitting apparatus without the appropriate licence contrary to the provisions of Section 1 of the Wireless Telegraphy Act 1949, covers the period May to October 1973. It shows a total of 14 cases involving 18 persons, with fines up to £75 in individual cases amounting to £465, and costs up to £50 in individual cases amounting to £245. In 13 cases, equipment was also forfeited.

Tapes of GM VHF Convention

Tape cassette recordings made at the Scottish VHF Convention in September 1973 by G8DVD are now available on loan from GM3OWU, RR for Region 13. Those so far available are on the following lectures:

1. "Use of integrated circuits" by GM8BJF (visual aids are being prepared).
2. "Current Topics" by G3FZL.
3. "Portable operating experiences and techniques" by GM8FFX.

QSLs astray

Mr M. J. MacKinnon, GM4AJV, 160 Carrick Knowe Drive, Edinburgh EH12 7EW, has a bundle of QSL cards belonging to G4CFZ and on receipt of an sae he will be pleased to forward them to him. G4CFZ's former QTH was in Southampton, but GM4AJV believes he is now in the Plymouth area.

Members who change QTH are asked to advise their QSL Bureau sub-manager of the change prior to moving to avoid loss and misdirection of cards.

Council election results

The results of the ballot to fill the five vacancies on Council from 1 January 1974 were as follows:

Ordinary members

R. J. Baker, G3USB	1,551 votes
P. Balestrini, G3BPT	1,357 "
S. R. Boakes, G3HXN	853 "
D. Byrne, G3KPO	1,266 "
A. P. Foss, G8EAY	685 "
M. Hearsey, G8ATK	947 "
P. F. Jobson, G3HLF	688 "
R. F. Stevens, G2BVN	2,050 "

Zonal Member—Zone F

W. F. McGonigle, GI3GXP	73 votes
L. C. Waring, GI3WUO	19 "
Spoilt papers	9
Disallowed	35
Voting papers accepted	2,571

Messrs **R. J. Baker, P. Balestrini, D. Byrne, R. F. Stevens** and **W. F. McGonigle** were accordingly elected to serve on Council for the three years 1974–6.

Vacancy at RSGB HQ

A vacancy exists at RSGB headquarters for an **administrative assistant,** who should have held an amateur transmitting licence (Class A) for at least five years.

The applicant should be prepared to deal with technical and members' queries, either by correspondence or telephone, on general technical matters, reciprocal licensing and other aspects of amateur operating.

Working hours: 9.15 to 5.15, five days a week. It is suggested that the post would be suitable for someone in the age range 50 to 60. Salary subject to negotiation.

Write in confidence to: The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE, and mark the envelope "Personal."

RSGB 1974 diaries

A few of these planner-type diaries are still available from RSGB HQ. Price 45p including postage and packing.

Can you help the RAIBC?

The following letter has been received from Allan Herridge, G3IDG:

"More handicapped amateurs and SWLs are, each month, becoming members of the Radio Amateur Invalid & Bedfast Club and we find ourselves in the unhappy position where they outnumber the people who help them.

The 20th anniversary of the club's founding will be celebrated on 8 February 1974 and we feel it would be fitting if, during the year, a special effort were made to enrol as many additional supporters and local representatives as possible.

Can we, please, have your assistance towards this end?

No one who volunteers need fear that he will be frequently asked to climb masts or transport equipment, although such jobs do need carrying out from time to time.

Equally valuable is the occasional visit and chat, a fault found, a birthday card in the post, a query answered or a ride in the car. There is something for everyone to do.

Helpers need not be technically inclined. A desire to encourage, assist and cheer those less fortunate than oneself is all that is called for.

Those who feel they might like to offer their services can receive fuller details of the club and its work by writing, enclosing an sae, to:

The Hon Secretary, RAIBC, Mrs Frances Woolley, G3LWY, Woodclose, Penselwood, Wincanton, Somerset BA9 8LT.

Our total of eligible members is now between 400 and 500, in 14 countries, and each one will be grateful for your help."

RNARS morse proficiency transmissions

The time at which these transmissions start has been changed to 2000, clock time, on the first Tuesday of each month. Full details appear on the RSGB slow morse practice transmissions page, last published in the November 1973 issue of *Radio Communication.*

50 years later

At 0332 on 28 November 1923, the first exchange of signal reports across the Atlantic took place between the USA station 1MO in West Hartford and the French station 8AB in Nice. 1MO was operated by Fred Schnell, then traffic manager of ARRL, while Leon Deloy was the operator at the French end of this historic QSO. Happily both are still alive, although Fred Schnell does not now enjoy the best of health.

On 28 November 1973 the station of the International Amateur Radio Club, located in the headquarters building of the International Telecommunication Union at Geneva and using the special call 4U5ITU, celebrated the occasion by contacts with USA stations. Monsieur M. Mili, the Secretary-General of the ITU, spoke to the USA, and Mr J. Herbstreit, Director of the CCIR, (W0DW, HB9AJI) also participated. These contacts took place on the 14MHz band, in contrast to the wavelengths of about 100m used by Deloy and Schnell.

Installation of President 1974

Mr G. R. Jessop, CEng, MIERE, G6JP, will be installed as the fortieth President of the Society during the course of a social evening on

Friday 4 January 1974

at the

Bonnington Hotel

Southampton Row, London WC1

commencing at 7.30pm

All members and friends are cordially invited to this social occasion. Tickets are not required but members are asked to notify headquarters if they will be attending so that catering arrangements can be made accordingly.

Gains and losses in hf aerials

by L. A. MOXON, BSc, CEng, MIEE, G6XN*

Part 2

Small beams

The length of a dipole or a beam element may be reduced to any desired extent without appreciably affecting its radiation pattern, but in the process the radiation resistance drops rather rapidly to a point where it becomes comparable with the losses, which may be estimated with the aid of Fig 9 if the aerial is sufficiently "in the clear" for dielectric losses to be neglected. Thereafter the effective transmitting gain starts to decrease and rapidly becomes unacceptable. Usually, before this point is reached the bandwidth has narrowed to a value which causes some inconvenience.

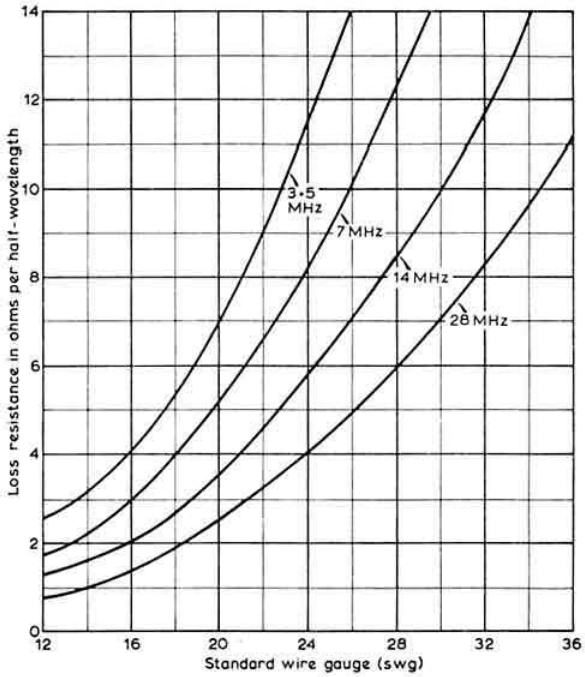


Fig 9. RF loss resistance of thin copper wires. Uniform current distribution assumed. Divide by two to obtain the effective loss resistance referred to a current maximum for the case of a sinusoidal distribution

When a dipole is shortened it must be loaded in some way to bring it back into resonance and there are basically two methods, inductive loading by a coil or stub in the centre or capacitive loading at the ends, Fig 10. In the case of the inductive stub, the dipole has merely been folded in the middle, keeping the total length of wire and therefore the loss resistance more or less constant, though in practice the length has to be increased somewhat and there is some "transformer action" in the stub which further increases the losses. To simplify the discussion these effects will be ignored and the reader should merely note that estimates based on Fig 11 for the inductive case will be slightly optimistic.

Fig 10(b) illustrates probably the simplest form of capacitive loading with the end wires providing capacitance to ground; currents flow in these wires but in opposite directions so they have negligible effect on the radiated field. The amount of loading required can be estimated *very* roughly, provided the loading wires are well removed from resonance, by taking 3ft of end-wire as equivalent to 2ft of radiator. More loading can be obtained by any device which increases the "concentration of metal" at the ends of the radiator, eg pairs of wires in the form of a cross, or by increasing the diameter of the loading wires relative to that of the radiator.

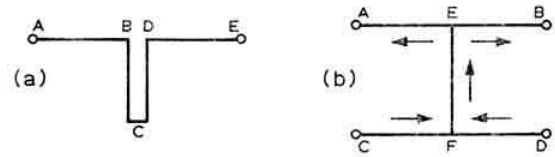


Fig 10. Methods of loading short dipoles: (*a*) Inductive loading; for resonance AB + DE + 0·75(BCD) ≏ λ/2. (*b*) Capacitive loading; arrows indicate current directions. For resonance 0·67 (AB + CD) + EF ≏ λ/2.
Formulas very approximate in both cases, depending on wire gauges and dimensions. In (*a*) the stub BCD may be replaced by a coil. Sometimes the two methods are combined, eg by using coils near the ends of a dipole

As illustrated by Fig 11, capacitive loading allows the use of very much shorter elements for any given low value of radiation resistance, and the loss-resistance is also reduced thus allowing the erection of an efficient beam in very limited space. Compared with inductive loading, the end-voltages will be much lower, allowing closer proximity to other objects although this advantage is partly offset by the risk of greater capacitive coupling to these objects. There are some snags, however, a point being reached where reduction in length of radiator is more than offset by the increased length of the loading conductors, and in general despite the shorter elements the total top-weight of a beam is increased by this form of loading.

The possibilities and some limitations of this type of element are illustrated by the following examples:

(a) A 14MHz beam was formed from two 15ft horizontal elements supported between four polythene-cord guys each having a 15ft copper-wire insert near the top, end loading being provided by these inserts. Performance at a height of 35ft showed only a very slight drop in average

* 1 Stonerhill House, Froxfield, Petersfield, Hampshire.

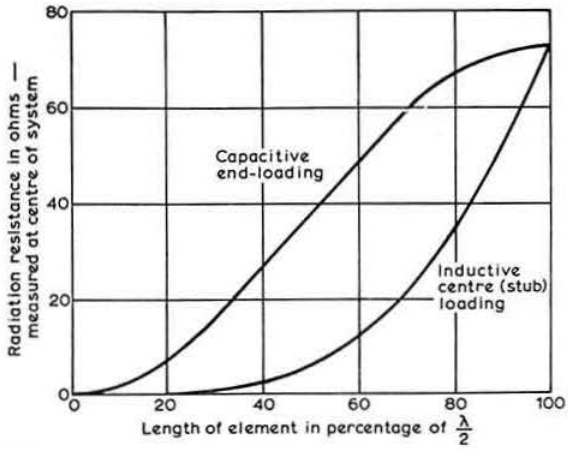


Fig 11. Radiation resistance of short dipoles with alternative methods of loading. For beams designed on the guide-lines of Fig 7, the radiation resistance varies with length of element in the same ratio as that of single dipoles

signal reports from VK, compared with a quad at 50ft, and provided the first evidence of a small site-superiority estimated as about 2dB from later tests with other aerials at a greater height.

(b) A vertical beam [3] was constructed for 7MHz using 25ft vertical elements as in Fig 10(b), end-loaded by 30ft lengths of horizontal supporting wires. Further reduction in height was prevented by the requirement for not more than $\lambda/4$ spacing between elements, the maximum usable lengths for the loading wires being equal to the spacing.

(c) A design for a 14MHz beam used 10ft wire elements end-loaded by 4ft crosses of 0·5in diameter tubing. Although the element-length was only 10ft, the total distance back-to-front with 8ft spacing was 12ft. Any further reduction in length would have required more loading, thus increasing back-to-front dimensions, and it was estimated that an 11ft square design would probably be optimum, giving a required turning circle of just over 15ft diameter. The radiation resistance (estimated for $\phi/\phi_0 = 0{\cdot}5$) for each element was 3·5Ω, the loss resistance (12 swg) was 0·36Ω, and the estimated bandwidth was of the order of 125kHz. Though not yet tried in practice, this example is thought to be realistic and one American manufacturer has produced a beam with very similar dimensions. It is thought they cannot be further reduced without significant loss of gain.

In contrast it appears unlikely that elements such as Fig 10(a) could be reduced below about 24ft length for a two-element beam without serious restriction of bandwidth and loss of efficiency.

High-loss beams

An interesting problem arises if, for any reason, it is necessary to use inefficient elements, a situation likely to arise, for example, when there are restrictions on the erection of visible aerials. A thin wire trailing over a wet tiled roof, or even a thicker wire just inside the roof space, clearly breaks all the rules of good aerial design, and resistance losses may be greatly augmented by losses in brickwork or other poor-quality insulating materials. But the situation is by no means hopeless, remembering that even a few watts of effective radiated power is capable of providing regular dx contacts. For reception, owing to the high external (galactic) noise level, a large number of decibels can be sacrificed without adverse effect on signal-to-noise ratios and, however great the losses, unidirectional patterns identical with those of typical high-quality beams may be achieved by the use of two or more suitably-phased elements, although a completely different set of design requirements arises.

These may be derived from calculations on similar lines to those in [1] by adding a relatively large loss resistance R_L to the radiation resistance R, the phase-shift due to a series-reactance X being given approximately by X/R_L which bears no relation to the previous formula $X/(R + R_m)$. Because of the assumed high value of R_L very little current flows in a parasitic element so *both elements must be driven*. Much higher values of reactance X are required to produce a given radiation pattern, but alternatively phasing-lines may be used without any of the complications described earlier since the mutual impedances which give rise to them are negligible in comparison with the loss resistance. The mathematics are actually very much simplified and it is easy to divide the power equally between two elements so that, if a current I would flow in one element alone, equal currents 0·707I flow in each of the two elements. With $\lambda/8$ spacing and 135° phase-difference (ie $\phi/\phi_0 = 1$) the field strength "in the beam" is identical with that from a single element and is only a fraction $R/(R + R_L)$ of that which would be produced by an efficient dipole, although the radiation pattern is the same as that of an efficient beam having the same spacing and phasing. 3dB improvement in the radiated signal may be obtained, however, by driving both elements in phase, which destroys the front-to-back ratio, so there is a conflict between transmitting and receiving requirements.

Fig 12 compares the variation of gain with phase angle for low-loss elements, the extreme lossy situation discussed above and two intermediate cases, the low-loss curve being an extended version of that shown in Fig 7. Front-to-back ratio is also plotted, over the range of main interest for the case of lossy elements. It will be noticed that losses cause the maximum of the gain curve to shift to the right, the loss of gain due to "incorrect" phasing being more than offset by the increase of efficiency due to higher radiation resistance as one moves further away from the antiphase condition. For the same reason it would be advantageous, in the intermediate cases only, to use wider spacings. It is notable that with wide spacings, compared with a single lossy element, 3dB gain always exists in some directions and these can be varied at will, depending on the phase-shift.

Indoor and some other "invisible" kinds of aerial might be expected to fall somewhere in the intermediate region, and the curves demonstrate the extreme unsuitability of the "8JK" aerial in such situations.

Breaking the "gain barrier"

Earlier in the article 6dB was quoted as an upper limit for the gain of hf beams, subject to the practical limitations which usually apply to amateur hf operation. Apart from special-purpose fixed-arrays, some 14MHz rotary beams with appreciably higher gain are in existence, but these are massive engineering projects beyond the resources of most amateurs. An additional 2-3dB gain may be obtained on 28MHz by building a beam the same size as a conventional 14MHz array, but it is usually difficult to accommodate both and such arrangements are used infrequently. Vertically-stacked

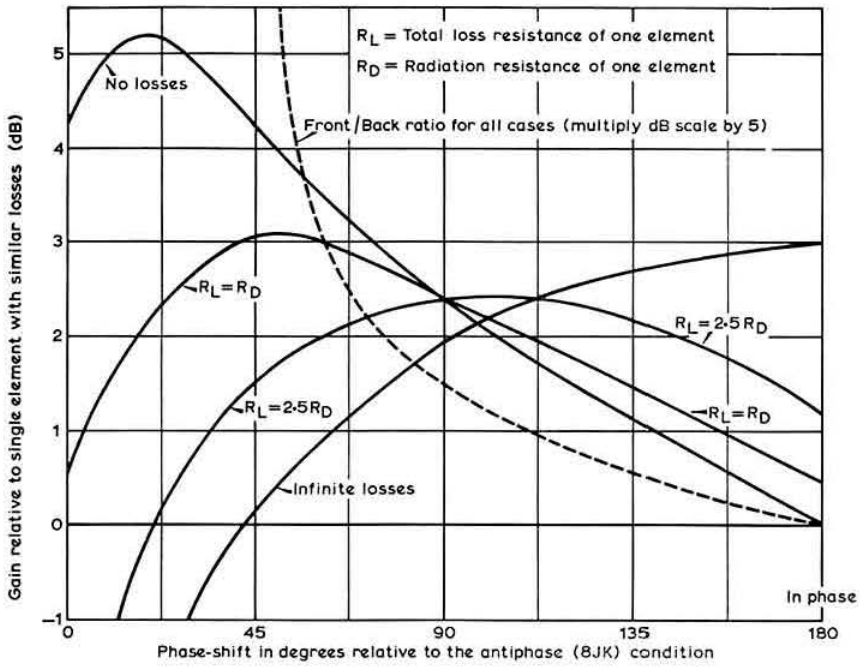


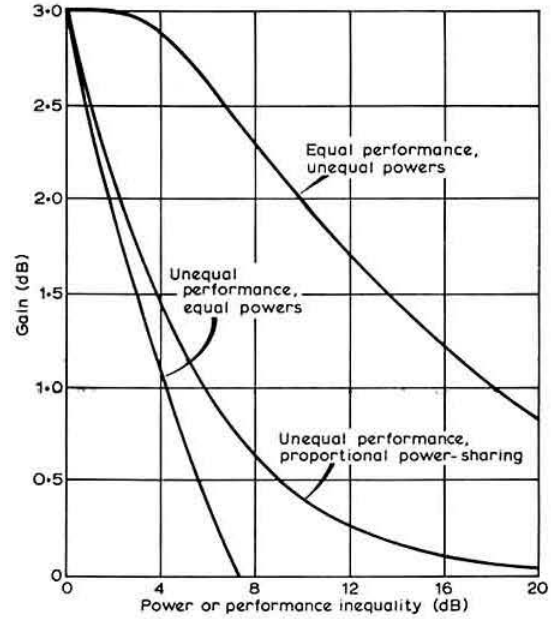
Fig 12. Gain and front/back ratio for a pair of lossy elements spaced $\lambda/8$. The elements are assumed to be driven with equal currents. Gain or loss relative to a loss-free dipole is obtained by subtracting the loss-figure $10 \log_{10}(1 + \frac{R_L}{R_D})$ from the gains indicated

Fig 13. Gain from combination of two aerials. When the aerials differ in performance, gain is relative to the best aerial alone and is maximum when power is shared in proportion to the performance, with the best aerial receiving most power. Both aerials are assumed to have the same polarization

arrays are sometimes feasible on 28MHz and can give useful extra gain if the height is sufficient, but vertical stacking reduces average height and at 14MHz this usually neutralizes any extra gain.

In fact, the "gain barrier" can be raised considerably at 28MHz since the use of resonant feeders (at least as far as a point within reach of the operator) provides a simple and efficient method of exploiting the full gain potential of 14MHz-sized elements on three bands. There are some mechanical difficulties with the feeder if 360° rotation is required but it is possible with two feeders to make the beam reversible so that less than 180° rotation is needed; moreover the facility of instantaneous beam-reversal can be a major advantage. Another method of using the whole of each element on each band [7] employs matching networks switched by relays at the aerial, but this might be expected to involve maintenance problems in many cases since it involves a complex unit which would not always be readily accessible.

There is one method of obtaining extra gain which, it is felt, deserves to be more widely known although it requires additional space and might sometimes add to difficulties with neighbours or planning authorities; it consists of the employment of two separate beams with appropriate phasing and provides an average improvement of 3dB, assuming spacings of half-a-wavelength and upwards. Adjustments are surprisingly non-critical, and random phasing, subject to an optional phase reversal with no attempt at equalizing the powers fed to the beams, is sufficient to ensure gains of more than 2dB in two cases out of three. Assuming correct phasing (within about 45°) even a 10 : 1 power inequality only reduces the gain by 1dB. A correctly-set four-position phasing-switch is sufficient to ensure that the gain is never less than 2·4dB (usually much closer to 3dB) and it could, if desired, be linked automatically with the beam heading. The aerials are assumed to be connected in parallel



with additional quarter-wavelengths of feeder brought into circuit as required. With twin feeder a single length of switched phasing line, with phase reversals, provides the required minimum of four options.

The above argument assumes, of course, that the two aerials are equally efficient. However bad one of them may be, there must always be some gain provided the aerials are similarly polarized and the power is shared between them

in proportion to their efficiency. Unfortunately, if one aerial is much worse than the other the extra gain is infinitesimal. Fig 13 shows gain as a function of the power sharing ratio for aerials of equal and unequal performance.

If the aerials are spaced by only half a wavelength there will be about $\pm$1dB variation of gain caused by mutual interaction but this rapidly diminishes with increased spacing.

If miniature beams are used it is important to note that this has no effect on the spacing requirement, ie a minimum of half a wavelength.

Other losses, and a few measurement problems

The rest of this article is mainly the saga of three aerials. The first, after producing a number of flattering reports, was found to be down on No 2 by an amount which was large compared with most of the gains or losses hitherto discussed. The second, in its turn, gave such a bad account of itself in comparison with No 3 that at first a feeder short was suspected. Nos 1 and 3, being fixed beams in different directions, could not be compared directly.

Resolution of this paradox was highly instructive, proving that 44 years of experience is no safeguard against surprises or, as the less charitable may suggest, elementary mistakes. No 1 was fed with coaxial cable and showed a particularly low value of swr which should have given and eventually did give cause for suspicion, particularly as, although the aerial was designed on the lines of Fig 8, the swr was not critically dependent on the position of the feedpoint which should have altered the radiation resistance as indicated by Fig 7.

In contrast, No 2, of similar design but fed with open-wire line, behaved as expected. The measured loss in the coaxial feeder was only 1dB and this tended to allay suspicion until it was found that the swr measured at the first aerial instead of at the transmitter behaved in the same way as that of No 2 aerial. No balun was used, in view of several previous experiments in which they had not been found necessary. Nevertheless, replacement of the coaxial cable by open-wire line completely removed the difference in performance and there can be no doubt that the initial high loss and low swr were fully accounted for by feeder radiation. The need for a balun when using coaxial feeder depends on feeder length as well as several more complex factors, and clearly the safest course is to use one at all times.

The poor result with No 2 applied only to one direction, that of No 3, and was due entirely to screening by No 3 despite a separation of about 1·5λ and reasonably good front-to-back ratios. Usually much smaller separations are adequate, but the result was explainable theoretically on the following grounds:

(a) The front-to-back ratio of a beam applies to signals at its input terminals, and not to its properties as a re-radiator of stray fields.

(b) Over short distances the ground reflected wave has to travel considerably further than a wave parallel with the ground, so that reinforcement can take place even though the angle of radiation is nominally zero. It is thought that, at least, the parasitic reflector of No 3 was being energized rather efficiently in this manner and producing a field in antiphase with the radiation from No 2 in this direction.

The effect of removing No 3 was very obvious on a field-strength meter and about two S-units in terms of signal reports. By focussing attention on the ground-reflected wave, this episode underlines one of the many difficulties in the making of gain measurements, namely the different role played by ground and other local reflections in the case of ground-wave propagation, particularly at short ranges, as compared with their effect on sky-wave propagation. Also, by implication, it highlights the risk of screening by power and telephone wires, and where such danger exists it would appear advisable to make comparative tests between temporary horizontal and vertical radiators at appropriate heights and positions before investing heavily in a permanent beam installation. It is obvious that little reliance can be placed on gain measurements using ground-wave signals, and even conclusions based on signal reports can be misleading unless any other aerials in the vicinity are either end on, dismantled, or in some way detuned from resonance. As a corollary to this it should be noted that when beams having separate feeders for different frequencies are stacked on a common mast, the driven elements not in use will have several resonances which depend on the feeder length, and one of these can easily coincide with the wanted frequency with disastrous consequences; the possibility of this can easily be checked by short-circuiting unused feeders and, if necessary, altering their length to avoid unwanted resonances.

References

[1] L. A. Moxon, "Supergain aerials", *Radio Communication* September 1967.

[2] *Radio Communication Handbook*, fourth edition, p13.41.

[3] L. A. Moxon, "Low angle radiation", *Wireless World* April 1970.

[4] F. E. Terman, *Radio Engineers' Handbook* 1943, pp700-707.

[5] *ARRL Antenna Book*, 12th edition, 1970.

[6] R. A. Baumgartner, HB9CV, "The Swiss quad beam aerial", *RSGB Bulletin* June 1964.

[7] E. R. Shepherd, ZL2ASJ, "The '663' beam", *73* June 1970.

Erratum—In Fig 1 the current should be shown flowing from left to right, not outwards to left and right from the centre.

Appendix

Derivation of gain figure for combination of two aerials

If one aerial is given a fraction x of the available power, the other receives $(1 - x)$.

The field-strength at a given distant point is therefore proportional to $\sqrt{x} + \sqrt{1 - x}$ assuming that both contributions arrive in phase. This is the relation which is plotted as the upper curve of Fig 13, the optimum condition being $x = (1 - x)$, ie equal power is fed to both aerials.

If the second aerial is n times less effective, in terms of signal power, than the first, the second term becomes $\sqrt{(1 - x)/n}$. Putting $x = (1 - x)$, ie $x = 0{\cdot}5$, this gives the lower curve of Fig 13.

By differentiation of the expression $\sqrt{x} + \sqrt{(1 - x)/n}$ we find that maximum field strength is obtained when $x = n/(1 + n)$, ie when the aerial which is n times better is given n times more power. Substituting this value for x, we find that with proportional sharing the field strength produced is proportional to

$$(1 + n)^{1/2} (n^{1/2} + n^{-1/2}).$$

This gives the middle curve of Fig 13.

EQUIPMENT REVIEW

Heath HM2103 dummy load and rf wattmeter

by R. F. STEVENS, G2BVN

THIS self-contained instrument is one of the latest additions to the Heath range and is suitable for use in the range 1·8 to 30MHz. A feature of the HM2103 is that the dummy load resistor is radiation cooled and no fluid is used.

Circuit

The circuit used in the rf wattmeter is one where the current is sampled by inductive coupling to a toroid coil. The operation of this type of circuit is such that it is frequency independent, essential in an instrument of this type. There is a front panel warning light which is operated by a thermal relay when the temperature of the load resistor exceeds its permitted rating. This light remains on until a safe temperature is reached. Calibration of the completed unit may be accomplished by the use of an internal calibrator, a valve voltmeter or another wattmeter.

Performance

The HM2103 has two ranges, having full-scale readings of 200 and 1,000W, and the accuracy is stated to be ± 10 per cent of full-scale reading. The maximum power ratings are 175W continuous and 1,000W maximum, and the instruction manual contains a power dissipation derating curve. Tests using a second wattmeter of known performance showed that the performance was within the limits specified by the manufacturer. Unfortunately insufficient rf power was available to check completely the higher range scale.

Wattmeters of this type are calibrated with an unmodulated radio frequency, and speech or two-tone test signals may give misleading results. This limitation should be borne in mind when using any instrument incorporating the directional wattmeter circuitry.

TECHNICAL DATA

Frequency range	1·8 to 30MHz.
Wattmeter ranges	0-200 and 0-1 000W.
Wattmeter accuracy	±10 per cent of full scale.
Power rating	175W continuous, 1,000W maximum.
Overload indication	Thermal switch, requires 9V battery.
SWR	Less than 1·2:1.
Load type	Non-inductive carbon.
Load impedance	50Ω nominal.
Connectors	UHF type SO-239.
Size	5¾in wide by 6in high by 13¾in deep.
Net weight	4¼lb.

Applications

Obviously the normal application of the wattmeter is to provide a load for the transmitter during tuning adjustments and to indicate any malfunction evidenced by a drop in the measured power output. In addition, the adjustment of matching networks can be checked by reference to the power output, and the instrument also provides the facility of checking the performance of coaxial cable. This can be done by first adjusting the power output of the transmitter to give a convenient reading on the lower range scale using only a short length of connecting feeder. The coaxial cable under test may then be connected to the transmitter and the wattmeter connected to the second termination. If the cable is in good condition there should be little difference in the wattmeter readings. The results of such a test carried out on a length of surplus cable at 21 or 28MHz may often yield some unexpected and disappointing results.

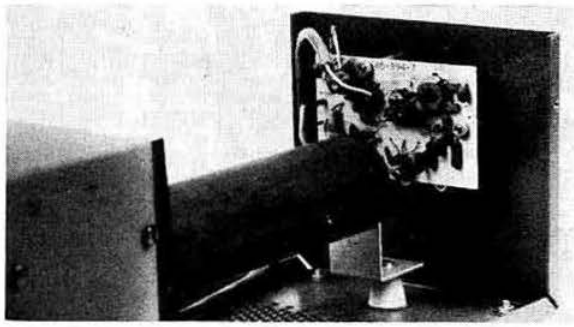
Comments

The HM2103 presents no constructional problems and three to four hours should suffice for building and calibration. The Heath manual is, as usual, completely adequate.

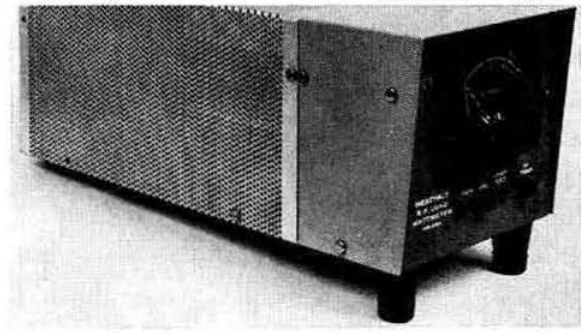
Due, no doubt, to its origin in the USA, the wattmeter scales are not the most convenient for UK users. It is felt that scales of say 0 to 50 and 0 to 500W would be of greater value.

This point apart, there is no fault to find with an instrument that is both easy and convenient to handle and use.

The HM2103 may be obtained from Heath (Gloucester) Ltd, Gloucester, GL2 6EE, price £31.90 (including VAT) plus 44p carriage.



Internal view of the wattmeter showing the load resistor and the circuit board



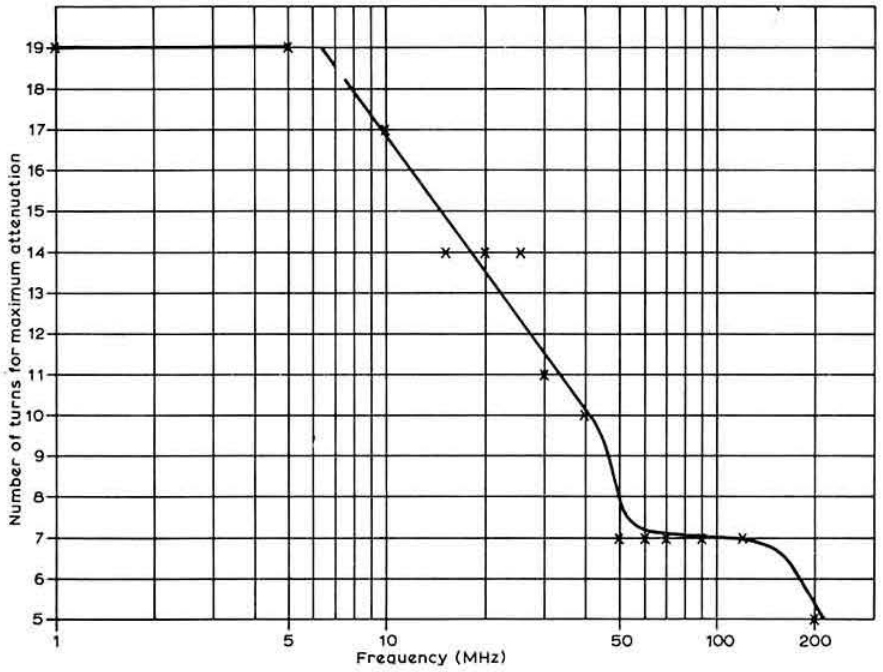
The front panel carries the meter, range switches, high temperature warning light and lamp test switch

PRODUCT NEWS

The braid filter

The braid filter using two ferrite rings has been used with considerable success in many cases of breakthrough on television receivers. The accompanying graph shows the relationship of optimum turns vs frequency. This was prepared by G3JGO based on information provided by Graham Barry, PO radio inspector at Cardiff. It is pointed out that the actual value of attenuation will depend on the position on the coaxial cable where the filter is positioned.

The rings are of nickel-zinc ferrite type B2FX 1588, outside diameter 38·1mm, while the coaxial cable is of miniature type, either BICC T3171 or Aerialite Aeraxial No 3. They may be obtained from Waters & Stanton Electronics, 22 Spa Road, Hockley, Essex, price 20p each.



Educational electronic kits

Electroni-kits are claimed to be a new concept in the educational field. They enable anyone to assemble easily and safely up to 150 electronic experiments and projects while acquiring knowledge of their operation. Each kit comprises components which are slotted into the board provided in accordance with the instruction manual. All the kits are powered by a 9V battery and the smallest kit allows the construction of radio receivers, amplifiers and morse code oscillators. Further information may be obtained from Electroni-kit Ltd, 408 St John's St, London EC1B 1LJ.

144MHz transceiver

The availability of the FDK Multi 2000, a solid-state 144MHz ssb/cw/fm transceiver, is announced by Western Electronics (UK) Ltd. An unusual feature of this equipment is the digital synthesizer allowing the selection of 200 channels between 144 and 146MHz. This selection is continuous at 10kHz spacing and further control is effected by a vxo which allows a ±5kHz variation. In addition there are five crystal-controlled channels. Other features include ac and dc power supplies, noise blanker, squelch, receiver incremental tuning, and two front-panel meters. Unwanted sideband suppression is claimed to be −50dB or better, and spurious and harmonic emissions −60dB or better. RF output powers are given as 10W on all modes with an output impedance of 50Ω.

The price of the FDK Multi 2000 is £240 carriage paid plus VAT. Further information can be obtained from Western Electronics (UK) Ltd, Osborne Road, Totton, Southampton SO4 4DN.

Reducing power consumption of the MM 144MHz receiver by G3JGO

The Microwave Modules 144MHz receiver as delivered is found to have rather a large power consumption, up to 160mA, and this can be reduced with advantage for portable working.

The modification consists of changing R42 from 100Ω to 330Ω, R23 from 100Ω to 270Ω and R25 from 220Ω to 100 to 150Ω. Add 220Ω in series with C28.

This gives some nfb to offset the cross-over distortion due to running the output stage at lower quiescent current. The optimum may vary with loudspeaker impedance and the value of standing current set with R25.

It is also useful to decouple the junction of D2/R23 to earth with a 0·01μF ceramic capacitor to reduce the shift of vfo frequency with supply volts.

By these modifications the no signal current was reduced from 160 to 55mA with no degradation in performance.

Catalogue received

Gardners Transformers Ltd have published a new edition of their catalogue of audio transformers. Fully described are the new ranges of miniature microphone and line-matching transformers in addition to the existing production types. Publication GT5B is available without charge from Gardners Transformers, Christchurch, Hants, BH23 3PH.

TECHNICAL TOPICS

by PAT HAWKER, G3VA

SPACE is at a premium this month, so straight down to business, pausing only to express the hope that 1974 proves a good year for all those constructional and/or experimental projects you will surely be trying your hand at. May your circuits all work first go, neither your fuses nor your semiconductors blow, your VFOs but not your amplifiers oscillate, your aerials stay up and your earth resistance stay down, and may you never know dry joints or Murphy's Law!

The MPT tvi statistics

A little later than usual, the MPT has recently released their annual report on radio and television interference complaints; this time covering 1972. The figures have to be interpreted with some caution—since the number of people who apply to the Post Office is certainly far, far less than those who experience some form of electrical or rf interference; nevertheless these represent the only available statistics on the interference situation.

For the first time for several years there was an increase in the total of complaints: at 57,536 these are 3·75 per cent higher than the year before, though still well down on most recent years and reflecting the lower susceptibility of uhf tv to electrical interference. Although it seems likely that the majority of viewers now use the uhf rather than vhf channels, complaints of interference to uhf reception are still only about a quarter of all tv complaints. Unfortunately uhf complaints are rising at a significant rate, though a very high proportion turn out on investigation to be due either to faulty receivers or inefficient aerials. There are now more complaints about Bands IV and V (uhf) than Band III, but Band I still accounts for over half of all tv complaints. There has also been a substantial rise (27 per cent) in complaints about vhf/fm sound broadcasting and also about mf broadcasting (24 per cent).

But the amateur is mainly interested in those complaints which are ascribed to amateur transmitters: Table 1 shows this over the five years 1968-1972 inclusive: Table 2 is a similar breakdown of the interference ascribed to UK transmitters other than amateur. This year both show a significant increase, though for amateur tvi the total is still less than the high figure of 1969.

Another figure we always look at with interest is what might be called reverse-tvi; the number of cases ascribed to television receivers in the form of oscillator radiation and line time-base radiation. Personally, I have been finding that time-base radiation seems to have increased, often marring reception on lf, mf and hf. The MPT report seems to confirm

TABLE 1

BCI and tvi ascribed to amateur stations

Band	1968	1969	1970	1971	1972
LW/MW	55	48	28	38	56
Band I	725	821	630	467	462
Band II	34	44	40	44	55
Band III	319	492	394	300	306
Bands IV-V	12	26	65	173	348
Mobile	6	11	4	5	15
Yearly totals	1,151	1,442	1,161	1,027	1,242

TABLE 2

BCI and tvi ascribed to UK transmitters other than amateur

Band	1968	1969	1970	1971	1972
LW/MW	86	91	95	101	164
Band I	765	790	805	654	703
Band II	137	140	201	167	201
Band III	635	637	728	517	582
Bands IV-V	55	84	210	317	631
Mobile	141	134	167	127	170
Yearly totals	1,819	1,876	2,206	1,883	2,451

this, saying: "Interference to long and medium wave radio has increased significantly owing to mains-borne rf voltages from the semiconductor-controlled power supply units of some large-screen colour tv receivers." Unfortunately the Post Office interference service is not concerned with spectrum pollution unless so high that it interferes with the reception of local radio and tv broadcasting stations, on the other hand the amateur seeks to hear stations at far, far lower signal levels, and has no remedy.

One possibly hopeful sign for tvi sufferers is that the MPT now puts considerable emphasis on the large number of complaints caused by inefficient tv aerials and notes that "the requirements of an aerial to reject interference are more stringent than those required to give a satisfactory signal in the absence of interference". On this point, we would like to support the views of Ian Jackson, G3OHX, who last month pointed out that set-top aerials, with their short feeders, often cause less of a problem to the amateur than the external aerials with long feeders that pick up signals on the braid: unfortunately, there are other considerations that make it impossible to recommend such aerials for uhf reception by the general viewer.

Barry Priestley, G3JGO, has also been looking at the MPT report and drawing some graphs which underline the exponential rise in cases of Bands IV/V tvi, and finds this all rather alarming. Certainly more could be done to make uhf tv receivers less susceptible to tvi.

Aerials a la G6XN

All those who attended the recent London lecture on aerials by Les Moxon, G6XN, (a full house, but why so few younger members?) were rewarded with plenty to think about: a right royal evening of myth destruction and constructive hints. Looking through my notes I find such nuggets as:

"What's so important about front/back ratio if the beam has side lobes: tune for maximum gain".

"14MHz folded dipoles work very nicely on 21MHz" (the trick apparently is to use resonant feeders).

"There is no optimum height for horizontally-polarized aerials—get as much height as you possibly can" (even, apparently, if this means using a two-element rather than a three-element Yagi).

"Unless a low swr has been achieved after great care, this usually indicates *poor* performance."

"Interaction between different aerials is important" (and

for the amateur who has everything, including *two* different beams, he can get an extra 3dB gain without difficulty).

"Loops are not single-band resonators" (see *TT* February 1973 for more G6XN views on this subject).

"Trees have a great effect on vertically polarized aerials".

"There is no limit to the possible errors when aerials are compared on the basis of ground-wave measurements".

Baluns in reverse (exit the Zepp ?)

G6XN also drew attention to the proportion of failures that can occur with aerials using the traditional Zepp feeder. Although the Zepp in its simplest form is still featured in almost every handbook, words of warning were published in the *RSGB Bulletin* as long ago as December 1955. Then G6CJ, in a survey of balun techniques, wrote:

"It is occasionally required to connect from an unbalanced aerial into a balanced line. The usual balun techniques can be used, but it is generally rather tricky to make all the currents keep to their correct paths when both ends of the cable are open. Fig 1 shows a good method. An aerial is connected to one side of a two-wire line. The earthed stub extension acts as a tuned centre-tapped transformer, so that the total impedance across the line is four times the aerial-earth impedance. The aerial may be moved along and a second stub added in the usual way if ratios other than 4 : 1 are needed. The earth may not be necessary but it is preferable. If a real earth is not readily available, an artificial earth can be provided in the form of a quarter-wave wire as shown: alternatively a ground plane of two or more such wires may be used.

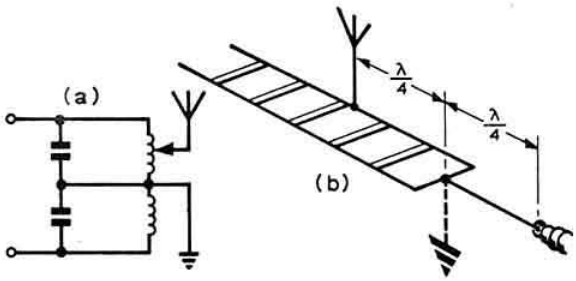


Fig 1. Technique for feeding unbalanced aerial from balanced line as originally recommended by G6CJ and found by G6XN to eliminate the proportion of failures involved in the traditional Zepp aerial while retaining the advantages of resonant feeder lines for multiband operation. Electrical equivalent is shown

"Simple connection of the aerial to one side of the line will not work—it is necessary to add the 'transformer winding' in the form of the stub to 'tell' the line it is balanced. *This is one reason why the old Zepp aerial was so uncertain in its behaviour.* On the other hand, two aerials, one either side and a half-wavelength apart, lazy-H style, would not need the addition of a transformer."

G6XN reported that he had made good use of the Fig 1 technique: once again pointing to the advantages of open wire feeders where no attempt need be made to keep the swr low.

Compact beams

One also came away from the lecture with a renewed belief in the value of the two-element beam (or rather a disbelief in the practical benefit of striving after more elements, at least for hf). So this seems the right place to mention two recent designs.

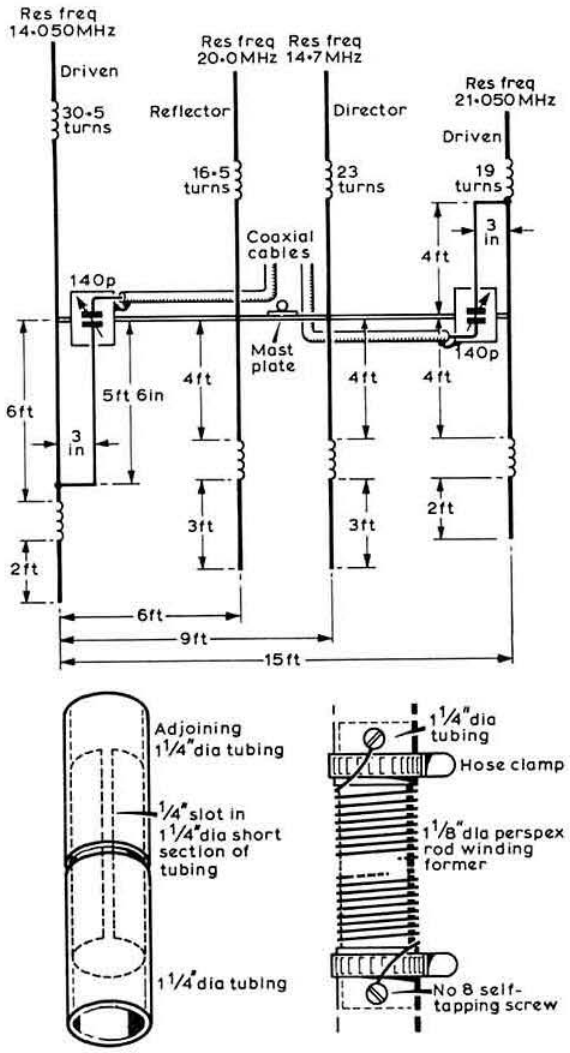


Fig 2. The compact 14/21MHz beam described by W1FBY and WA1JLD using inductance loaded elements and gamma matching

In *QST* (September 1953) Robert Myers, W1FBY, and Clarke Green, WA1JLD, describe "A bite-size beam" for 14 and 21MHz. This is unusual in several respects, including the interleaving of two separate inductance-loaded, gamma-matched two-element Yagi beams: see Fig 2. For 14MHz this consists of a driven element plus director; for 21MHz driven element plus reflector with the direction of fire the same on both bands. The loading coils are wound on 1⅛in diameter Plexiglass rod slipped into the element tubing and held in place with compression clamps (be sure to split the ends of the aluminium tubing where the clamps are fitted). All elements and boom are in 1¼in aluminium tubing. In the original model the loading coils were wound with Teflon

insulated miniature coaxial cable with shield braid and inner conductor shorted together, but a suitable substitute would be No 14 enam copper wire.

The VK2ABQ triband beam

A rather different approach has emerged from many months' work by Fred Caton, VK2ABQ/G3ONC, and his ideas have appeared in *Electronics Australia*, October 1973. This is shown in Fig 3 but it should be appreciated that this is drawn *looking down* on (or up at) the aerial. It has no traps or coils, a turning radius of only 12ft, no special 'blobs of electronics', and is mechanically convenient. No special claims are made for decibel gain, but the performance has left VK2ABQ convinced that "it is the simplest and best home-brew tribander yet".

In sending along the clipping from *Electronics Australia*, Fred Caton has added some extra details, inserted in the following notes on construction and adjustment.

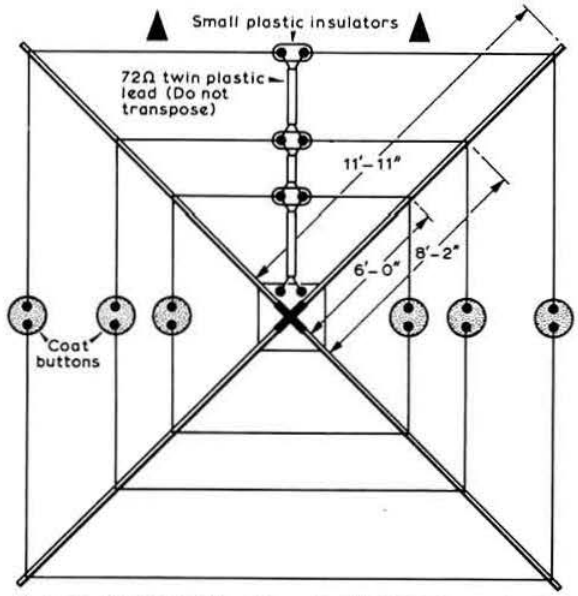


Fig 3. The VK2ABQ triband beam for 14/21/28MHz seen looking down on the aerial

"Fig 3 shows the general arrangement. I used a piece of board 15in square in the centre and then two pieces of ¾in conduit 10ft long and mounted at right angles on the board. Then an 8ft length of ⅝in diameter dowel was inserted into each of the four ends of the conduit. Any metal work used for the frame must be securely bonded to the mast. The three loops are then arranged as shown, making sure the loops are a little longer than 248/MHz ft for trimming. At this stage leave the loops uncut, except for the interconnecting feeder: I used 72Ω twin feedline but 300Ω ribbon would probably be satisfactory, though this has not been tried.

"Adjustment is carried out with a gdo. Insert one- or two-turn link across the interconnecting feeder at the board end and check for resonance. When dipping to make sure that the dip really is of the loop of interest, grip the loop at a voltage point (eg where the button will be placed later on) and check that this affects the dip; if no change is observed grip the feeder to see if it is due to this. With adjustments made at about 4ft above ground, trim the loops to the low end of the band; this will then be about mid-band when the aerial is at normal height. At this stage the aerial takes the form of a "2PL Special" and provides a bi-directional array with relatively little radiation or pick-up off the sides.

"To make the beam uni-directional, cut the loops at exactly mid-point on each side, using coat buttons as insulators. Pass each lead through a hole in the button and tie a knot as close as possible to the wire end. This uses up very little of the loop length and resonance remains roughly as before. In this form the array should exhibit a good front-to-back ratio and forward gain.

"While adjusting, the loops are held in place by any temporary means; when trimmed, the loops can be held by open-ended screw eyes in the top of each rod. With the metal work of the conduits, VK2ABQ found the loops needed to be placed at 5ft 9in, 8ft 5in and 10ft 10in rather than as shown on the diagram.

"The impedance at the feed-point at the centre board is about 50Ω but 70Ω line can be used since the aerial exhibits a broad response. No balun has been found necessary and the radiation pattern appears to be symmetrical.

"Because of the small turning radius and lightweight construction it is easy to rotate on a pipe mast lashed to the house."

VK2BTS is reported to have duplicated the beam with equally good results. I must admit to being a little puzzled about the two sections of wire in each loop being exactly the same length, as I would have expected there to be a need for the "reflector" sections to be a little longer than the driven sections, and there are one or two other features that cause some slight qualms. But the general concept seems both interesting and a convenient way of constructing a compact tribander; so the information is presented as possibly experimental, but well worth investigating; certainly VK2ABQ/G3ONC has had good results using such a beam.

AGC-controlled rf attenuator Mark III

Last month two designs for agc-controlled input attenuators were described, both using pin diodes. But just as these were going through the press another idea turned up from David F. Spears, G4AIL, based on the Cachia level control technique outlined in *TT* of April 1971. He writes:

"It was decided that some sort of attenuator was required to enable a receiver front-end based on bipolar devices to cope with the 7MHz band after dark, and inspiration was found in the Cachia technique developed in Australia. It was felt that if such an attenuator could be controlled by agc action rather than the use of a potentiometer, this might prove the answer.

"To start with, the original idea was tested using two ferrite rings of 0·5in diameter (unknown origin). Primary, secondary and control windings were determined experimentally as three, three and nine turns respectively. This arrangement gave about 3 to 55dB swing over 3 to 30MHz when used with a 5kΩ pot across the control winding and well matched into coaxial line.

"It was then decided to try using a pair of tiny ferrite beads (FX1115), as used for decoupling, instead of the larger rings; the results were successfully repeated. It was then further simplified by using only a single bead, as shown in Fig 4. This broadened the bandwidth to 1·8 to 30MHz and

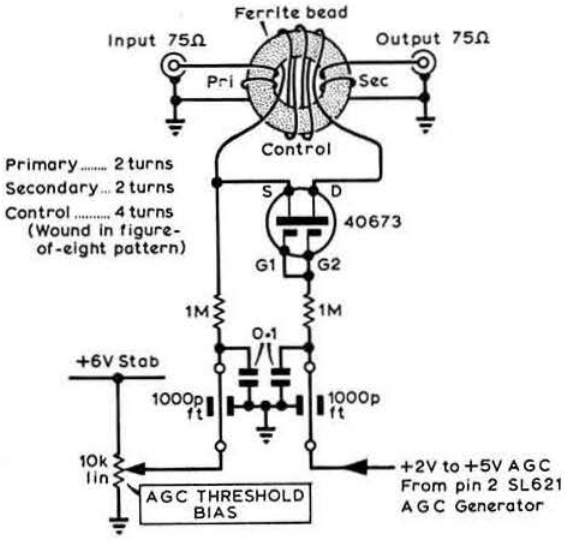


Fig 4. The automatic aerial attenuator developed by David Spears, G4AIL, based on the technique by Laurence Cachia, described in *Technical Topics*, April 1971

various types of fet were tried as agc control elements to replace the manual pot. Junction-type FETS were found unsuitable since they conduct gate to source when reverse biased, and so load the agc line. A gate-protected dual-gate mosfet, type 40673, proved best, with a minimum channel resistance of 70Ω. This has the effect of reducing the maximum attenuation to about 22dB, but this is sufficient to reduce input signal voltage by a factor of 10. The threshold control can be adjusted so that the attenuator "bites" at the desired signal level.

"A word of warning: do not enclose the device in a small metal screening can since this will act as a shorted turn coupled to the transformer and so increases insertion loss.

"Under test a complete absence of waveform distortion was noted, certainly not the case with a series-fet type of attenuator tried earlier. Results are shown in Table 3 for both forms of control and with a control voltage swing from +2 to +5V and source bias set at +4·5V.

TABLE 3

Results with Cachia attenuator

(a) Controlled by potentiometer

Frequency	Loss	Max. attenuation
1·8MHz	4dB	67dB
14MHz	3dB	47dB
30MHz	2dB	68dB

(b) Controlled by dual-gate FET

Frequency	Loss	Max. attenuation
1·8MHz	4dB	20dB
14MHz	3dB	22dB
30MHz	2dB	24dB

"When inserted in a low-impedance aerial input, the receiver performed much better than expected; 7MHz was much quieter and clear of intermodulation products. Weak cw could easily be copied in the gaps between the broadcast signals. On 14MHz the device cleaned up sideband splatter, rather like switching in a really good crystal filter.

"A new receiver is under construction and one of the Plessey SL621 agc generators will be used to control the aerial attenuator. Even with a reasonably good fet front-end, capable of handling 100mV signals, the attenuator should allow this to cope with signals up to 1V; there is also an added bonus of some 20dB of front-end protection left in circuit when the receiver is switched off."

Neutralizing fet amplifiers

From Bob Wilkinson, G3VVT, comes a tip about neutralizing. He writes: "I have found considerable difficulty in neutralizing 144MHz grounded source fet pre-amplifiers. The usual method appears to be to fiddle with the tuning and neutralizing until stable, since FETS do not appear to neutralize like valves (ie remove supply voltage and adjust neutralizing coil for minimum signal). I suspect this is due to a variation of capacitance of the semiconductor device with or without voltage applied.

"The method I have used is to turn the pre-amp back to front, ie to feed input signal to output socket and input of pre-amp to the convertor. Then apply supply voltage and tune for minimum signal. Then revert to normal connections and tune gate and drain resonant circuits. Repeat procedure until no further improvement can be made.

"I have also used this technique with a DL6SW converter which has two neutralized stages and found it simple. I have never seen this method described in print but it seems effective. Perhaps somebody can shoot holes in my theory that the signal passage from drain to gate is by internal capacitance only and that correct neutralizing removes this path."

Cocktail parties in practice

Arising out of the recent notes on pseudo-stereo and the cocktail party effect, Stan Cook, G5XB, passes along some most interesting information that confirms the value of this approach when listening to very weak broadcast signals. Several years ago, the organization with which he is concerned discovered by chance that if the signals from a broadcasting station operating on two different frequencies (common practice of course in hf broadcasting) are kept separate and fed to split headphones, the listener finds the output significantly more intelligible than the signals would be from either channel alone. This is most noticeable on extremely weak signals where the listener is straining to get anything at all. While it is true that in such circumstances the wanted signal will be coherent on both channels, while unwanted interference and noise will be non-coherent, G5XB feels that the effect is so noticeable that this is not the whole explanation. He thinks it is possible, after reading G6CJ's comments, that benefit is being obtained from the extremely small, but finite, time differences of signal arrival arising from the different reflection heights of signals on different broadcast bands. The belief that the advantages stem at least partly from the action of the listener's brain is strengthened by the fact that it has always proved impossible to make really satisfactory recordings, using stereo recorders, to illustrate the improvement in intelligibility.

Also on this subject, Harold Chorley, G5YH, mentions that for those with hearing impairments (for example a 40dB cut below 240Hz in one ear) normal ssb reception provides effectively the advantage given by binaural hearing on dsb. He wonders if anyone has commented on this effect before.

MICROWAVES—1,000MHz and up

by DAIN EVANS, G3RPE*

A klystron rf source for 10GHz

Although small klystrons have to a large extent been superseded in professional applications by semiconductor devices such as Gunn diodes and impatts, nevertheless they are still attractive to amateurs because they usually work first time. This is more than can be said for the semiconductor devices.

A practical waveguide 16 mount for the 723A/B klystron, and its near equivalents the KS9-20 and the 2K25, is shown in Fig 1. This klystron is similar to a metal octal valve, the main difference being that pin 4 is a coaxial line which terminates in a $\lambda/4$ radiator. This is one of the few transmitting valves fitted with its own built-in aerial! The klystron is coupled to waveguide simply by passing this probe through a hole in the broad face of the guide, the hole being offset from the centre line by 0·18in to improve the match. To reduce the escape of rf through this hole, the probe is best passed through a $\lambda/4$ choke. One end of the guide is closed by an adjustable brass block which is positioned approximately $\lambda_g/4$ from the probe.

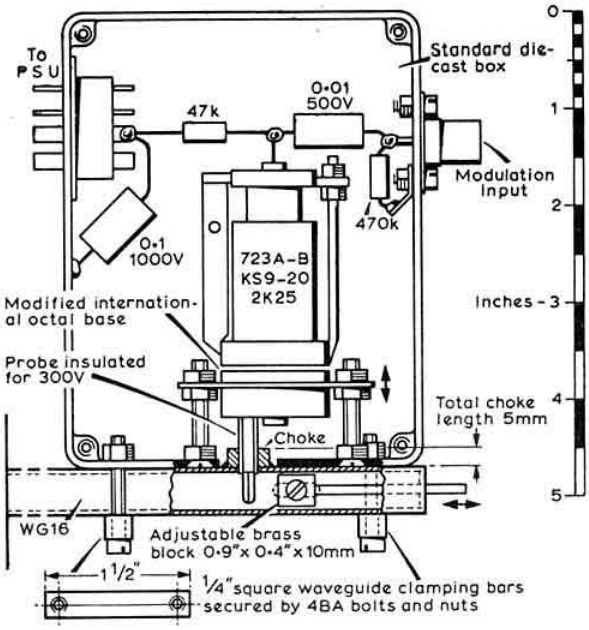


Fig 1. A waveguide mount for the 723A/B type klystron

The klystron is mounted in a standard international octal base, pin 4 of which is removed and the hole enlarged to pass the probe. The base is mounted on bolts so that its height, and therefore the depth of penetration of the probe, can be adjusted to maximize output. It is strongly recommended that the klystron be contained in a sealed metal box to eliminate draughts (the temperature coefficient of frequency is 0·25MHz/°C), to provide electrical screening, and as a safety precaution necessary with some methods of operation.

A basic power supply to drive the klystron is shown schematically in Fig 2. The klystron may be operated with either the reflector, the resonator or the cathode at earth potential, but two points must be borne in mind: the heater/cathode voltage must not exceed 50V, and the resonator is connected to the metal body. If the body is operated at earth potential then the heater supply must be floated. If the cathode and heater are at earth potential, then the body including the mechanical tuning screw and the output probe will be at +300V and due attention must be paid to insulation and protection.

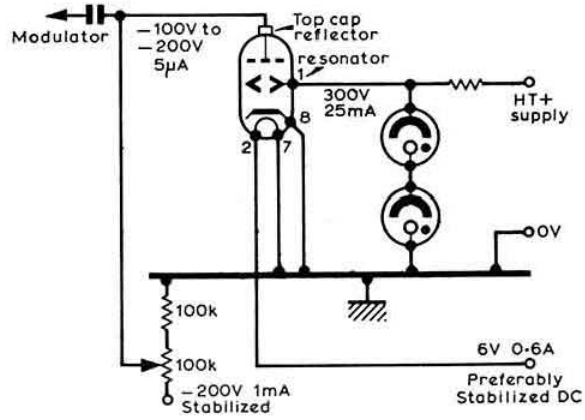


Fig 2. Basic power supply for operating klystron of the 723A/B type

To set up the klystron, some means of measuring frequency and of estimating output power is necessary. This can take the form of the unit described in the October 1973 column, the directional coupler preferably being in the range 13 to 17dB. It is important that the reflector not be allowed to run at positive potential when the other supplies are connected: its valve grid-like structure is easily burnt out. RF power is generated by the klystron only when the reflector volts are set at one of a number of quite critical voltages. These depend on the position of the mechanical tuning screw and vary from klystron to klystron. A typical series would be 152 ±3V, 172 ±3V and 192 ±3V, the one normally selected being the one producing maximum power.

As the reflector volts are changed from the optimum, the output power falls rapidly. A second effect is that the frequency of oscillation changes: for the 723A/B klystron, a ±2V change results in a frequency change of about ±20MHz. This characteristic is valuable in providing a fine tuning mechanism, which may be operated by an afc system, and also allows the output to be frequency modulated by applying in the region of 100mV rms of modulation to the reflector. It also implies that the reflector supply must be stable

Continued on p29

*4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

FOUR METRES AND DOWN

by JACK HUM, G5UM*

The new band plans

After the new metre-wave band plans had been announced over GB2RS on 11 November and the details simultaneously circulated to all affiliated societies, one detected among members a certain amount of misgiving tinged with regret that the orderliness of the UK plan enjoyed for so many years was to be disrupted.

Most of these doubts were set to rest after the appearance last month of the VHF Manager's comprehensive article describing the logic of planning by mode instead of by geography. What looked at first sight to be "revolutionary changes" turned out upon more mature thought to be "making haste slowly". For there seems to be little doubt that although a date *had* to be set for the introduction of the new internationally agreed IARU plan, 1 February 1974, the metre-wave scene will not be engulfed in tumult on 2 February 1974.

As we see it, visualizing the situation through the eyes of just one of the UK's many thousands of vhf operators, we believe that there lies ahead a process of gradual change and the emergence of a new kind of orderliness as the dx modes regroup towards the bottom end of each band and the local ones occupy the rest of it—all in all, a continuation of the progressive development of 2m operation. And because two sizeable chunks above 145MHz are labelled "Repeater input" and "Repeater output", this is no reason for vacating them forthwith; the present limited growth rate of repeaters in the UK suggests that they will not be required for this service for some time to come and therefore should continue to be used exactly as they are now. But it would have been poor planning if a band plan for the 'seventies did not take account of future repeater needs by earmarking an area for them. Meanwhile, repeater channels can be freely used by fixed stations in areas where there are no repeaters (most of the UK), as can the spaces in between these channels.

In case you were foxed by that "R" designation it may be stated that an "R" channel is a repeater input channel; there are 10 of them, R0 to R9, spaced 25kHz between 145 and 145·225MHz as shown on last month's chart. That other mystery letter "S" describes fm simplex calling channels where standard "over to you" QSOs may be had; there are four of them between 145·5 and 145·6 where fm users may conveniently congregate.

But last month's chart shows large areas of 2m labelled "All modes", and a very good thing too, if it helps to promote more inter-mode communication. It is a pity to divide ourselves into four packets called cw, ssb, a.m. and fm, and thus reduce our potentiality for intercommunication by a factor of four. The all-modes provision of the new plan should help stave off this process.

Consternation among mobile men that they must immediately move to the new 145·5 calling frequency is unfounded. It is envisaged that 145MHz will continue to be used as a vehicle spot for some time to come: it will be no bad thing to get yourself a crystal for 145·5 switchable at will from 145 against the time when 145·5 does take over.

And apropos crystals, any operators who wish to use the "Xtal Xchange" facility of *FMD* to put them on to new spots should send G5UM details of crystals available (frequency and pinnage) and crystals wanted. Of course, existing crystals are still of use either for the dx segment or for local working according to where you live. Examples: operators in Scotland will work local using their present crystals but will move down to the bottom end of the band with flexible vfo or vxo to work dx. Conversely, south-westerners will find their present crystals useful for the dx area and will move to the top end for "localizing".

Well, what kind?

What kind of people do they think we are when they overhear what we say on the amateur bands? The question was put in *FMD* in November, and plenty of people have come up if not with answers to it then certainly with comments upon it.

Summing up the thoughts of many, BRS31912 writes: "On the subject of fatuities heard over the air one could go on and on. The remedy would seem to be the realization by licensed amateurs that they have a responsibility for a certain standard of operating procedure, and that includes speech and good manners if they are not to bring the hobby into disrepute and themselves into ridicule."

Operators' loss of manners is regretted also by G8GI, who fears the spread of 80m malpractices to 2m. Push-to-talk, he feels, tempts net-users to butt in with facetious or clever-clever "saloon bar" comments even when someone is actually talking. "The only small consolation is that when ssb is the mode in use ordinary listeners cannot understand what goes on," he adds.

From a London area member: "Some of the newer-comers to 2m purchase wideband fm sets and chatter about their motor cars and other personal business on nets, often with bad jokes. If your man from the ministry hears them he must feel that most of the natter would be best passed down a telephone line at some profit to the Post Office!"

Other observations received include:

"I do not think the phrase 'carefully tuning' is objectionable: it often implies care and politeness."

". . .absurdities such as 'Listening for any possible call'. What about the *im*possible ones?"

"What an ordinary person finds most annoying is the interpolation of the word 'there' so often, eg 'OK Jim, there. The weather's fine here, there, you're five and nine there,' and so on ad nauseum".

"I wonder if the RAE, like the majority of other qualifications, should not in future call for a knowledge of basic English as a requirement before an amateur launches his solecisms upon a larger audience (often silent) than he realizes".

If Confucius had a saying for it he would probably remark: "Small blots on otherwise clean white sheet devilish hard to

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remove", or that ". . .small patches of weed in beautiful cornfield become large ones if care not taken". Apply the analogies to amateur radio and you will see what we mean.

More about ms

A welcome to the increased interest being shown in 2m meteor scatter work is voiced by G3WZT, well known as a consistent persister at the *genre*. What do these two words mean in practice? Typically, this: a contact established with OK1BMW during the Leonids shower took 2½h to complete before the welcome "RRR" came through from Prague, to confirm that callsigns and reports were solid both ways (no QSO of any kind, ms or otherwise, is a QSO if this fails to happen).

John Matthews tells *FMD* that he has taken the hard work out of the repetitive sending inseparable from ms communication by constructing a programmable keyer with a 1,024-bit memory. He says:

"My key speed is normally around 40-45 words/min, and I think the only limitation on speed is governed by the audio frequency of the received tone, ie if the other station hears your keying at 50words/min and at an audio frequency of 1kHz, then if he slows down the recording by half he must read 25words/min, but the frequency of audio is only going to be 500Hz. In an i.f. bandpass of 600Hz to 1kHz this can give rise to problems at high keying speeds, unless the operator can read very high-speed cw."

Sideband on 70cm

As the finishing touches were put to their 432MHz Cumulative logs just a month ago, many "seventy centimentalists" must have noted the great increase in A3J activity which the 1973 Cumulatives disclosed. What was also very evident, in contradistinction to the situation on 2m, was ssb users' flexibility of operating and readiness to settle on the other man's frequency anywhere in the band, promoting many cross-mode contacts. Even so . . .

"A little more flexibility on the part of A3 users would be no bad thing," says G8EOP, one of many north-countrymen using A3J. "It was hard going in the Cumulatives, with few listening on their own channels," he adds. More encouraging news which he imparts is that even farther north, up Tyneside way, G3YRH and G3ZJY will soon be on 70cm sideband. For his own part Melvyn Jackson welcomes 432MHz sideband skeds any time (G8EOP, QTHR).

Meanwhile, A3 remains the predominant mode in use on 70cm, with a touch of fm here and there. It was the two-band event of November which showed that cw is still by no means a neglected art on uhf; the earlier finishing time of 0100gmt was much favoured by those who had complained concerning the one-time all-night events that there was little fun in sitting up listening to one's receiver noise until breakfast time. But G3DAO of Selsey was not alone in querying the wisdom of telegraphy two-banders: "Why, oh why, does it have to be a two-band contest?" Maybe there is a case for two-hour telegraphy cumulatives—on *both* bands, but not at once!

That OK comet

If you have not yet seen the Kohoutek Comet, keep gazing. The Czech professor's prediction was that it should be within best view during January at its nearest approach.

How near? A QRB of a mere 75 million miles, giving little reason to hope that amateur signals can be reflected from it. As Bill Scarr, G2WS, puts it: "If amateurs cannot get signals back from Mercury why attempt them from a much smaller and less discrete body at the same distance? Meteor scatter is achieved at a range of a few hundred miles at most, usually much less."

Which seems to put the matter of Kohoutek where it belongs. But it was nice to know while it lasted.

The DX Clip

The law of universal cussedness, popularly attributed to "Murphy", was in suspense on 22 November, the night of the penultimate 432MHz Cumulative. Rarely had the "seventy centimentalists" had it so good, and a list of the dx worked during that super-lift would fill the rest of this column with a mass of indigestible letters and figures. Even more so on 2m: full marks to the Continentals for sorting out anything readable from the solid phalanx of UK stations calling them.

A couple of days later when most British radio amateurs had sunk exhausted to bed after the previous nights' excitement, a small Ar developed, visible at GM8FFX in Aberdeen and producing somewhat late dx from 2345 to 0200 (Graham Knight's best was with G8FQO in Surrey at 58A). The north-firing beacon SK4MPI, always a good indicator of Ar conditions, was lower in strength than usual at S6 in Aberdeen.

* * *

November's "lifts" affected 4m (big signals from non-amateur stations), but the old tvi bogey inhibited people from coming on. Nor does the swing to uhf television help them, eg "I have had more tvi trouble with uhf transistor models than with the old Channel 1 valve set." says G3LVP: but he adds that most problems are solved with the "UHF tv braid breaker" by G3OHX (this journal, November 1972).

Tenacity earns its reward

Quick work by G3RSD in putting a QSL in the post immediately after the November 2m telegraphy contest brought to G2HDT of Burton on Trent his thirtieth county (Lincs) and the prospect of putting in a claim for the Four Metres and Down Operating Award. It was a prospect which G2HDT had awaited for 12 years. And anybody who has visited Burton on Trent will know why: you go sharply downhill from whichever direction you approach it.

At the base of one of the hills is the Ted Crouch QTH, facing NW. Here in 15 years on 2m the Wrotham beacon has never been audible, nor the Continentals. Even Leicestershire, virtually the next county, is dx! So the cards have come in slowly for the FMD claim. When they *did* arrive the VHF Certificates Manager was fascinated at the cross-section of 2m activity which they disclosed over a period of 12 years. Expeditions long since forgotten were represented in the five-plus-30. So, sadly, was many a silent key.

Sheer tenacity and the ability to concentrate on weak cw signals have brought to G2HDT a more than well-earned Certificate No 364.

* * *

Last month's annual consolidated table of Four Metres and Down Certificate holders inevitably missed a few of the 1973 claimants whose cards were processed after the press closing date. Almost as galling as just missing being shown in the

Callbook because your new licence came through only days after it went to press. "Ah well, there's always next year . . ." is small consolation.

For the record, eight FMD parchments were issued for 70MHz in 1973, plus three "Seniors", notable for an impressive performance by G3ZRH, who won his "Senior" only six months after he had received the 70MHz Standard award. But not a single 70MHz Listener's Award was claimed.

On 144MHz three Listeners' Awards went out, by contrast with 68 transmitting. Where the 2m "Senior" was concerned the year went out with a gallop when G3EHM, G5DF and GW3ZTH all got theirs in October to bring the 1973 total of 144MHz Seniors to seven.

On 432MHz only one "Senior" was awarded during the year, but nine "Standards"—plus (once again) *nil* Listeners'.

As for the hardest-to-get of all, the two 23cm Transmitting awards of 1973 were the first to be issued for six years; and the three "Supremes" to G3ZYC, G3COJ and G4BEL were earned as a consequence of dedicated operational and technical expertise.

The year also saw recorded five microwave awards for first contacts made on 3cm beyond the 150km mark—more dedication there, to be sure.

But where, oh where, are the metre-wave listeners? A hint to Bob Treacher's boys to have a go (armed with a goodly supply of SAEs when reports are sent out).

* * *

And so at length to a round-up of the parchments issued after last month's annual table had appeared: a special mention that 432MHz Award No 100 has been reached (it is now on the wall at G3WSN). Another Essex man, G3LVP, gets Certificate No 104 for 70MHz, earned by a skilful mixture of A1, A3 and A3J and a careful watch on the much-praised expeditions of G3FDW and G3VPS; in fact, 12 of the 20 cards which Ken Eastty turned in were for contacts with G(GW)3VPS/P from several rare counties. Now, in search of the 70MHz Senior, he would welcome skeds with EI, GI and Glamorgan.

In the 144MHz Transmitting bracket, the last three certificates to go off before press deadline were No 369 to G4BTZ in London, No 370 to G3SDS/P (the South Dorset club), and No 371 to GW4BXE/P whose visit to the mountains which surround his Pontypool site paid off in the end in spite of a notable failure of any PA stations to send cards ("During the lift on 22 November I found a PA just as eager to QSL as I was as he needed GW, so we exchanged addresses over the air and QSLd direct," adds Phil Edwards).

Rutland's last stand

A dozen years ago, Rutland, which is England's smallest county, successfully resisted absorption into its larger neighbour, LR. But now it is to disappear from the map if not from memory when the local government reshuffle happens on 1 April.

On 30-31 March a special activity station, GB3RUT, will put the "littlest county" on the radio map for the last time. Members of the Havering Radio Club, noted for their earlier expeditions to sought-after regions, will be active for the 48 hours of these two days on 4m, 2m, 70cm and 23cm.

Past expeditions, and the dozen indigenous Rutlanders who work on vhf, have brought QSLs to people in search of their FMD certificates, but many newer licensees will not yet have been lucky. The GB3RUT foray will be their last chance. G4ACN is organizing it.

* * *

Further to boundary changes, a comment from GW4BXE of Pontypool: "Don't forget that Monmouthshire, after centuries of political argument, is officially Welsh next spring. Do not forget to alter the boundary on the locator map and on FMD claim forms!"

Here and there

Try 70·15 as an ssb calling channel on 4m, suggests G3BA. The idea has the merit of letting sidebanders know where they can find others, and it keeps powerful A3J QRM off the national calling 70·26 where weak mobiles may be attempting to get out.

Collecting for a 23cm parchment? Want Staffs? Then try a sked with G3EHM any time but Thursdays, when Ken Parkes takes an RAE class. His 1,296MHz aerial is 50ft up on an 830ft site.

Sked-spots also required by G3WZT in Sussex with GY, CA, CR and FT. Any GC or GW in these counties who can oblige, write to John Matthews, QTHR.

25 Years Back

"Panoramic receiver, range 2,250 to 2,500 Mc/s . . . intended for general monitoring, frequency measurement and bandwidth measurement in the 2,300-2,450Mc/s amateur band, at an i.f. of 60Mc/s and a panoramic display"
From a report on the equipment to be seen on the GPO stand at the Amateur Radio Exhibition. *RSGB Bulletin*, **January 1949.**

Microwaves—1,000MHz and up

Continued from p26

and hum-free to within a few millivolts if unintended modulation is not to occur. Variations in the resonator supply also affect frequency, although to only about one-fifth of that to the reflector. It is easier to reduce hum levels if the heater supply is dc rather than ac, and frequency stability is improved if this supply also is stabilized, for example using a simple transistor series stabilizer.

A simple form of psu could consist of a standard 350V mains supply or inverter stabilized by two 150V neons. The reflector supply can simply be a dry battery since the drain is due almost entirely to the potentiometer across it. A mains power supply which could be made suitable is described in the *VHF/UHF Manual*, second edition, p. 5.33. The design of a psu for operation from a 12V accumulator and due to G3WJG is being prepared for publication.

When in an unmodified state, the 723A/B klystron can be tuned over the range 8·5 to 9·6GHz by three turns of the tuning screw on the side of the klystron. This operates by mechanically changing the dimensions of the resonator cavity. Most klystrons can be pulled into the amateur band by carefully filing away *all* of the weld locking the adjusting nuts on the side arm, and unscrewing these nuts progressively while monitoring the maximum frequency that can be tuned. Most klystrons can be made to work at 10·1GHz, some even to 10·5GHz. Recalcitrant klystrons can be encouraged by increasing the resonator volts up to 350V.

It must be emphasized that as the output power developed is in the range 20 to 40mW, the power density at the open end of the waveguide may well exceed the "safe" level of 10mW/cm² and the appropriate precautions must be taken.

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

1974—a New Year, and one nearer to the World Administrative Radio Conference in 1979. How does this concern the average amateur? An article by VE3RX in a recent issue of *Worldradio News*, recalls a conversation which took place between VE3CJ and a licensing official of Ghana at the ITU space conference in 1971. At the time a number of Canadians were working in Ghana setting up a tv network and the official was asked whether he had met any of the visiting radio amateurs. He said that he had, but that he felt that he could not really actively support the amateur service because of the behaviour of some individuals who had run phone patches, used excess power, and showed no respect for regulations. At the 1959 conference when the question of 7MHz allocations arose one of the delegates obviously opposed to amateur radio produced a tape recorder and recordings of bad language and bad manners which he suggested were typical of amateur conversations. Perhaps the best New Year resolution for us to make is that we will *never* misbehave on the air or use language which could be recorded by the enemies of the service and used as a weapon against us at a later date.

Apologies to G3AAE whose call was inadvertently left out of the list of UK callsigns in the latest DXCC Honor Roll on page 768 in November *MOTA*.

Dxpeditions

W6KNH and VU2KV are planning a trip to Bhutan which should result in A55KV coming on the air for four days commencing 28 December. Frequencies to be used are 14,195, 21,290 and 28,600kHz on ssb, and 10kHz up from all lower frequency band edges on cw. A linear will be used, as well as a beam, and it is possible that operation will also take place from other countries north of India. The exact dates of the expedition are not available at the time of writing.

West Coast DX Bulletin says that WB0ANT has permission from the Colombian government for HK0AA to be used in late December from Baja Nuevo—WA0VKP and WA0MHJ will also go on the trip. The same source mentions interest in a visit to South Sandwich by some Argentinians, as a research vessel is at present in Buenos Aires for repair and maintenance work.

CT2AZ will be visiting Madeira and may have a CT3 call from 1 to 15 January.

The projected VR1PC operation from British Phoenix Is by W6NKF has been delayed, but may take place during January. Another postponed expedition is that which 4W1AF and FL8OM had hoped to make to the Kamaran Is. It seems that their landing permission was revoked on account of political problems in the area. When these are resolved they hope to make fresh plans.

A group of W9s hopes to visit San Andres Is (HK0) in late December and to stay until mid-January. They will operate on all bands (including 160m) with ssb and cw.

5W1AU will be on the Tokelau Is (ZM7) for about a week early in January and will try to get on the air. INDXA has been inactive due to the fact that K3RLY has recently moved home and changed his job. However, these matters are now settled and plans for stirring up activity on Palmyra Is (KP6) and Cocos-Keeling Is (VK9) are under consideration.

DX news

A number of strange prefixes have been in evidence during the past few weeks, some associated with periods of special activity such as the CQ WW DX Contest. During the latter, stations in Trinidad were heard using 9Z4 instead of the more usual 9Y4. French stations were allowed to use the HW prefix from 15 November to 15 December to commemorate the transatlantic contact between Leon Deloy, 8AB, and Frederick Schnell, 1MO, on 103m on 28 November 1923. The ZY prefix was used by Brazilian participants in the Export 73 contest. KX1MUM was on from the Bristol Mum Festival (Conn, USA), and KF2NYS from the New York State Fair.

Tuatai Tupou, ZK1MA, has returned to Rarotonga and an attempt is being made to get his successor on the air. It seems that ZK1TA will count as being located in Manihiki, and as W6KNH will be away from home for several months in the near future anyone needing a ZK1TA or ZK1AI QSL should apply without delay. All ZK1MA's logs will be in W6KNH's hands when he returns to California. JA0CUV/1 reports difficulties in confirming 3B6CF contacts as there is no regular mail service between Agalega and Mauritius. The only logs he has received refer to the period 19 March to 21 April.

BV2A hopes to have permission to use ssb soon. When he does, INDXA is hoping that they will be able to supply a five-band transmitter for his use.

VQ9HCS is located on Astove Is in the Cosmoledo group. This is located 260 miles south-west of Aldabra and 800 miles south of the Seychelles. He will be there for two years and has two KW2000s, a linear, and a three-element beam.

A new station on Campbell Is is ZL4NJ/A who will be there for another nine months. QSLs go via ZL3IT.

It is rumoured that all amateur operation from Burundi will cease at the end of 1973.

KB6CU has a new job and is likely to be on Canton Is for some months to come. VK9ZC was due to close down at the end of November.

TJ1EZ is PA0EZ and has been reported to be active on 14,345kHz at 1730, especially at weekends when he is in company with ZS6UR. He also uses 7MHz cw around 2000 when looking for PA0 contacts.

KH4NCA was the callsign of a special station set up to commemorate the 70th anniversary of the first powered flight (made by the Wright brothers) at Kitty Hawk, NC, USA. The ON50 prefix was used by Belgian stations for a while at the end of November—this celebrated the 50th anniversary of amateur radio in their country.

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Expeditions

Due to the impending absorption of Rutland into surrounding counties on 1 April, members of the Havering ARC have decided to activate the county during the last two days of its existence. The callsign will be GB3RUT and will be on the air from early Saturday 30 March to Monday morning 1 April. SSB and cw will be used on 1·8 and 3·5MHz as well as vhf. Special commemorative QSLs will be issued—please send sae direct to G4CAF, 17a Askwith Rd., Rainham, Essex RM13 8EL.

News from overseas

Sid May, VP2KH, has advised that the St Kitts, Nevis, Anguilla Amateur Radio Society has now been formed. VP2KX is the secretary, and VP2s KF, KH, KM, KQ, KV and SK are the committee. They have been loaned the use of the local Red Cross hall for meetings and intend to organize evening classes for the RAE and to build a club station which will include rtty from a Creed 54 printer which has been obtained from the local Cable & Wireless office. Any help in supplying equipment for use in the station would be appreciated and details should be sent to the secretary at PO Box 423, Basseterre, St Kitts, BWI.

Maurice Caplan, VS5MC, hoped to operate from Hong Kong during the cw section of the CQ WW DX Contest. He expects to remain in Brunei for two years and at the time of writing he was using a KWM-2A and dipoles, although by now he should have a TH3 in action.

The latest *Ex-G Radio Club Bulletin* (edited by W3HQO/G3XNV) reminds us that the club is for those who were born or naturalized in the UK and are now living abroad. Official nets take place on Sundays at 1900 on 14,347kHz, and on Saturdays at 1900 on 14,065kHz. A Pacific net meets at 0500 on Saturdays on 14,347kHz and a local Australasian net on Wednesdays at 0900 on 3,650kHz. UK stations are especially invited to join in. This year's president is WA6GLF, and secretary W3CTR. The UK honorary secretary is G8FG (235 Station Rd., West Moors, Dorset).

Barry Kirkwood, GW4COP, formerly ZM1BN/A (Snares Is), ZK1CM, ZL1BN/MM (aboard the nuclear protest yacht *Tamure*) and ZL1BN/A3, returned to Wales in October but expects to return to New Zealand early in 1974.

Dave Hibbin, G4AOP, has written from Cyprus to say that he is licensed there as ZC4DJ and also as ZC4ASG (Akrotiri Scout Group). The latter contacted 78 overseas and 30 UK scout stations located in a total of 46 different countries during the 1973 JOTA, and may be active during some contests in 1974. QSLs will be sent out to all who apply to the address in *QTH Corner*.

Top Band news

EP2BQ now has his 160m inverted-V up at his new QTH in Tehran. He says that he is usually on 1,803-1,805kHz listening between 1,825 and 1,830kHz for Europe, 1,908-1,912kHz for Japan, and on 1,826-1,828kHz himself, listening 1,800-1,805kHz for North and South America. During the CQ WW DX (CW) Contest he made 41 contacts in 10 countries, these included OK, OH0, PA, HB, OH, DL, GW3UCB/P, GM4ASY, and G3s YUV, SZA, UNT, XAP, ZPS, ZEM, RXH, SED and XSC. He briefly heard KV4FZ and JA3AA. Harry's new address is given in *QTH Corner*.

Contests

ARRL International DX Competition

2-3 February and 2-3 March (phone)
16-17 February and 16-17 March (cw)

From 0001 Saturday to 2400 Sunday in each instance. Non-W/VE stations endeavour to contact as many W/VE stations as possible, and stations may be contacted on each band for credit. Each completed contact counts three points and dx stations should send RS/T plus dc input power, W/VEs will give RS/T and state or province. The multiplier on each band is the number of different contiguous USA states (48—*excluding* KL7 and KH6) plus VO and VE1—VE8 worked. Final score is the total of the band multipliers times the QSO points. Logs must arrive at ARRL, 225 Main St, Newington, Conn, 06111, USA, no later than 13 May, A supply of summary sheets and log sheets is available from G3FKM (sae please)—the latter have space for 100 contacts.

The CQ WW DX 160 Contest

2200 25 January to 1500 26 January

Exchanges consist of RST and QSO number (starting from 001). W/VE stations will also indicate their 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 the USA or Canada which count 10 points. The multiplier consists of the total number of DXCC countries, USA states and Canadian provinces contacted. Note that QSOs with USA and Canada count as state/province multipliers only and not as countries as well. Log and summary sheets may be obtained by sending a large sae (with IRCs) to CQ 160 Contest, 14 Vanderventer Av, Port Washington, LI, NY, 11050, USA. Completed logs should be mailed before 28 February to this address.

The 1973 French Contest

1400 26 January—2200 27 January (cw).
1400 23 February—2200 24 February (phone)

Exchange RS/T and serial QSO number (from 001). QSOs with France or the 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 count as multipliers. Contacts made during this contest may be used as credits when applying for the DUF, DPF, DDFM and DTA awards within the following two years. Logs go to Lucien Aubry, F8TM, 53 rue Marceau, 91120 Palaiseau, France. In the 1973 event UK entries were as follows:

Phone			CW		
G3UOL	**21,826**	**points**	**G3NYY**	**41,712**	**points**
G4ACQ	20,865	,,	G4ALG	14,193	,,
GW3GHC	20,303	,,	G8VF	13,098	,,
GW3RAA	6,552	,,	G5GH	7,695	,,
			GW3INW	6,125	,,

The AGCW/DL Winter QRP Contest 1974

1800 12 January—1500 13 January

Operating time 15 hours maximum, the six-hour break to be in not more than two periods. QRP entries—single-operator, under 10W cw only on 3·5, 7, 14, and either 1·8 or 21MHz. Exchanges consist of RST, QSO number, power and "X" if using crystal control. Points are as follows: contacts with own country = 1, with other countries in own continent = 2, with other continents = 3. Add three more if the other

station is also QRP. "Handicap" bonus: if less than 3W or crystal control at either station, one handicap. For one handicap multiply score by two, for two multiply by three, and for three by four. Multipliers are one for each country in own continent, two for others for each band. Each JA, PY, VE, VK, W or ZS call area counts as a country. UK stations send entries before 7 February to G8PG, 37 Pickerill Rd, Greasby, Wirrall, Cheshire. Note that QRO entrants contact QRP stations only and indicate "QRO" after their other figures. Points per QSO are as earned by the QRP station worked.

The Venezuelan 40th Anniversary Contest
0000 19 January to 2400 20 January
3·5 to 28MHz. Telephony, single-operator single-transmitter only. Exchange report and serial QSO number (from 001). Contacts between stations in the same country count one point, in different countries three points, and with official stations of the RCV 50 points. Multipliers are DXCC countries and YV prefixes on each band added together. Official stations are YVs 1AF, 1AJ, 1BS, 1JB, 1KJ, 1KV, 1VG, 1ZO, 2AA, 2AJ, 2AS, 3AJ, 3EL, 3GO, 3JJ, 3SP, 4AA, 4AJ, 4AM, 4YV, 5AJ, 5AAG, 5AAM, 6AG, 6AJ, 6AO, 6AW, 6BB, 6JF, 7AA, 7AJ, 7AS, 8AJ and 9AJ. Send logs to RCV, PO Box 2285, Caracas, before 31 March. Printed rule sheets are available from G3FKM.

In the scores made in the **1972 CQ WW DX (CW)** contest, which were listed in a recent *MOTA*, there was an omission. GW3UCB/P acquired 3,463 points on 1·8MHz but as a multi-operator station was treated as a multi-band entry—the total included contacts with 15 countries in four zones.

Band reports

Not a very good period on the bands with a very marked fall off in the number of reporters. Many thanks to G4RZ, G6GH, G3RFG, G3UEG, G3UKH, A7511 and A8312, who appear to have been the only readers in whom listening around produced any enthusiasm.

Stations listed in italics were on cw, the rest on ssb,

1·8MHz. 0000 *KV4FZ, VE1CD, W3ZQW.* **0430-0715** *W1BB, K2ANR, WA8IJI, YV4AZP, ZF1FOC.*

3·5MHz. 0000 7X2MD. **0700** CN8HD, KZ5CQ, W5KGJ, K6AHV, W0AR, ZL4s HJ, LT, NH. **0800** VP2EN. **1900** 9H1CW. **2100** JY3ZH. **2200** FP8DH. **2300** KP4AN, ZB2CF.

7MHz. 0400 *HI7RFM.* **0700** CR4BS, *LU3EX,* ZL4NH. **0800** *JA4BJO, ZL1SV.* **2200** *PY7s BX, DKC.*

14MHz. 0700 ZC4ASG. **0800** CV4C (Uruguay), *KA6WS,* KG6AAY, KL7HPQ, M1C, TA1KT, 5N2ESH. **1800** KH6BB, 9X5NA. **2100** VP2KM.

21MHz. 0800 *UA0YT, VS6AW.* **1100** *7P8AC.* **1200** *HS4AGN.* **1300** *FG7TG.* **1400** *HC2LF, TR8PB,* VP2VAN, 9G1AR, 9J2TB. **1500** *FR7AI,* K5LWL/YV6, 4C9AA. **1600** *FM7AD, ZD9GG.*

Very many thanks to all correspondents, and specially to the following for information obtained from their publications: The **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0INA/PA0TO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*George Allen*), **World Radio News,** the **DXers Magazine** (*W4BPD*), and **Long Skip** (*Nick Sawchuk*).

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

QTH Corner

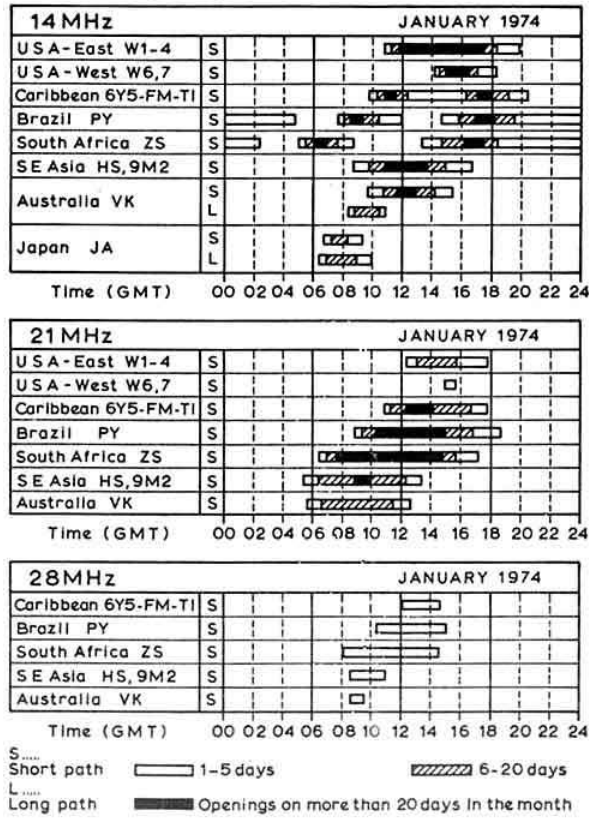
A55KV	via W6KNH, 42 Donald Drive, Orinda, Cal, 94563, USA.
EP2BQ	Dr H. McQuillan, c/o Oil Service Co of Iran, PO Box 1065, Tehran, Iran.
FP8BH	via VE6AYU, 4416 Bulyea Rd, NW, Calgary, T2L 2H3, Al, Canada.
HS3AGL	via K4UBR, 114 Bayshore Court, Ft Walton Beach, Fla, 32548, USA.
HS4AGZ	via K5LBU, C. F. Frost, RFD 1—Box 1267-E, Odessa, Texas, 79760, USA.
KH4NCA	via K4CIA, 3709 Huntleigh Dr, Raleigh, NC, 27604, USA.
KX1MUM	Box MUM, Bristol, Conn, 05010, USA.
LG5LG	via LA4YF, Hans Kinck, 3800 Bo 1, Telemark, Norway.
SJ9WL	SSA, Jonakersvagen 12, S-12248, Enskede, Sweden.
TJ1EZ	PA0EZ, A. A. Dogterom, Nieuwlandseweg 8, Hilversum 1302, Netherlands.
TY1UW	via ET3ZU, Aldo Zumbo, Box 379, Asmara, Ethiopia.
ex-VK9ZB	B. P. Bailey, VK3MK, 298 Mitcham Rd, Mitcham, Vic, 3132, Australia.
YJ8BL	via W6NJU, 7632 Woodland Lane, Fair Oaks, Cal, 95628, USA.
YJ8KM	K. A. Munyard, c/o Radio Station, Vila, New Hebrides.
ZC4ASG, ZC4DJ	D. Hibbin, G.R.F., 103 M.U., BFPO 55.
ZD3X	via OH2NB, Lansipellontie 12, SF-00390 Helsinki 39, Finland.
ZF1DH	via W5LDH, P. Spencer, 7030 Argonne Blvd, New Orleans, La, 70124, USA.
ZL4NJ/A	via ZL3IT, J. MacDonald, 42 Buchanan St, Timaru, New Zealand.
5R8CO	via F8US, 28 Rue des Poilus, 78 Mesnil-Le-Roi, France.
5T5LO	via K9KXA, Mas Seo, 6430 N. Lakewood Av, Chicago, Ill, 60626, USA.
5V7AR	via CN8CG, J. Roux, PO Box 22, Ouarzazate, Morocco.
6Y5BF	via WA6AHF, 17494 Via Alamitos, San Lorenzo, Cal, 94580, USA.

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

Propagation Predictions

Conditions in January will differ little from those of the previous month. The forecast given for December will hold good for all bands mentioned. It is again pointed out that all times given are 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 1973 from the Swiss Federal Observatory was 22·1 with the greatest solar activity occurring during the last 10 days of the month. The predicted smoothed sunspot numbers for March, April and May 1974 are 24, 23 and 22 respectively.



The 1973 AGM

In spite of travel difficulties and a cold wet evening, more than 100 members made the journey to the Royal Society of Arts in John Adam Street, London, to attend the 47th Annual General Meeting of the Society on 7 December. The meeting was opened by the President, Dr J. A. Saxton, CBE, who welcomed those present and, after the reading of the formal notice convening the meeting, asked for the approval of the minutes of the previous AGM which had been published in the August 1973 issue of *Radio Communication*. After objections had been raised from the meeting, and following some discussion, the minutes were formally approved on a show of hands. The Report of Council was then received and adopted. It was again explained that this was the statutory report as required by the Companies Acts and a full account of the Society's activities had been provided in a supplement contained in the November issue of *Radio Communication*. Generally the meeting was appreciative of the comprehensive report provided for the 1973 AGM and expressed the hope that it would be produced for all future annual meetings.

The next agenda item concerned the approval of the audited accounts for the year ended 30 June 1973, and this was formally proposed by the Treasurer, G3DVV, and seconded from the floor of the meeting. A number of questions were asked concerning relatively minor matters in the accounts, and these were answered by the Treasurer. Several questions were asked about the present-day value of 35 Doughty Street and the value of £100,000 given in Note 2 to the published accounts. The Treasurer explained that this figure was probably pessimistic and he hoped that the market value was in excess of this. The Society had not obtained a valuation of the premises but had received a number of offers from would-be purchasers. Surprisingly, there was no comment from the meeting concerning the future of the Society's finances; one can only infer confidence in the Treasurer.

After the adoption of the accounts the President announced the result of the ballot for ordinary and zonal members of Council to fill the five vacancies occurring on 1 January 1974. The following members were declared elected: G3USB, G3BPT, G3KPO, G2BVN and GI3GXP.

The President then reported that the Council had invited Professor Sir Martin Ryle, FRS, G3CY, the Astronomer Royal, to become an honorary member of the Society and that he had accepted. Council had also invited Mr W. E. F. Corsham, G2UV, to become a Vice-President of the Society. "Uncle Vic" had a long history of participation in the affairs of the Society since his successful part in the trans-atlantic tests in December 1921. G2UV was present at the meeting and received a hearty ovation from the members.

From the chair it was then explained that no questions had been received from members in accordance with the articles of association but that there would be an opportunity later to discuss matters informally. The Secretary then read a supplementary report to "The Year in Review" and stated that the former would be published in *Radio Communication* for the benefit of members who were not present at the AGM.

It was suggested from the floor of the meeting that the presentation of the trophies should be made after the informal discussion but on a show of hands this was rejected and the President then proceeded to present trophies to those winners who were present.

Informal discussion

This was opened by G3VZV who regretted the lack of operation from the station at 35 Doughty Street. It was pointed out that there was only one amateur on the staff of HQ (the general manager) and that members were not inclined to visit HQ in order to operate the station during evening periods. A rota of volunteers would be compiled in order that the station might be heard more frequently.

The Treasurer then asked the meeting for its opinion on a reduced subscription for students. This produced many comments from the floor of the meeting and the final reaction was that a lesser subscription should be payable up to the age of 18 irrespective of whether or not the member held a transmitting licence.

G3IIR asked how many persons had taken advantage of the family membership concession. The general manager replied that about 40 persons had applied, and it was then commented that this was indeed a minority interest.

G3VZV then asked what steps were being taken to counter the effects of badly designed television receivers that were susceptible to out-of-band transmissions and how was the Society reacting to the problems of emc. G2YS outlined the work of the Interference Committee and mentioned the presence of the Society on a BREMA committee. Other speakers on this subject were G2CVV, G3VUQ, G3JIP and G3VA. Conclusions were that it was necessary to bring pressure on the manufacturers to improve front-end design and that published statistics on interference were often misleading.

G3SJE raised the possibility of holding the AGM at places other than London and on occasions other than Friday evenings. G2CVV mentioned the failure of a meeting at Derby, and G6LX stated his experience of meetings of another organization held at Manchester and Glasgow where insufficient persons to form a quorum were present. G2UV said that in his opinion Friday evening was the right time for the AGM.

G3YJC gave instances of what was in his opinion a lack of communication between the Council and Regional Representatives and accused the Society of inactivity and a lack of interest. A somewhat heated discussion then ensued without any firm conclusion being possible. Ron Ham stated that he had attended the meetings of many local clubs at which he had been a guest speaker and there had been little complaint of the RSGB. The President outlined the consideration that had been given during the past year to ways in which the efficiency of the Society could be improved and referred to the acceptance by Council of the principle of a restricted term of service for Council members. GW8NP referred to the plan to hold committee meetings in the provinces provided the cost involved was acceptable. G3ZXA said that he felt any criticism of the Society was constructive and indicated an interest in its future.

G3SJE asked that, despite comments by an earlier speaker, the informal write-up on the AGM should be repeated, for the benefit of members who had not been able to attend.

In concluding the informal session the President referred to the difficulties that would certainly be experienced in the future, particularly concerning frequency allocations. He then thanked members for their attendance and participation in a lively discussion.

This brief report of the AGM is an informal account in advance of the minutes of the meeting proper and in no way constitutes a formal record of the occasion. G2BVN

South-East Counties HF Convention

ORGANIZED by the Crawley ARC, the Reigate ATS and the West Kent ARS as part of the celebrations of the RSGB Diamond Jubilee Year, the South-East Counties HF Convention attracted more than 150 visitors to the Airport Hotel at Crawley on 18 November.

Most visitors spent the morning and early afternoon browsing round the trade stands with personal QSOs giving an opportunity for suitable refreshment. Dealers present included the Amateur Radio Bulk Buying Group, Burns Electronics, Lowe Electronics and Western Electronics. Other exhibitors included Crawley ARC, MEL Ltd, Plessey Ltd, Redifon Telecommunication Ltd, Reigate ATS and the West Kent ARS. Representatives of the RSGB Interference Committee were on hand to offer advice; the IARU Region 1 display emphasized the co-operation existing among the 41 societies of the region, while Tonbridge School showed examples of their current electronic projects.

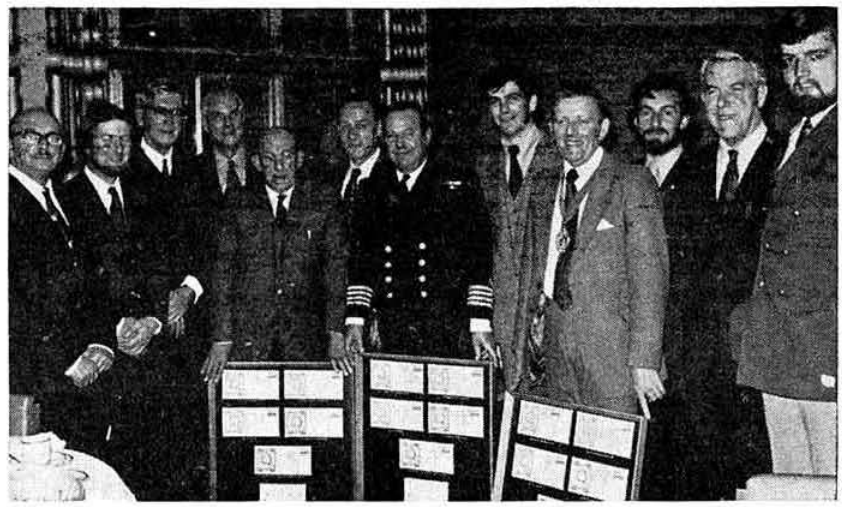
The RSGB bookstall conducted a brisk trade in Society publications including the new *Teleprinter Handbook*. The 1974 *RSGB Amateur Radio Call Book* and *Amateur Radio Awards* were also in demand. The stand provided a convenient centre for discussion of Society matters, with G3TDR, G6JP and G3BZG participating.

The afternoon lecture session, presided over by G3TR, commenced with an address by the President, Dr J. A. Saxton, CBE. Dr Saxton emphasized that, while recognizing the past achievements of the amateur service, members must face the difficulties of the future. No longer could radio amateurs expect to receive frequency allocations as a matter of right but rather that these must be retained and improved by hard work and co-operation, both nationally and internationally.

Len Newnham, G6NZ, then gave a talk entitled *A brief history of the RSGB*, and after the tea break Leslie Moxon, G6XN, showed how to optimize the dx performance of hf aerials. A description by Alan Taylor, G3DME, of the origins and working of the international beacon project concluded the lecture session, and with a final flourish of activity in the area of the trade stands the convention closed just before 7pm.

For this initial venture the organizing committee of the convention wisely chose a venue that offered several types of accommodation, buffet facilities, and ample car parking with the location readily accessible. If, however, the convention is repeated and becomes more popular, no doubt a more ambitious venue will be necessary. In the meantime the efforts of the organizing committee (G8ABC, G3NKS, G4BKG, G3TR, G8ECR, G3ZYP and G3TIR) receive a hearty vote of thanks from those who participated in the convention. *G2BVN*

75th anniversary of the Marconi-Kemp Bristol Channel experiments



Left to right: GW3PWE, GW3WBU, GW8NP, GW3ITQ, GW2FOF, GW3VLU, Capt K. Carstens, GW3YSA, Clr H. Clease, GW8HEZ, GW3VBP and GW4AMV

As a fitting climax to its celebrations of the anniversary, the Barry College of Further Education Amateur Radio Society held a luncheon at the college on 9 November. The distinguished gathering included the president of the society, County Alderman Mrs Dorothy Rees, CBE, JP; the principal of the college, Mr Arnold James, MA; the chairman of postal services for Wales and the Marches, Mr D. J. McDougal; the deputy mayor of Barry, Councillor Clease; superintendent of Trinity House, Capt K. Carstens; public relations officer for Trinity House, Mr T. Thompson; and Messrs Sam Weaver, GW3ITQ, and Garfield Williams, GW2FOF, representing the Radio Amateur Invalid and Bedfast Club. RSGB Council was represented by the Zone Manager.

It had been decided to record permanently the activities of the year in an ingenious manner devised by the Barry society's secretary, Mr Dan Adams, GW3VPB. Ten sets of five first-cover envelopes posted and franked on Flat Holm Island on the anniversary day were individually signed by the Marchesa Maria Cristina, widow of Marconi; HM King Hussein of Jordan, JY1; Senator Barry Goldwater, K7UGA; Mr L. Kemp, (son of the Post Office engineer who assisted Marconi in his experiments) and Mr Brian Rix, G2DQU. These sets were mounted together with explanatory plates, making very striking exhibits.

Four framed sets were presented as follows: to the Post Office Wales and the Marches for help and co-operation received in the project; to the Elder Brethren of Trinity House for the use of Flat Holm Island; to the mayor of Barry Town as a permanent record of the event; to the principal of the college without whose help and encouragement the venture would not have been possible; and, representing a very thoughtful gesture, six sets to the Radio Amateur Invalid and Bedfast Club for auction to aid the funds of that organization.

C. H. P.

General Rules for VHF/UHF/SHF Contests 1974

The rules governing all RSGB vhf/uhf/shf contests to be held in 1974 will be selected from among the following general rules, which will be referred to by number. Supplementary rules will be added for the more complex events such as VHF NFD.

Contestants are requested to observe the provisions of the Code of Practice for VHF Contest Operation. See page 36.

Please read these rules carefully. Failure to do so may result in the waste of a great deal of effort on your own part, and delays in the publication of contest results.

RSGB vhf/uhf log sheets are designed for ease of use and checking, with columns of appropriate width and line spacing to fit most typewriters, and the cover sheets provide all the information the adjudicator needs in accessible form; please use them. Entries for the multiband contests have become so large that logs have to be divided among several adjudicators, each of whom deals with one band, and in order that the corrected scores can be reassembled a special summary sheet has been provided. Contest stationery can be obtained from adjudicators (whose addresses are given in the contest rules) or from RSGB HQ on receipt of a large, strong sae. The cover sheets (Form 427) also act as re-ordering forms.

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 **Sections**
- (a) There are two sections:
  Section F—fixed stations.
  Section P—portable and temporary stations.
- (b) All classes of station with no separate sections.
- (c) Fixed stations only.
- (d) Portable stations only.

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/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 **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 runners-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.
- (c) Awards will be made to the highest-scoring station in each of the seven RSGB electoral zones, and to the runner-up in any zone from which more than 10 entries are received.

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 may transmit A3j (ssb) only, but cross-mode contacts are valid.

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. Serial numbers start at 001 and advance by one for each contact.
- (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. Serial numbers start at 001 for each activity period and advance by one for each contact.

11 Stations using telephony in the recognized cw sub-bands 70·025-70·1MHz, 144·0-144·15MHz, 432·0-432·15MHz and 1,296·0-1,296·15MHz, or transmitting on beacon frequencies, are liable to disqualification. Entrants are encouraged to observe the provisions of the RSGB/IARU band plans.

12 **Contest exchange**
The contest exchange shall consist of:
(i) RS or RST report followed by serial number
(ii) Both QTH 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) QTH Locator received.
- (vi) QTH received.
- (viii) 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 An entrant may not engage in more than one contact concurrently.

19 **Sites**
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.

Portable stations may be required to provide proof of permission to use a site.

/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.

QTH (formerly 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.

20 Contacts with unlicensed stations will not count for points.

21 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.

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

23 Proof of contact may be required.

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

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

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

General Rules for Listeners' VHF/UHF Contests 1974

1. Dates and times. As for the concurrent transmitting contests.
2. Entries should be sent to the adjudicator of the transmitting contest, at the address given, and must be postmarked not more than 15 days after the end of the contest.
3. Listeners' contests are open to all non-licensed fully-paid-up members of the RSGB. Only the entrant may operate the receiving station.
4. The station must remain at the same site for the duration of the contest, although portable operation is permitted.
5. Points will be scored in the same manner as in the transmitting contest (Rule 5).
6. Logs must show in columns: (a) date/time (gmt), (b) callsign of station heard, (c) my report on his signals, (d) report and serial number sent by station heard, (e) callsign of station being worked (f) location given by station heard, (g) points claimed.

   On 144MHz the callsign in column (e) may occur only once in every 20 contacts logged. CQ and test calls do not count for points and should not be logged.

The Hanson Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 2 March and 6 October.

Code of Practice for VHF Contest Operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.
2. Take all possible steps to ensure that a site is not going to be used by some other group or club. If it is, come to an amicable agreement *before* the event. Groups are advised to select possible alternative sites.
3. *All transmitters* generate unwanted signals; it is the level of these signals that matters. In operation from a good site, levels of spurious radiation which may be acceptable from the home station may well be found excessive by nearby stations (up to 25 miles or even further).
4. Similarly, *all receivers* are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.
5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur-band spurious radiations, including noise modulation, to a level of at least —90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.
6. Above all, be gentlemanly at all times. Be helpful and *inform all stations* apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! If asked to close down by a Government or Post Office official, do so at once without objectionable behaviour. If the site owner requests your station to close down, accede to his request without hostility.

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			PH	Perth		
DF	Dumfriesshire	KB	Kirkcudbrightshire	PK	Pembrokeshire	YS	Yorkshire
DH	Durham	KE	Kincardine				

Note. Although county boundaries and names of counties are to be changed in April this year, for the purposes of contests in 1974 stations should use the county boundaries as at 1 January 1974 throughout the year.

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. Overseas entrants should ensure that their logs reach the adjudicators within eight weeks of the date of the contest.

(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 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).

CONTEST NEWS

432MHz SSB Contest rules

Date: 20 January 1974.
Times: 1000-1400gmt.

All entries and checklogs to: VHF Contests Committee, c/o G3XHU, 94 Hermon Hill, South Woodford, London E18.

The following general rules, published in this issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8b, 9c, 10a, 11-26.

This contest will provide the first opportunity for 432MHz ssb stations to "stand up and be counted", and may be repeated later in the year if there is sufficient interest.

70MHz Fixed Station Contest rules

Date: 27 January 1974.
Times: 1000-1800gmt.

All entries and checklogs to: VHF Contests Committee, c/o G3SEK, 15 Holmbush Road, London SW15.

The following general rules, published in this issue of *Radio Communication*, will apply: 1, 2, 3, 4c, 5a, 6a, 7a, 8b, 9a, 10a, 11-26.

432MHz Spring Cumulative Contest rules

Dates: 5, 13, 21 February, 1, 9, 17, 25 March 1974.
Times: 2000-2230 local time.

All entries and checklogs to: VHF Contests Committee, c/o G2HIF, 20 Harcourt Road, Wantage, Berks, OX12 7DQ.

The following general rules, published in this issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8c, 9a, 10b, 11-26.

144MHz Fixed CW Contest rules

Date: 3 February 1974.
Times: 1000-1800gmt.

All entries and checklogs to: VHF Contest Committee, c/o G3FZL, 11 Liphook Crescent, London SE23 3BN.

The following general rules, published in this issue of *Radio Communication*, will apply: 1, 2, 3, 4c, 5a, 6a, 7a, 8b, 9b, 10a, 11-26.

First 1·8MHz Contest 1974 rules

1. The General Rules for RSGB HF Contests, published in this issue of *Radio Communication*, will apply.
2. When. 2100gmt Saturday 9 February to 0200gmt Sunday 10 February 1974.
3. Contacts. CW (A1) only in the 1·8MHz band. County code letters, as published in this issue of *Radio Communication*, must be sent after the report/serial number group—eg for a contact from Surrey, 579001SY.
4. Scoring. Six points for eachof 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 UK.
5. Logs. Column 5 should be headed "County code letters received". Entries must be addressed to: The HF Contests Committee, c/o S. V. Knowles, G3UFY, 32 Nursery Road, Thornton Heath, Surrey CR4 8RF.
6. Awards. The Somerset Trophy will be awarded to the winning station, and Certificates of Merit to the second- and third-placed entrants. The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the 2nd 1·8MHz Contest 1973.

A Certificate of Merit will be awarded to the highest placed entrant whose 18th birthday falls on or after 14 February 1974. Entrants wishing to compete for this award should state their date of birth on the cover sheet, and mark clearly at the TOP of the sheet "UNDER 18". Entries will only be eligible for this award where operation has taken place under the entrant's own callsign, and from the "main address" as stated on the station licence.

80m Field Day Results

Entries went up this year to 13 compared with 11 in 1972, and at least 20 or more /P stations were active. In addition there was a lot of general activity, enabling the leading stations to make nearly 90 contacts and to score at a good rate even during the last hour.

The winning station is once again G4ALE operated by G3SJX and G3UFY from Oakham in Rutland. Equipment used was an FT277 transceiver with a 2E26 pa, the aerial being a dipole at 60ft.

In second place is G3LHJ who operated alone all of the time from Newton Abbot, Devonshire. His equipment was solid-state up to a 12BY7A driver to a 2E26 pa for the transmitter and a solid-state home-brew receiver; the aerial was an inverted-V dipole.

There is a tie for third place. G3VW operated by G3VW and G3BZG used a Codar transmitter and a home-brew converter into a BC453, while G3VOC was operated by G3ANK and G3VLT using a home-brew transmitter with TT11 pa and an SB303 receiver. Both stations used dipole aerials.

Once again the only entrant with all home-brew solid-state equipment was G3JKY. Some entrants claimed full points for /A stations but these do not count as /P or /M.

The Houston Fergus Trophy will be presented to G4ALE, and certificates of merit to G3LHJ, G3VW and G3VOC.

The HF Contests Committee thanks G5OJ, G3HRS and G3RQZ who sent in check logs.

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G4ALE/P	88	607	8	GW3HGL/P	68	477
2	G3LHJ/P	86	590	9	G3BTO/P	57	430
3	G3VW/P	77	570	10	G3RDI/P	57	375
3	G3VOC/P	86	570	11	G3AGX/P	33	300
5	G4AUU/P	89	560	12	G3KTC/P	36	285
6	G3BXS/P	72	545	13	G3HTI/P	29	255
7	G3JKY/P	73	515				

RSGB/IARU October 1973 UHF/SHF Contest

More than twice the number of stations than last year entered this event, which is very pleasing. The lads from RAF Sealand have a secret weapon for cw contacts, it is called a MoleWrench key, but they did not mention what speeds they could attain with it. G3SHY/P nearly had their erp raised many fold by a close-in lightning flash during a thunderstorm. It would seem that conditions were varied with reports of average to a little above.

Please note that a summary sheet is required for *all* multiband contests and a 427 for each band operated. It makes it easier for all adjudicators to glean the information required to formulate a

results table which is not "gappy" and entrants will have the results published quicker. Band leaders will each receive a certificate. *L.V.G.T*

432MHz FIXED

Posn	Station	Cnty	Points	QSOs	Best dx	Km
1	G4BEL	CE	7,987	61	PA0JOU/P	420
2	G3ZYC	DY	6,525	48	PA0ZAZ/P	438
3	G4BYV	NK	4,500	25	PA0NAS	350
4	G5UM	LR	2,828	35	G8AZM/P	151
5	G8FJG	EX	1,601	29	G3NHE	215
6	G5DF	BE	1,290	19	G3NHE	210
7	G3COJ	BS	1,195	17	G3NHE	200
8	G8FMK	OX	1,175	21	G3NHE	180
9	G4BBW	LE	680	10	GI8AYZ	234
10	G3SBV	LD	661	21	G8EDL/P	95
11	G8HBQ	YS	378	6	GW3ITZ/P	146
12	G8BKR	GR	260	9	G8EDL/P	90
13	G8DLQ	KT	234	7	G3DAH	42

G3EHM excluded (radial scores only = 88 points)
Check logs acknowledged from G3BPM and A7683

432MHz PORTABLE

Posn	Station	Cnty	Points	QSOs	Best dx	Km
1	G3LTF/A	EX	6,758	46	DC8EEA	514
2	G8AZM	SY	6,446	80	G8EOP	308
3	G8EDL	BE	6,365	66	G8GXI/P	249
4	GW3ITZ	DB	6,120	50	G8AZM/P	294
5	G3SHY	NM	5,188	40	PA0ZAZ/P	378
6	G4ATD	BD	4,759	41	GW3ITZ/P	220
7	G4ARD	BD	4,453	62	G3KMS	238
8	G3RPE	OX	3,895	48	G3GXI/P	219
9	G8ELO	NR	3,365	40	GW8ACG/P	170
10	G6XM	WE	3,340	40	G3LQR	227
11	G5HD	BE	3,268	39	G4BYV	227
12	G4ALE	SY	2,935	40	G3NHE	252
13	G3JHM	HE	2,372	34	G3NHE	251
14	GW8ADP	MH	1,768	17	G3NEO/P	225

G8GXI excluded (radial scores only = 158 points)

1,296MHz FIXED

Posn	Station	Cnty	Points	QSOs	Best dx	Km
1	G4BEL	CE	2,171	17	PA0ZAZ/P	310
2	G3EHM	SD	897	40	G4BEL	180
3	G4BYV	WK	565	3	PA0ZAZ/P	255
4	G3COJ	BS	501	10	G4BEL	103
5	G8FJG	EX	296	7	G8EDL/P	116
6	G3FYX	GR	242	5	G6XM/P	78
7	G8BKR	GR	59	2	GW8ADP/P	40

1,296MHz PORTABLE

Posn	Station	Cnty	Points	QSOs	Best dx	Km
1	G3LTF/A	EX	1,923	18	PA0ZAZ/P	295
2	G8EDL	BE	1,862	25	G4BEL	157
3	G8AZM	SY	1,808	25	G8BWL	154
4	G3WDG	BE	1,493	21	G3LTF/A	151
5	G4ARD	BD	1,258	19	G8AVH	123
6	G8ATD	BD	1,182	14	GW30DC/P	220
7	G4ALE	SY	890	15	G4BEL	120
8	G3THQ/A	OX	792	15	G3LTF/A	115
9	G6XM	WE	726	13	G8AZM/P	123
10	G3RPE	OX	694	12	G3LTF/A	98
11	GW8ADP	MH	683	8	G4BEL	213
12	GW3ODC	DB	599	6	G8ATD/P	223
13	G3JVL/A	HE	574	9	G3LTF/A	118

2·3GHz PORTABLE

Posn	Station	Cnty	Points	QSOs	Best dx	Km
1	G4ARD	BD	299	4	G3BWL/P	102
2	G3WDG	BE	271	4	G3EEZ/P	114
3	G3LTF/A	EX	238	4	G4ARD/P	79
4	G3THQ/A	OX	145	3	G3BWL/P	77

10GHz PORTABLE

Posn	Station	Cnty	Points	QSOs	Best dx	Km
1	G3WDG	BE	182	5	G3BWL/P	49
2	G3THQ/A	OX	138	4	G3WDG/P	35
3	G3WJG	BE	119	3	G3RPE/P	60

Mobile Rallies Calendar

19 May 1974—Northern Mobile Rally. Details later. Contact G8BZY, QTHR.
19 May 1974—Amateur Radio Mobile Society's Rally, RAF Cosford, Shropshire.
26 May 1974—Hull Mobile Rally, Bishops Burton.
7 July 1974—Longleat Mobile Rally.
7 July 1974—South Shields Mobile Rally.

RAYNET

by S. W. LAW, G3PAZ*

The Raynet Committee, as at the meeting on 5 January 1974, wishes to convey to all members New Year regards for success in all their undertakings and thanks for past efforts in the maintenance and furtherance of our aims in emergency communications.

At the meeting held on 3 November 1973 the committee were pleased to welcome representatives from the Deeside group. These very active members had much of interest to impart and in turn learned something of the problems of administration faced by the committee. Such visits are always welcome, particularly from outlying groups who can find the time and opportunity in view of the distances involved. The chairman will always be pleased to make the necessary arrangements should any controller wish to attend a committee meeting to exchange views across the table.

Honorary registrations secretary

It is with regret that we have to announce the resignation of Mrs Balestrini from the position of honorary registrations secretary. Jane has been troubled by failing eyesight for some time but has refused to give up until compelled. At an earlier meeting of the Raynet Committee a sincere vote of thanks was recorded for the splendid way in which the duties of this onerous task have been carried out over the past five years, and at the November meeting a presentation was made of a pair of very fine pewter goblets to mark the appreciation of the committee members individually and collectively.

However, Mrs Balestrini will continue to handle all supplies of badges, armbands, windscreen stickers etc, and applications for these items (together with the appropriate cost and postage, please) should still be made to the original address (G3BPT, QTHR) as before. She has also agreed to continue as a committee member under her new title of "supplies officer" and we are delighted to continue to have the benefit of her wide and extensive knowledge of the make-up and personnel of groups throughout the country.

We have been fortunate in obtained the services of Mrs Crane, ("Taff" to all her friends) xyl of Len Crane, G3PED, who will now handle all registrations. The address appears below.

Group titles

Since the new metropolitan boundaries will lead to the re-distribution of group coverage and the creation of new groups, the Raynet Committee has decided that in future it will be mandatory for each and every group to include the word "Raynet" in the title of the group. This will apply as from this year and in view of the inevitable changes mentioned this would appear to be a suitable time for the introduction of this ruling. This will obviously not affect those groups whose title is already in this form and we trust that others will follow suit as soon as can be arranged by the terms of their internal constitution.

Controllers are invited to consult the chairman of the committee (G3BPT, QTHR or c/o RSGB HQ) in cases of difficulty or dispute, should any such arise. Existing controllers will have read the resolution in the last Raynet Newsletter but the above is for the information of prospective groups and their controllers-to-be. The reason for the resolution is to preserve the identity and recognition of Raynet in the eyes of the user services, the authorities and the public.

Raynet Trophy and awards

In view of the general excellence of group endeavour during 1973, the committee has decided that it would not be appropriate to single out any one group. The award has, therefore, been held over for later consideration. However, a letter of commendation has been sent to J. Smythe, GI3OAB, of the Mid-Antrim Group. This group has consistently carried out regular exercises and submitted reports and registration information under the most difficult conditions.

Hon Registrations Secretary; Mrs L. A. Crane, "Greta Woods", Bromley Road, Ardleigh, Colchester, Essex.

* 130 Alexandra Road, Croydon, Surrey CRO 6EW

CLUB NEWS

RSGB Affiliated Societies are invited to submit items for inclusion in this section to their Regional Representatives (not direct to the editor), whose addresses appear on page 13 of this issue, for inclusion in the appropriate regional section.

Items of news and dates of forthcoming events should reach RRs by the following dates:

1 February for March issue

29 March for May issue

REGION 1 — RR B. O'Brien, G2AMV

Ainsdale (ARC)—Members should contact N. Horrocks, G2CUZ, for details of meetings.

Blackburn (ELARC)—First Thursday each month, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Sec—W. E. Baxendale, G8FDG, "Juverna" Westland Avenue, Darwen, Lancs.

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

Bolton (B & DARS)—"Clarence Hotel" Bradshawgate, Bolton, third Tuesday in each month, 8pm. 2m net Tuesday nights at 1900gmt—145·73MHz. Sec—S. Macdonald, G4AQB, 8 Archer Avenue, Bolton.

Bury (B & RRS)—Every Tuesday at the Bury Community Centre, 8pm. Second Tuesday each month is the main lecture night; other Tuesdays being devoted to RAE classes, morse classes and informal meetings. Sec—J. D. Clifford, 10 Arley Avenue, Bury.

Carlisle (C & DARS)—Mondays, 7.30pm, Currock House, Lediard Avenue, Currock. Sec—G8DVD, 21 Green Croft, Brampton.

Cheshire (Mid-Cheshire ARC)—Wednesdays 7pm, Technical Activities Centre, Winsford Verdin Comprehensive School, Grange Lane, Winsford. Nets on 160m 7pm, Mondays; on 2m 7pm Tuesdays; on 10m 7.30pm Thursdays. Tuesdays, RAE classes and slow morse transmissions are available. Sec—G3SIQ. Chairman G3JWK.

Chester (C & DARS)—Tuesdays at 8pm, YMCA Chester, except the 1st Tuesday in each month which is a net night on 145·08MHz and 433·15MHz. Further details from G8AYW, G6AHC/T, QTHR.

Douglas IOM (D & DARS)—Secretary, GD3YUM, will be pleased to hear from any member who intends to visit the island.

Eccles (E & DARC)—Tuesdays, 8pm, Bridgwater School, Worsley, Manchester. Club 2m net 1100 on Sundays on 145·65MHz. All visitors and prospective members welcome. Sec—G4AEQ, QTHR.

Lancaster University (UoLARS)—Every Wednesday at 7pm, in Furness College, together with RAE and morse classes. The society is active on the hf bands and 2m using G3ZBY and G8DOU. The rtty gear is also operational on these bands. Skeds and visits welcomed, enquiries please to Colin Pegrum, Department of Physics.

Leyland Hundred (ARG)—Second Monday in each month, 7.30pm Rose & Crown, Ulnes Walton, Leyland. Net night Saturdays 2000 gmt on 145·8MHz. Details from F. Harrison, G3XII, 78 Lancaster Lane, Leyland, Lancs.

Liverpool (L & DARS)—Tuesdays, 8pm, Conservative Association Rooms, Church Road, Wavertree. Sec—G3WCS.

Liverpool (NLRC)—Tuesdays, 8.30pm, informal meeting at the "Nags Head", Thornton, Crosby, Liverpool 23. Visitors welcome. Sec—Alan L. Hart, G4BLI, 50 Strawberry Road, Liverpool L11 7AD.

Liverpool University (LUARS)—Meet every lunchtime in the radio shack in the Students Union. Formal meetings are on Monday nights at 7.30pm. We are now active on all bands up to 70cm. The annual dinner will be held at the start of next year and we would be pleased to see all past members and friends of the Society, more details from the sec. Visitors are always welcome, contact the sec Mike Harbach, G8GMC, c/o Radio Society, Students Union, 2 Bedford Street North, Liverpool 7.

Manchester (M & DARS)—Wednesdays, 7.30pm, all meetings include morse classes. 203 Droylesden Road, Newton Heath, Manchester 10. Sec—G3IOA.

Manchester (SMRC)—Mondays and Fridays. On Mondays meetings are at the club shack, Greeba, Shady Lane, Manchester 23, with the vhf lads operating the club gear on 2m with the call G3UHF from about 8pm. On Fridays, meetings are held at the Sale Moor Community Centre, Norris Road, Sale, Cheshire, starting at 8pm. 4 January (Tape/slide lecture "A History of Radio"), 11 January ("Radio theory Parts 1 & 2"), 18 January ("DF activities of 1973" by D. C. Holland, G3WFT), 25 January ("Radio theory Parts 3 & 4"), 1 February ("Experiments with Gunn diodes at shf." by J. McBurney, G4AUR), 8 February ("Dxpedition to Andorra, tape & slide lecture); 15 February ("Radio theory Parts 5 & 6"), 22 February (Surplus equipment sale, lots of bargains, non-members welcome.) It is hoped that the "Radio theory" series of talks (given by various club members) will enable the newcomer to understand radio a little easier, the talks will be not too complex. (Series continued in March/April). Visitors welcome both nights. Hon sec—G3WFT, QTHR.

Manchester University (ARS)—G3VUM is active on all bands 160-10m and also on 2m. The programme of lectures, visits, RAE and morse tuition continues as previously. Details may be obtained from the sec, G. T. Phelan, G8EPS, at the University Union, Oxford Road, Manchester M13 0PL, or from G3AOS, QTHR.

University of Manchester—Institute of Science & Technology (ARS)—G3CXX is active on all hf bands and G8FOT on 2m and perhaps 3cm. Items for club magazine/newsletter or letters from intending members gratefully received by G8GOS, 66 Howard Road, Kings Heath, Birmingham B14 7PQ.

Preston (PARS)—7.30 pm, Windsor Castle (private room), St Paul's Square, Preston. Morse practice 7.30pm, main feature 8pm. 3, 17 & 31 January, 14, & 28 February.

Stockport (SRS)—Second and fourth Wednesday each month, 8pm, Blossoms Hotel, Buxton Road, Stockport. Sec—G. R. Phillips, G3FYE, 6 Ross Avenue, Davenport, Stockport.

Thornton Cleveleys (ARS)—First and third Wednesdays, 8pm, St John Ambulance Brigade HQ, off Fleetwood Road North (behind Police Station) Thornton, Lancs. Project group meets on Fridays, 7.15-9pm, at the Project Laboratory, Rossall School, Fleetwood. Work in hand includes 160 and 2m transmitters and receivers. Please note acting secretary is J. Duddington, G4BFH, The Grove, Thornton Cleveleys, Blackpool.

Warrington (W & DARS)—Every Tuesday, 8pm, Thames Board Mills Social Club, Alford Hall, Manchester Road, Warrington. Sec—G. H. Read, 2 Princess Avenue, Great Sankey.

Wirral (WARS)—First and third Wednesday each month, 7.45pm, Sports & Recreation Centre, Grange Road West, Claughton, Birkenhead. Sec—G3WSD.

Wirral (Wirral DX Association)—Last Thursday each month at members' homes. visitors are welcome—please inform sec beforehand. Sec—T. O'Neill, G4AHC, 41 Willioughby Road, Wallasey.

Merseyside members meet for lunch on the first Monday of every month. It is essential to book beforehand and obtain details of the venue from either G3VQT or G2AMV.

REGION 2 — RR J. E. Agar, G8AZA

Barnsley (B & DARC)—Meets at King George Hotel, Peel St, Barnsley. Details from PRO P. Ackley, G3LRP, QTHR, or hon sec P. Carbutt, G2AFV, QTHR.

Bradford (BR & ES)—Meets at 10 Southbrook Terrace, Bradford 7, (near Chester St bus station) at 7.30pm. Details from PRO B. Ackroyd, G8GOV, QTHR.

Doncaster (DCTARC)—Mondays 7pm (during term time) at Doncaster College of Technology (Refectory). Club callsign G3UER. Visitors always welcome. Details from hon sec G4AWT, QTHR.

Durham (County) **(Durham Contests Club)**—c/o R. Henderson, 5 Laxton Close, High Grange, Wolviston, Teesside. Club callsign G4ANR.

Durham (City) **(DCRS)**—c/o G3LIV, 5 Lancashire Drive, Mow Park Estate, Belmont, Durham.

Easington (EAR & EC)—Tuesday and Thursday at 7.30pm at Easington Workingmen's Club, Easington, Peterlee. Nightly net on 28·750MHz at 1930z. G3VSS, QTHR.

GDX Club (GDXC)—c/o B. J. Stork, G3VUU, 20 Oakdale Avenue, Bradford 6, Yorks.

Halifax (NHARS)—2 January (Ragchew), 9 January (Committee meeting), 16 January (Annual dinner), 30 January ("Hi-fi" by Mr P. Allen, G3USH), 13 February (Film show), 20 February (Ragchew), 27 February ("Digital tv techniques" by Dr O. J. Downing). 7.45pm at Peat Pitts Inn, Ogden, Nr Halifax. W1BB lectures on tape are available on loan from NHARS, details from G3MDW, QTHR.

Harrogate (H & KRS)—2nd and 3rd Mondays of each month at Scriven Women's Institute. Details from G8CRH/G4AZJ, QTHR.

Hartlepool (HARC)—c/o J. W. Thompson, G3NWU, 73 Eamont Gardens, Hartlepool, Co Durham.

Hull (H & DARS)—7.45pm Fridays at 592 Hessle Road, Hull. Details from G8GDD, QTHR.

Members of the Northumbria Radio Club "on site" during last year's High Power SSB Field Day. Left to right: (back row) G3OTH, G3XYV, G8EKQ, SWL Jewitt, SWL Graham, G3UMJ and G4ADD; (front row) G4AVN, G4BCP and G4AVO

Hull (HUR & ES)—Department of Electrical Engineering, The University, Hull.
Leeds (WRRS)—Meets every Wednesday at 83 Town Street, Armley, Leeds. RAE and morse classes are in progress. The 1974 White Rose Mobile Rally will probably be held on 31 March. Details from hon sec G3VTY, QTHR.
Mexborough (M & DARS)—Meets at Free Christian Church Hall, College Road, Mexborough. Details from G8FUV, QTHR.
Middlesbrough (POARC)—7.30pm Thursdays at 200 Marton Road, Middlesbrough. Club callsigns G4BAY and G8GPO. Details from hon sec G8CDP, QTHR. Tel Middlesbrough 35237.
Morpeth (NRC)—7pm Thursdays at 3 Wheatsheaf Yard, Morpeth. Details from hon sec G4AVO, QTHR.
Otley (ORS)—7.30pm Tuesdays. Details from hon sec G8BZY, QTHR.
Scarborough (SARS)—7.30pm Fridays at Technical College, Scalby Road, Scarborough. Details from G3VAN, QTHR, or G8KU, QTHR.
Sheffield (SARC)—21 January ("Dxpedition to Andorra" by Chris Eley, G8DNF) at Sheffield Polytechnic, Arundel Gate, Sheffield. 18 February (Natternite, a quiz, NFD discussion and the Sheffield Contest on 21 February). Details from hon sec G3PHO, QTHR. Tel Sheffield 306956.
South Shields (SS & DARC)—8pm Fridays at Trinity House Social Centre, Laygate, South Shields. New and old members are always welcome. 1974 Mobile Rally will be held on 7 July 1974. Details from G3SFL, QTHR.
Spen Valley (SVARS)—Meets at Grammar School, High St, Heckmondwike. Details from hon sec G8DSB, QTHR.
Sunderland (SARS)—Meets at Sunderland Polytechnic. Details from hon sec G3XID, QTHR.
Tyneside (TARS)—7.30pm Mondays at Community Centre, Vine St, Wallsend-on-Tyne. Details from hon sec G. Lowden, 21 Winefred Gardens, Wallsend NE28 6EF. Tel 627878.
Wakefield (W & DRS)—Alternate Tuesdays at 7.30pm at Youth Centre, Ings Road, Wakefield. Details from hon sec G3XVU, QTHR.
York (YARS)—Thursdays 7.30pm. RAE class in progress. Meetings at 61 Micklegate, York. Recent lectures have included a talk on silverware and jewellery for the XYLs. Future plans include a visit to the ITV Studios at Leeds. Details from hon sec G3WVO, QTHR.

Closing date for Club News entries at G8AZA is 31 January for March issue.

REGION 3 — RR B. Kennedy, G3ZUL, G6AGT/T

Birmingham (MARS)—15 January ("Aerials in practice" by G6GR), 19 February ("An integrated circuit keyer", by G3KPT). At the AGM held on 16 October the following were elected to office: president G8BHE, hon sec G3ZKQ, hon treasurer G6RKU/T. *G3ZKQ.*
(Slade) No information. Club meets at 8pm in The Committee Room, Church House, Erdington on alternate Fridays. *G4BRT.*
(South) No information. Club meets on the first Wednesday of the month, 8pm, at Hampstead House, Fairfax Rd, Birmingham 31. Informal meetings in the club shack every Friday evening. *G8GDZ.*
Bromsgrove (BDARC)—No information. Club meets on the second Friday of the month at The Royal Oak, Barley Mow Lane, Catshill, Bromsgrove. *G3VGG,* 22 Elm Grove, Bromsgrove.
Coventry (CARS)—No information. Club meets at Baden Powell House, St Nicholas Street, Radford Road, Coventry, on Friday evenings at 8pm. *G3TFA.*
Dudley (DARC)—8, 22 January, 5, 19 February. The first meeting of each month is for members willing to bring along equipment to demonstrate on the air using the club callsign G3RXK. Club meets at 8pm in the Central Library, St James's Street, Dudley. *G8HHK,* 21 Scotts Green Close, Scotts Green, Dudley.
Hereford (HARS)—No information. Club meets on the first and third Friday of the month at Civil Defence HQ, Gaol Street, Hereford. *G4CNY,* 181 Kings Acre Road, Hereford. Tel Hereford 3237.
Lichfield (LARS)—Club meets on the first Monday and third Tuesday of the month at the Swan Hotel, Bird Street, Lichfield. *G3NLY.*
Mid-Warwickshire (MWARS)—Society meets at 8pm each Monday at 28 Hamilton Terrace, Leamington Spa. *G3UDN.*
Rugby (RDAR & EC)—Informal meetings on the first Tuesday of the month at the Lawrence Sherriff Arms in the Town Centre. *G6YQC.*
Shrewsbury (Salop ARS)—Club meets every Thursday at the Harlescott Youth Centre, Sundorne Road, Shrewsbury at 7.30pm. *G3VZG.*
Solihull (SARS)—15 January. Club meets at the Manor House, High Street, Solihull. *G4AEJ.*
Stoke on Trent (NSARS)—Club meets every Monday evening at 8pm. Regular morse class each week. On the last Monday of the month there is an RSGB tape lecture and slides . . . Harold Clowes Community Centre, Ubberley Road, Bucknall, Stoke on Trent. *BRS33329,* 36 Newstead Road, Stoke on Trent.
Stourbridge (STARS)—8 January (Informal), 21 January (Annual constructors' competition), 5 February (Informal), 18 February ("70cm dxpedition to GW by G3ZUL and G8ACB). Club meets on the third Monday of the month at Longlands School, Brook Street, Stourbridge. Informal meetings at the Shrubbery Cottage, Heath Lane, Oldswinford. *G8HUQ,* 17 Mill Road, Cradley Heath, Warley.
Stratford on Avon (SADRC)—Meetings are held at the South Warwickshire College of Further Education, Alcester Road, Stratford on Avon. *G8GAG.*
Sutton Coldfield (SCRS)—Club meets on alternate Mondays at the Central Youth Headquarters, Clifton Road, Sutton Coldfield at 7.30pm. *G8ALO.*
Willenhall (WDARC)—2 January (Chairman's night), 16 January (Talk by the Wolverhampton Astronomical Society), 30 January (Junk sale), 6 February (Natternite), 20 February (Visit to Walsall Fire Station). Morse classes are held at the end of each meeting. Members' RAE course is held on alternate Wednesdays. *G4CFR.*
(May I welcome the Willenhall Club to RSGB Region 3 and wish them good luck for the future—*RR*)

Wolverhampton (WARS)—4 January (New Year's Party at the Black Horse), 7 January (Illustrated talk on a dxpedition to Andorra by G8DNF). Club meets at Neachell's Cottage, Stockwell End, Tettenhall, Wolverhampton. *G3UBX*.
Worcester (WARS)—7, 19, January. The annual dinner will be on Saturday 12 January. 4 February (Amateur tv lecture/demonstration by G6KQJ/T and G6AGT/T), 16 February. Meetings are held at the Old Pheasant, New Street, Worcester. *G8ASO*. Tel Worcester 29208.
Wrekin (WARS)—Meetings are held at the Ketley Bank Youth Centre, near Oakengates at 8pm. Meetings on the first Wednesday of the month held at Walker Technical College, near Wellington. *G3UKV*.

REGION 4 **RR T. Darn, G3FGY**

Derby (DADARS)—2 January (Surplus sale by auction), 9 January ("All our yesterdays"—Members are invited to bring along slides and film of activity during 1973), 16 January (Tape/slide lecture on "Andorra Expedition" by G8DNF and G4BIA), 23 January (Technical film show), 30 January (Basic aerials—T. Darn, G3FGY), 6 February (Surplus sale by auction), 13 February (Night on the air), 16 February (Annual dinner and dance, *Derbyshire Yeoman*), 20 February ("Certificate hunting"—K. Frankcom, G3OCA), 27 February (Technical film show). All meetings take place in the club room, 119 Green Lane, Derby, and commence 7.30pm. Visitors always welcome.
Melton Mowbray (MMARS)—18 January (Lecture by G3VGW and his xyl on the technical and studio aspects of local Radios Nottingham and Derby), 15 February ("Expedition to Andorra made by the Nottingham Radio Club" by G3YUT and G4AFJ). All meetings 7.30pm at the St John Ambulance Hall, Asford Hill, Melton Mowbray. The club Top Band net is now on Sunday mornings at 1115 on 1,960kHz. *G3NVK*.
Spalding (SADARS)—The AGM of the Spalding Club will be held on Friday 11 January at the "Ship Albion", Spalding, commencing at 7.30pm. All future meetings will be held on the first Friday of each month, the February meeting being on 1 February at the "Teachers Centre", Knight Street, Pinchbeck at 7.30pm. *G3VPR*.
Nottingham (ARCON)—Recent activities have included a junk sale, a demonstration of closed circuit tv and a lecture about the dxpedition to Aland Island (OH0) by members of the club. The cw class continues with 10 new members for this season. Meetings are held as usual at 7.30pm each Thursday at the Sherwood Community Centre, Mansfield Road, Nottingham. *G4AFJ*.

REGION 5 **RR P. J. Simpson, G3GGK**

Bedford (B & DARC)—3 January ("2m transverter" by G4CBZ), 10 January ("Building a digital frequency meter" by G3FWA), 17 January ("Rare dx on Pitcairn Island," tape/slide lecture by G3XDU and G8GRH), 24 January ("Safety in the shack" by G3XKB), 31 January ("Making the most of test equipment" by G4CBZ and G8FMG), 7 February ("Antenna ancillaries" by G3UQR and G5AGU), 14 February ("Which receiver" by Gerry), 21 February (Members' equipment), 28 February ("VSWR fact and fallacy" by G3XKB). Meetings 7.30pm at "The Dolphin", The Broadway, Bedford. Hon sec—G. E. Parker, 12 Dawlish Drive, Bedford.
Cambridge (C & DARC)—4 January (Social evening), 1 February (Film night). Meetings 7.30pm at Civil Service Sports Club in Brooklands Avenue, Cambridge. Every other Friday is informal at club HQ. Hon sec—Sam Stimson, G5BBP, 2 Burns Way, St Ives, Huntingdon.
Dunstable Downs (DDRC)—4 January ("Spectrum analysers and receivers with no-quibble S-meter" by Stuart Fox, G3VVS), 11 January (Discussion on contests for 1974), 18 January (Annual club dinner and dance at Halfway House, Luton Road, Dunstable). 1 February (Amateur Radio Bulk Buying Group), 8 February (Between week), 15 February (AGM), 22 February (Between week), 1 March (Garex sale). Meetings 8pm at Chews House, 77 High Street South, Dunstable, Beds. Hon sec—C. G. Powell, G8BPK, 1 Wenwell Close, Aston Clinton, Aylesbury, Bucks.
Shefford (S & DRS)—3 January (Members' mini-lectures), 10 January ("DXing" by G2DPQ), 17 January (AGM), 24 January (Contest planning for 1974), 31 January (Workshop practice), 7 February ("VHF aerials" by G8CTB), 14 February ("Use of scopes in the shack" by G3VMI/G3EUS), 21 February ("Simple receiver fault finding" by G3XTQ), 28 February ("Moving coil instruments" by G3VMI). On 10 November the club held its annual dinner, and on this occasion celebrated its silver jubilee. This year the attendance was 65 and after an excellent meal the RR presented the various awards to club members. An evening of entertainment followed, including a film show and live entertainment. Meetings are held at 8pm in the Church Hall, Ampthill Road, Shefford, Beds. Hon sec—C. L. Davies, G8DUY, 17 Brigham Gardens, Biggleswade, Beds.
Stevenage (S & DARS)—3 January (Not decided), 17 January ("Using teleprinters" by G8CDL), 7 and 21 February (Not decided). 8pm, Hawker Siddeley Dynamics Ltd, Gunnels Wood Road.

REGION 6 **RR L. W. Lewis, G8ML**

Cheltenham (RSGB Group)—First Thursday in each month, 8pm, Royal Crescent Hotel, Clarence Street, Cheltenham. *G2FWA*.
Cheltenham (CARS)—Every Wednesday at 8pm, St Marks and Hesters Way Community Centre, Brooklyn Road, Cheltenham. *G8DVA*.
Banbury (BARS)—Fridays at 43 North Bar, Banbury. Details from G3LTN. Tel Banbury 710623.
Gloucester (ARS)—First Thursday in each month at the Oddfellows Club, Eastgate Street, Gloucester, at 7.45pm; each remaining Thursday at the Leisure Centre, The Old Drill Hall, Painswick Road, Gloucester, at 7pm. Club station callsign—G4AYM. *G3MA*.

Chris Marsden, G3XSO, and the former Miss Nina Appleby, G8ENX, after their wedding last August. The bridesmaid was Miss Margaret McCabe, G8HCO; best man Geoff Wilkerson, G8BPN; ushers Peter Appleby, G8CXW, and Peter Burfoot, G8GGM, Guests included Ian MacHardie, G3YMV, and Mike Marsden, G8BQH. Left to right: G3YMV, G8BPN, G8HCO, G3XSO, G8ENX, G8GGM, G8CXW and G8BQM

Oxford (O & DARS)—Second and fourth Wednesday in each month, 7.30pm, at the Mansfield Road Club, Oxford. New secretary—G4BHR, 31 Netherwoods Road, Headington, Oxford.
North Bucks (ARS)—Second Monday in every month at Wolverton Youth Club. *G8CHK.*
South Bucks VHF Club—First Tuesday in every month at Bassetbury Manor, High Wycombe. 5 February (Mr D. A. Findlay, FCA, G3BZG, General manager of the RSGB will talk on the activity of the Society). All visitors welcome. *G8DDM.*

REGION 7 **RR R. S. Hewes, G3TDR**

Acton, Brentford & Chiswick (ABCRC)—Third Tuesday in each month, 7.30pm, Chiswick Trades and Social Club, 66 High Road, Chiswick W4. Hon sec—W. G. Dyer, G3GEH, QTHR.
Addiscombe (AARC)—Tuesdays, 9pm, "Prince George", High Street, Thornton Heath. Hon sec—S. F. Knowles, G3UFY, QTHR.
Ashford, Middlesex (Echelford ARS)—Second Monday and last Thursday in each month, 7.30 for 8pm, St Martin's Court, Kingston Crescent, Ashford. Hon sec—Vic Higgs, G3WVJ, QTHR.
Barking (BR & ES)—Mondays (Morse class), Tuesdays (RAE class), Wednesday (OP's night), Thursday (General), 7.45pm. Visitors welcome any Thursday. AGM to be held on 24 January at 7.45pm. Westbury Adult Centre, Westbury School, Ripple Road, Barking, Essex. Hon sec—R. Clark, G8BXC, QTHR.
Burnham Beeches (BBRC)—First and third Mondays in each month, 8pm, Hedgerley Scout Hut, Hedgerley, Nr Slough, Bucks. Hon sec—Margaret McCabe, G8HCO, QTHR.
Cheshunt (C & DRC)—First Friday in each month, 8pm, Methodist Church Hall, opposite Theobalds Station. Hon sec—Richard Ludwell, G3ZZQ, QTHR.
Chingford (Silverthorn RC)—Fridays, 7.30pm, Friday Hill House, Simmonds Lane, Chingford E4. Hon sec—M. Higgins, G8BUF, QTHR.
Cray Valley (CVRS)—3 January ("The super grid transmission system" by D. R. Stevens, MIEE, of the Systems Planning Branch, CEGB, with illustrative films), 17 January (Natter nite), 7 February ("Amateur topics" by D. A. Findlay, G3BZG, general manager, RSGB), 20 February (Surplus sale), 7 March ("Linear amplifiers" by Peter Chadwick, G3RZP, of KW Communications), 8pm, United Reformed Church Hall, Court Road, Eltham SE9. Hon sec—P. F. Vella, G3WVP, QTHR.
Croydon (Surrey Radio Contact Club)—Third Thursday in each month, 8pm, "The Ship", 47, High Street, Croydon. Hon sec—Sid Mosley, G3FWR, QTHR.
Crystal Palace (CP & DRC)—19 January (To be announced), 16 February (To be announced), 8pm, Emmanuel Church Hall, Barry Road, SE22. Hon sec—Geoff Stone, G3FZL, QTHR (01-699 6940).
Dartford Heath (DF Club)—Fridays, 8pm, The Scout Hut, Broomhill Road, Dartford. Hon sec—Maureen Worby, G3XXC, QTHR.
East London RSGB Group—20 January (Lecture and sale by Burns Electronics), 17 February ("Microwaves for beginners" by Dain Evans, G3RPE), ("FAX for all" by G8GGU), 3pm, Wanstead House, The Green, Wanstead, E11. (Buses: 66, 10, 20, 101, 167. Underground: Wanstead Central Line stations). All SWLs, transmitting amateurs and friends very welcome. Hon sec—Ron Broadbent, G3AAJ, QTHR (01-989 6741).
Esher (Thames Valley ARTS)—2 January (AGM), 6 February (being arranged), 8pm, King George's Hall, (Next door to fire station), Esher, Surrey. PRO—Rob Muir, G3LHN, QTHR.
Gravesend RSGB Group—Mondays, 7.30pm, "Windmill Tavern", Shrubbery Road, Gravesend, Kent. Area representative—P. F. Jobson, G3HLF, QTHR.
Guildford (G & DRS)—Second and fourth Fridays in each month, 8pm, Model Engineering HQ, Stoke Park, Guildford, Surrey. Hon sec—Dave Coltart, G3SYM, QTHR.
Harlow (H & DRS)—Tuesdays, 8pm, Mark Hall Barn, First Avenue, Harlow, Essex. Hon sec—Vic Heard, 106 Vicarage Wood, Harlow.
Harrow (RSH)—Fridays, 8pm, Harrow Sea Scouts HQ, Woodlands Road, Harrow, Middlesex. Refreshments available during evening. Hon sec—Les Light, G3KDL, QTHR.
Havering (H & DARS)—First and third Wednesdays in each month, 8pm, British Legion House, Western Road, Romford. Hon sec—Sam Hobday, G3SKV, QTHR.
Holloway (Grafton RS)—11 January (Open night), 18 January (Junk sale), 25 January (AGM), 1 February (Open night), 8 February ("Air traffic control" by T. H. Mallett), 15 February (Open night—committee meeting), 22 February ("Industrial rf heating" by G8EEI),

Mr Harold Barnard, right, recently retired editor of *Wireless World*, receiving a hand-made plaque depicting Hampton Court from Mr Alan Mears, G8SM, chairman of Thames Valley Amateur Transmitters Society, after addressing the society, and visitors from the Sutton & Cheam and Echelford clubs, on the history of *Wireless World* from its origins as the *Marconigraph*

1 March (G. R. Jessop, G6JP, President of RSGB). 7.30pm, Archway School Annexe, Whittington School, Highgate Hill N19. Hon sec—H. D. Ashcroft, G8AYU. QTHR.
Ilford RSGB Group—Thursdays, 8pm, Mortlake Road, (off Ilford Lane), Ilford, Essex. Hon sec—Derek Sapsworth, G3YAW, QTHR.
Kingston (K & DARS)—Second Wednesday in each month, 8pm, The Berrylands Scout Troop, Stirling Walk, off Grand Avenue (behind Surbiton Lagoon), Berrylands, Surrey. Hon sec—Dick Babbs, G3GVU, QTHR.
Loughton (L & DRS)—Second and fourth Fridays in each month, 8pm, Loughton Hall, nr Debden station. Hon sec—David Bowers, 12 Theydon Park Road, Theydon Bois, Epping, Essex.
New Cross (Clifton ARS)—Fridays, 8pm, 225 New Cross Road, London SE14. Details from hon sec—R. A. Hinton, 48 Camilla Road, Bermondsey SE16.
Northolt (British Airways, European Division, ARS)—First Thursday in each month, Trident Club, Western Avenue, Northolt, Middlesex. (This club is open to non-BA employees by invitation; contact David Evans, G3OUF, Amersham 21573, for details).
Paddington (P & DRS)—First Thursday in each month, 8pm, Beauchamp Lodge, Warwick Crescent, W2. Hon sec—Mike Pawley, G8AWV, QTHR.
Purley (P & DRC)—4 January (Wine and cheese party), 18 January (Constructional contest), 1, 15 February (Being arranged), 8pm, Lansdowne Hall, Lansdowne Road, Purley, Surrey. Hon sec—M. H. Roach, G3TWJ, QTHR.
Reigate (RATS)—First Tuesday in each month (Natter nite 8.30pm), "Marquis of Granby", Hooley Lane, Red Hill. Third Tuesday in each month (Club night), 8 pm, St Mark's Church Hall, Alma Road, Reigate. All visitors and prospective members welcome. Hon sec—F. H. Mundy, G3XSZ, QTHR, tel Reigate 43130.
St Albans (Verulam ARC)—22 January ("Varicaps" by Robin Hewes, G3TDR), 19 February (Being arranged), 8pm, Market Hall, St Albans, Herts. All visitors welcome. Hon sec—Hugh Young, G3YHY, QTHR.
Southall (UK FM Group London)—Second Tuesday in each month, 8pm, The Scout Hut, Hayes Road, Southall, Middlesex. PRO—Roger Wilkins, G3XFA, QTHR, tel Heathfield 2189.
Southgate (SRC)—3 January (Being arranged), 7 February ("Varicaps" by Robin Hewes, G3TDR), 8pm, The Green, Winchmore Hill, N21. Hon sec—John Bachelor, G3XMV, QTHR.

S Kensington (Baden Powell House Scout ARG)—Third Tuesday in each month, 8pm, Baden Powell House, Queensgate, S Kensington, SW7. Hon sec—Alf Watts, G3FXC, QTHR.
Sutton & Cheam (SCRS)—22 January (Talk by Mike Bues, G8AAI, of the UK FM Group), 19 February (Construction contest), 8pm, The Library, Cheam, Surrey. Hon sec—Alan Keech, G4BOX, QTHR.
Welwyn (Mid-Herts ARS)—Second Thursday in each month, 8pm, Welwyn Civic Centre, Prospect Place, Old Welwyn. 10 January ("Marconi—the early years of wireless" by G. R. M. Garratt, G5CS), 14 February ("History of vhf mobile radio" by P. J. Simpson, G3GGK). Visitors welcome. PRO—Maurice Pyle, G2BLA, QTHR, tel Welwyn 4685.
Wimbledon (W & DRS)—Second and fourth Fridays in each month, 8pm, St John Ambulance HQ, 124 Kingston Road, Wimbledon, SW19. Hon sec—F. W. Hill, G3WDO, QTHR.

REGION 9 — RR H. W. Leonard, G4UZ

A happy, prosperous and eventful New Year to all amateurs and especially those in Region 9.
Bath (B & DRG)—Every Monday, 8.30pm, The Crypt, Church of the Ascension, Oldfield Park, Bath. Full details from G8DRK, tel Bath 23465.
Bristol City & County RSGB Group—28 January (AGM)—make sure *you* are there, 25 February ("The RR speaks again"), 7pm, Becket Hall, St Thomas Street, Bristol 1. *G3ULJ.*
Bristol (BARC)—Every Tuesday, 7.45pm, 24 Bright Street, Barton Hill, Bristol 5. New chairman—G8CKJ, new secretary—G4BZZ. *G4BZZ.*
Bristol (Shirehampton ARC)—Every Friday, 7.30pm, Twyford House, Shirehampton, Bristol. *G5AQZ.*
Bristol (University ARS)—Most Saturdays during term time, 2.30pm, Dept of Physics, Royal Fort, Tyndall Avenue, Bristol BS8 1TL. All details from G3WDG.
Camborne (CRAC)—First Thursday in month. 3 January ("PCB etching" by G8DZE), 7 February ("Speech compression" by G4BHC, and "DX reception" by G8HTE), 7 March ("Ship-to-shore radio" by Mr D. Smith of Lands End Radio GLD), 7.30pm, SWEB Clubroom, Pool, Camborne. *G3XTF.*
Penzance (WCRC)—Alternate Wednesdays, 7.30pm, Guild Hall, Penzance. Full details of Cornish and West Cornwall clubs from G3NKE, tel Camborne 2419.
Exeter (EARS)—Second Monday of each month, 7.30pm, ATC hut, Colleton Hill, The Quay, Exeter. RAE class every Monday at 7.30pm, hon sec—Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
North Devon (NDRC)—Second and fourth Wednesdays, 7.30pm, "Crinnis", High Wall, Sticklepath, Barnstaple. *G4CG.*
Plymouth (PRC)—First and third Tuesday. 1 January (No official meeting), 15 January (2m seminar), 5 February (Visit to Texas Instruments factory), 19 February (Open night), 5 March (Film show). Club room now redecorated. 7.30pm, Virginia House, Bretonside, Plymouth. Visitors always welcome. *G3UVS.*
Saltash (S & DARS)—First and third Fridays, 7.30pm, Burraton Toc H Hall, Saltash. *G3ZHM.*
South Dorset (SDRS)—First Friday of month, 7.30pm, Alma Road section of Weymouth Technical College. *G3VPF.*
Taunton (T & DARS)—Every Friday, 7.30pm, Jelalabad Barracks, The Mount, Taunton. Hon sec—G. Swetman, "Little Copse", Monkton Heathfield, Taunton, tel West Monkton 298.
Torbay (TARS)—Every Tuesday with special meeting on last Saturday of month. 26 January (Construction night), 23 February ("Designing and etching PCBs" by G3NBR), 9 March (Annual dinner at Templestowe Hotel), 7.30pm, rear of 94 Belgrave Road, Torquay. Visitors most welcome. *G3UIQ.*
Weston-super-Mare (WsMRS)—Second Friday of month, 7.30pm, Room Lewis M2, Worle School, New Bristol Road, Worle. *G3PQE.*
Yeovil (YARS)—Every Thursday, 7.30pm, The Youth Centre, 31 The Park, Yeovil. 3 January (Tape/slide lecture—"Aerials" by G6CJ), RAE coaching by G3FXW every week. *G3NOF.*

REGION 10. — RR D. M. Thomas, GW3RWX

Blackwood & District (ARS)—Fridays 7pm, Community College, Oakdale, Mon. *GW3KYA.*
Barry College of Further Education (ARS)—Thursdays, 7pm, at the college, Colcot Rd, Barry. Alternative meeting place at Barry Rugby Club. The society will be holding a 10m phone contest on 31 March 1974. The contest is principally for Regions 9 and 10 entrants but any other entries will be welcomed. It will last from 0900 until 1700gmt, and rules and sample log sheets are available from C. J. Drover, GW8GJW, 5 Dyffryn Place, Colcot. Barry, Glam, on receipt of an sae. Details from GW3VKL.
Cardiff (RSGB Group)—Monday 14 January, 7.30pm, at BBC Social Club, Newport Rd, Cardiff. *GW3GHC.*
Hoover (ARC)—Mondays, 7.30pm, at Hoover Social Club, Hoover Works, Pentrebach, Merthyr, Glam. *GW3RNC.*
Glamorgan VHF Group—Third Tuesday of each month, 7.30pm, at the NCB Staff Members Club, Tondu, nr Bridgend, Glam. January meeting by GW3WRE ("Crossed Yagi antennas on 2m" by GW3WRE). *GW3ZTH.*
Pembroke & District (RSGB Group)—Last Friday of month, 7.30pm, at the Defensible Barracks, Pembroke Dock. *GW4AKO.*
Pontypool (RSGB Group)—Tuesdays, 7pm, at the Educational Settlement, Rockhill Rd, Pontypool, Mon, during school terms. *GW3JBH.*
Port Talbot (ARC)—Meets at the Rail & Transport Club, Station Rd, Port Talbot, Glam, on the second Tuesday of the month. The club has suffered a very severe loss in the death of its president, Arthur Williams, GW5VX, and the sympathy of the region is extended. Sec—Mr George Watson 19 Kelvin Rd, Clydach, Swansea, Glam.
Swansea Radio Society—1, 15 and 19 January, 7.30pm, at the Commercial Hotel, Killay, Swansea. *GW4BIQ.*
Sully & District Short-wave Club—Tuesdays, 7pm, at the Annexe, Sully Bowls & Social Club, 59 Port Rd, Sully, Glam. *GW4AMV.*
Rhondda (ARS)—Meets at Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. *GW3PHH.*
University College of Wales, Cardiff—Details of society activities from the radio society secretary, c/o Students Union, Dumfries Place, Cardiff.
University College of Wales, Aberystwyth, Radio & Electronics Society—Details from the secretary, c/o Students Union, University College of Wales, Aberystwyth, Cards.

REGION 11 — RR P. H. Hudson, GW31EQ

Bangor (UCNWARS)—24 January ("Design considerations in vhf/uhf communications equipment" by Mr R. B. Porter, G3VXK, Microwave Modules Ltd), 7 February ("Satellite communications systems" by Commander Collins, RN). At 1710 in the small lecture theatre of the School of Engineering Science.
Conway Valley (CVARC)—10 January (Guest speaker Dr David Last), 14 February (Raynet). The club station GW6TM is active on Tuesdays from 1930. Meetings at 1930, The Quarries, Llandulas.
Rhyl (R & DARC)—8 January (Technical film show), 12 February ("Taking part in contests" by Brian Clark, GW3HGL). At 1945, New Ambulance Station Lecture Room, Mercia Drive, Rhyl.

REGION 13 — RR V. W. Stewart, GM3OWU

Berwick (BARS)—Last Sunday in each month, 3pm, Tweed View Hotel. Further details from G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.
Dunfermline (DRS)—Second Wednesday in each month, 7pm, Queen Anne High School (TV studios). Further details from D. G. L. Anderson, GM8HEY, 10 Cairneyhill Road, Crossford.
Edinburgh (LRS)—Second and fourth Thursdays, 7.30pm, Adult Education Centre, Riddles Court, High Street. Further details from J. B. Howie, GM8DIJ, 39 Marionville Road. 10 January (talk by GM3ZVB), 24 January (Sale), 14 February (Constructional competition), 28 February (Aerials).
Glenrothes (GDARC)—First Sunday in each month, 7.30pm, Old Nursery Buildings, Leslie. Details from A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife.
St Andrews (UStAARS)—Details from R. Marchant, GM3ZCQ, Dept of Physics, North Haugh, St. Andrews.

REGION 14 — RR M. A. Comrie, GM3YRK

Ardeer (ARCARS)—Thursdays, 7.30pm, Ardeer Recreation Club, Stevenston, Ayrshire.
Ayrshire (AARD)—Meets at YMCA, Howard Street, Kilmarnock. Further details from hon sec—R. D. Harkness, GM3THI, 55 Woodend Road, Alloway.

PHOTO NEWS FROM REGION 15

Believed-youngest holder in Northern Ireland (possibly in the UK) of the amateur morse test certificate is Robert Quigg, who was aged 10 years and 10 months when he passed the test at Portpatrick Radio, in company with father, Ken, BRS8808. Although OM Ken has passed the RAE, son Robert will have to wait until he is 14. Meanwhile, the self-evident callsign GI4CRQ has been applied for. (Photo *Belfast Telegraph*)

Mrs Christine Tuff of Glengormley, near Belfast, Co Antrim, who has just been issued with the callsign GI8IBH to become GI's first woman licence holder. Christine passed her RAE in May at the first attempt. "She was one of my star pupils," says her husband, Broder, who is a lecturer in marine radio at the local polytechnic, and who has been on the air for over a year now as GI4ANX.

Falkirk & District (RSGB Group)—Meets at the Temperance Cafe, Lint Riggs, Falkirk. Further details from J. Ramsay, GM3OQI, 78 Wheatlands Avenue, Bonnybridge, Stirlingshire.
Greenock & District (ARC)—(GM3ZRC) Tuesdays and Fridays at 7.30pm, Watt Library, Union Street, Greenock. Enquiries to hon sec N. C. Henderson, GM3LYI, QTHR.
Glasgow University Radio Club (GURC)—George Service House, University Gardens, Glasgow. Details from hon sec, c/o Dept of Engineering.

REGION 16 — RR E. Jacobs, BRS32513

Ipswich (IRC)—Meetings will be held on 9 and 30 January at Handford House, Ranelagh Road, Ipswich. Hon sec—P. Hubert, G3YWM.
Great Yarmouth (GYRC)—Meeting the last Thursday each month at 67 Southdown Road, Gt Yarmouth. Hon sec—A. D. Besford, G3NHU.
Lowestoft (L & DARC)—Meeting twice per week at 7.30pm, YMCA, Park Road, Lowestoft. Hon sec—R. P. Finch, G4AJO.
Vange (VARS)—Meetings held every Thursday evening at the Youth Hall, Barstable Community Centre, South Riding, Basildon at 8pm, details from Mrs D. Thompson, 10 Feering Row, Basildon.
Chelmsford (CARC)—Meeting the first Tuesday each month at 7.30pm, Marconi College, Arbour Lane, Chelmsford. Hon sec—W. L. Pechey, 49 Vicarage Road, Chelmsford.
Colchester (CRA)—Meeting most Wednesdays, 7.30pm, at the Garrison Amenity Centre, Reed Hall, Colchester. Hon sec—E Jacobs, 26 Pondfield Road, Colchester.
Stowmarket (SDARS)—Hon sec—A. P. Ashton, G3XAP.
Colchester (U.EARS)—Hon sec—A. E. Green, G4ABB.
Norwich (U.EAR & EC)—Meetings held room 029 UEA Village. Hon sec—P. Gowen, G3IOR.

REGION 17 — RR L. Hawkyard, G5HD

Basingstoke (BARC)—5 January (Club wavemeter project), 17 January ("Amateur tv" by G6OPB/T), 2 February ("Station operating techniques"), 16 February ("Interference—Prevention or cure?" by G3VUQ). *G8FKT.*
Farnborough (F & DRS)—Second and fourth Wednesdays of each month at the 8th Farnborough Air Scouts' Hut, Rectory Road, Recreation Ground. *G8FWE*, QTHR or Camberley 22887.
Harwell (AEREARC)—Third Tuesday of each month, also informal meetings and junk sales every Friday lunch time, 7.30pm at the Social Club, AERE, Harwell, Berks. *G3NNG.*
Swindon (SDARC)—9 January ("Potentiometers" by G3LLZ), 23 January and 6 February ("Practical use of ICs by G3JAP), 20 February ("SS *Great Britain*" (RSGB Bristol)). Meetings at Penhill Junior School, Swindon.
UK FM Group (Southern)—First Wednesday of each month, 8pm, at Chineham House, Popley, Basingstoke. *G8BIH.*
Winchester (WARC)—Every Friday at Antrim House basement, St Cross Road, *G4BKE*, tel Winchester 61133.

OBITUARIES

The Society records with regret the deaths of the following amateurs.

Mr J. Hartwell, G3LAY
Jack Hartwell died on 5 November after a short illness. He was well known for his service to customers of Chas Young's Amateur Radio Shop in Birmingham, and was active on the hf and lf bands until his death. He had been a pioneer of ssb and rtty on vhf.

Mr F. Pack, G3MEQ
Fred Pack died on 22 November in Bedford Hospital. He was a long-standing member of Bedford ARC, and a regular operator on all bands 2 to 160m, with a particular interest in regular contacts with a UK group that included Keith, VK4KS.

Mr C. H. Whibley, G3SST
Cyril Whibley died on 30 September at the age of 71. He took up electronics as a career late in life, becoming a member of GEC Radio Club in 1960, and gained his licence in 1969 as a prelude to his retirement. He was active mainly on 160m and the vhf bands, from his home in Tunbridge Wells.

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted 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, and a remittance by postal order or cheque for 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

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.

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.

See the current order form on the last page for further details.

Post to : MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE

FOR SALE

R216 rx, 19-157MHz tunable, five ranges, a.m./fm/cw with psu, connecting leads, spare valves, manual, exc condition, £55, deliver 50 miles; morse lp record, up to 14wpm, 50p. G3ZIJ, QTHR.

Heathkit SB310 rx, good condition, covers 80, 49, 40, 31, 25, 20, 19 and 16m, bandwidth 500kHz, ssb and cw filters fitted, manual and spare valves, £85. G3WNS, QTHR. Tel Crawley 35674 after 7pm.

Stereo 7in tape deck, 3 speed, piano controls, brand new, £15; two 140μA vu meters, new, £1 ea; Garrard battery tape deck, stereo heads, 4in spools, £6; 6in crt with base £3, sae list or telephone. G8DEV, QTHR. Tel 0789 68554.

OS2 scope £20 ono; Heath homebuilt rx, needs attention, in working order, £15 ono; books and junk also—sae lists, buyer collects. S. Whitehead, 19 Roundhill Street, Brighton, Sussex.

600ft asl, good QTH with 60ft Strumech Versatower on Berks Downs near Wantage and M4, attractive mod det bung, 3 bdrm, dble grge, enclosed garden, £13,950. G3YFM, QTHR. Tel Chaddleworth 418.

256-bit digital keyer, programmed with diode matrix, £20; Avo 7, faulty, £6; til 209 LEDs, red, 10 for £1; 16561 power transistors 20p ea; BD176, BD177 15p; BF256, BF245 FETs 10p ea; BF240 8p. G3WZT, QTHR. Tel 0403 710565.

Jones (USA) rf power and swr Micro-match with remote coupler unit £7; BC435 £4; Sontronics Bandscanner £5; new HRO tuning dial £1.25, all carriage extra, sae pse. *Wanted* fb Eddystone 888A. G3ZCO, QTHR.

Transistor Ranger 2007 dash 4m, tx converted, working, rx complete unconverted, £5; Parmeko transformer, 1,000-0-1,000V 250mA £3; 813 and base £2; 3B28 mercury vapour rectifiers, two, £1, prefer buyer collects. G4AFT, QTHR.

Property late G8FSH: Heathkit HW17A £55; 2m Cambridge AM1OD, tunable rx, £30; 70cm U450 Cambridge £25; Codar preselector £4; Q-mult £4; Sentinel 2m converter, 28-30, £8; 70cm converter, 28–30, £4 all ono. Mrs E. Hodkinson, 29 Wellhouse Street, Barnoldswick, Colne, Lancs. Tel Barnoldswick 3195.

KW77 rx £55; Akai CS35D stereo tape deck, £37; Koss K/711 stereophones, new, cartoned, £7; unused G3OLB 2m converter, 28-30MHz, £8; Metrosound ST20E stereo amplifier, 10W/channel, £24, all mint with handbooks. A. S. Carpenter, 10 Avenue Road, Frome, Somerset BA11 1RP.

Property late G3GY: Panda Explorer tx; BC221N with tables; tx and rx variable capacitors; G2DAF mark 3 ssb tx, part built; valves, crystals etc, sae for list. G6PG, QTHR. Tel Smallburgh 271.

NCX500, mint condition, with ac psu, £130. G3WRM, QTHR. Tel Rownhams 5277.

Wideband uhf scope, 5in, and pulse generator, bulky, with manuals, separate psu, offers. Tel Cobham (Surrey) 3117.

KW2000A, new pa valves, complete ac power supply, £140; KW2000 dc power supply £18, both items little used; FT101, as new, £210. G3ORK, 1 Doctors Lane, Tarleton, near Preston PR4 6HO. Tel Hesketh Bank 2482.

Marconi rx CR300/1, 5-25MHz, with psu, rx not checked, £6; DL6SW 2m converter, 28-30 i.f., £5; Class D wavemeter, ac modded, £5; transformer, 230V 50 cycle in, 6·3V 1A out 50p. Tel Worcester 27495.

Westminster W15AM 145MHz tx/rx £45 ono; Star SR200 mains hamband rx £30 ono, consider exch either for T28-AT5 station or why; Sony mono tape recorder, very good, £25. Tel 01-858 1448.

150ft long-wire 14AVQ, 2 beds, living, kitchen, bath, flat in sought-after area SE3 London, *circa* £10,500. *Wanted* property in Dover, Please tel 01-858 1448.

HW32A/HP13, ac supply, Tavasu aerial, mic, cables, handbooks, coaxial cable, £100; Heath Cotswold £20; Teletype reperf £15; Micro t-o keyer £6, all mint; two AM25Bs with h/b; sae list. G3LDI, QTHR.

Inoue IC700 rx, 10-80m, matching speaker unit, £50 ono; will exch for Vanguard FM25B or VM1A with cash balance. 12, Black Barn Lane, Usk, Mon NP15 1BP.

Elan mast rotator, indicator wires, fittings, complete, offers wanted; mint HRO, 1155 £5; TCS £5. H.W. Gannicott, Highfields, Little Rissington, Glos. Tel Bowton on the Water 20977.

Electronic keyer, fully automatic model, DA-1, mains or 6/12V, £10. GM4AVJ, QTHR. Tel Invergordon 2512.

KW2000A with ac/psu, exc condition, mic, handbook, circuits, spare valves inc two pa valves, rf indicator, £140 ono, will exchange for KW2000B or KW202 and KW204 with cash adjustment. P. J. Leach, 27 Grosvenor Rd, Heaton Moor, Stockport, Cheshire. Tel 061-432 2985.

Varactor diodes, quantity of VBC types, new and used, very cheap, sae list. *Wanted* fm Westminster, any condition. Adamson, Woodend, Victoria Rd, Kingsdown, Deal, Kent CT14 8DY. Tel Deal 3788.

Viscount hi-band fm mobile, suitable 2m, £26; Storno 10W lo-band base stations, as new, £19; Hudson lo-band base £12; Hudson FM208 lo-band £9; 50W Storno base station, lo-band £20; 10W tx strips £3. G8AKA, QTHR. Tel Reading 332582.

J Millen (USA) GDO all coils and holder; Ham M rotator with C-Quad beam; Delta loop 2-el beam; BC221 ac pu, modulated type; several linears + kit of parts; 813s, 4CX300a etc. G2MF, QTHR. Tel Sheffield 360210.

Eddystone EC10 mk 2, mint, £65 ono; Codar AT5, dc psu, £25. *Wanted* Trio 9R59D or Eddystone 840C rx, any condition. Jenkins, 30 Gainsborough Road, North Finchley, London N12 8AG.

Liner2, fitted SSM pre-amp, matching mains power supply, Bantex whip; unused JB 6-over-6, £130 or exchange FT200 tx/rx. G3GHB, QTHR. Tel Inkberrow 792582.

Hamband transistor rx, Electroniques quoilpax, i.f. strip, internal speaker, mains psu, compact, £25; URC-4, 144MHz, with xtal, £3; walkie-talkie 28·5MHz, "Eagle", £5. G3TSO, QTHR. Tel Kington Langley 393.

Eddystone 840c, recently retuned, with new set of valves, rx in very good condition £45 ono. S. Whittingham, Invergordon Park Rd., Stony Stratford, Milton Keynes.

Eddystone 888A, mint condition, £65 ono; KW Viceroy mk3 £45 ono, vgc; frequency meter, BC221, with psu, £15 with charts, complete station consisting of the 3 items £110, buyer collects. G3LPQ, QTHR. Tel 076-123 301.

De-luxe TE-200 120kHz-500MHz sig gen £9; de-luxe Joystick aerial with tuner £7; El-Bug Vibroplex key £5; Eagle rf field gen £3. BRS 13336. Tel 262 1461.

Avo model 40 £10; Heathkit OS1 scope £10; CSE2A10 transistor 160m tx £12; Creed 7B, half cover, £10, all good condition. Will deliver 7B reasonable dist. G3ZER, QTHR. Tel Northwood 22085 after 6pm.

Eddystone 840A rx, good cond, recent overhaul, ideal for beginner, £25 ono. 2 Rolleston Close, Petts Wood, Kent. Tel 01-467 5908.

FT2 Auto 2m fm tx/rx with 8 channels fitted inc repeater with add-on TBA120 discriminator and narrow filter £110. G3JTQ, QTHR. Tel 01-894 7249.

Trio JR500SE rx, new condition, £45 ono; Heath DX100U tx, 160-10m, £35 ono; Johnson valve tx/rx, aerial switch for "break-in" operation, rated 2kW, £5; wireless sender no 76, 160-80-40, £5. Ten-tec El-Bug £10. G3JFC, QTHR. Tel Crayford 22489.

Trio JR500SE with full 28-30MHz coverage, £45; Sentinel 2m pre-amp £4; Storno CQF-13 fm tx/rx, mains powered, working on 2m, £15, all excellent clean condition. G8EQT, 32 Pond Croft, Hatfield, Herts AL10 OBX.

Hunts capacitor analyser and resistance bridge type CRB3 in good order with instruction book but no test leads £15 carriage extra. G3LTU, QTHR.

KW2000A ac, psu, vgc, Shure 444 mic, £140, can deliver rsnble dist. *Wanted* circuit/info S640 rx; HRO MX rx less coils, valves, psu ok; 17,500kHz crystal. G3ICH, 25 Park Rd, Freemantle, Southampton. Tel 21711.

TF144G hf signal generator £8; CR300 rx, 15kHz to 25MHz, £5; both working but require attention. G3TAX, 50a Leigham Vale, London SW16 2JQ. Tel 01-369-2627.

FT101 mk1, 80-10m, £200; Microwave Modules mosfet converter, i.f. 28-30MHz, £15. G8DDW, QTHR. Tel 01-858 3921.

Hamtower, 30ft plus topcap and brackets, no base grillage, £30; 10/15m spider quad £8; AR22 rotator and control £15; 4 band Tennaswitch and control £8; Katsumi EK9X £6; lot £62, prefer buyer collects. G3YHB, QTHR. Tel 051-228-1321.

Galvanized 50ft tower with 10 and 20m beams, buyer to dismantle and remove, offers. GW3EJM, QTHR. Tel Llangors 277.

Hamgear PM2 preselector £4. G8GVE, QTHR. Tel Welwyn Gdn 22112.

External vfo for KW2000B, VFO4b, exc condition, £20. *Wanted* BC221, will part exchange—haggle. GW3WWN, QTHR.

Racal TRA 355 ssb/a.m. tx/rx chassis only partly stripped but containing usb/lsb filters, demodulators, xtal oscillator, pa stage, etc, £5; BC348, good condition, with built-in mains psu speaker, £12, buyer collects. G3ZDB, QTHR. Tel Epsom 24814.

BC221, charts, built-in psu, £15; 19 set variometer 55p; valves KT88s, 6146s, 5B255Ms etc, UM3 £2; postage extra. *Wanted* 2m base station rx, Pye or similar, xtal control. G3NPZ, 35 Iron Mill Close, Fareham, Hants. Tel Titchfield 43894.

Creed 7B printer with 80-0-80 psu RCA fsci, 465kc terminal unit and control box, fb working, £25; keyboard perforator and tapes £5; Panda low-pass filter £3, buyer collect. J. A. Rowley, Castle Rise, West Ayton, Scarborough. Tel West Ayton 3039.

Hamobile 144-146mHz tx/rx, ac and dc power packs, contest winner, £20; few 813s £1.30 ea, bases 35p ea; parcels US ham magazines 20 for 50p, carriage extra; coaxial aerial relay, 12V, £1.25 post 25p. G5CP, QTHR. Tel 024-689 253.

Lafayette HA600A gen cov rx with Sentinel 28-30MHz 2m converter, £35 ono; Pye Vanguard FM25B, tx modded on 2m, new condition with large mains psu, £25 ono, buyer collect. G8FBL, QTHR. Tel Lichfield 23919.

Exch 1970 Reliant van, under 4,000 miles and valued £375, for modern radio gear of equivalent value and in equally good condition; van used solely as run-about by retired engineer. G4CMN, QTHR. 55 Buckswood Drive, Crawley, Sussex.

Pye Cambridge fm, 25kc, 12V mobiles, boot models with all plugs, sockets, control units, mics, new speakers, performance as new, high-band, suitable for marine or 2m bands, £50. GC3HKV, QTHR Tel 0481-47278, 6/7pm.

Codar ac power unit, AT5 T28, homebrew atu, speaker unit, mic, phones, key with side monitor, all cabling, ready for use, £25 lot, buyer collect. G3XFY, QTHR. Tel Sheffield 366707.

GR64 communications rx, 160-10m, as new, with circuit, £15; Marconi 1330 scope, working but transformer u/s, £35. G3SDK, 27 Norton Cresc, Towcester, Northants.

Microwave Modules tx and rx, 145MHz xtal plus mic, 5W input, rx, 144-146MHz tunable, 12V, ideal for mobile station, $\frac{5}{8}\lambda$ 2m mobile whip, all for £50. G8BNX, QTHR. Tel 540 1479.

Heath HW17, full mods, dc psu, fm adaptor, £60; HW32A, dc psu, £80; SB102 £180; psu £22.50, mint condition, no offers; Trio JR59DS, as new, £45 ono. GW8GPX, QTHR. Tel Monmouth 2498.

BC221 mains psu, original charts, £16; 7B page printer, 24V motor, £10; 85R printing reperf with silence cover, 110V motor, £5, prefer buyer collect. G8DNK, QTHR.

LG300 tx, power unit and modulator; Minimitter MR44 tx/rx; American aircraft rx type RA-1b, many spares etc, any offers. G2VM, QTHR.

Lafayette HA350 sideband rx, 160-10, 100kHz calibrator, good condition, speaker and manual, £45 ono; G8ATK tx strip £4; 30ft telescopic mast with guys £10. G4AEQ, QTHR. Tel 061-790-2662.

Pye Westminster W15FM, 10 channel, xtals for 145·00, complete, £55. G4BQS, The Gables, Wootton, Canterbury, Kent. Tel Selsted 216.

Trio TS510, xtal filter, external vfo, £165; Eddystone EA12 rx, £120 with ext speaker; KW Match 75Ω 8KW aerial, 75Ω dummy load £11, the lot as one station £290 ono, any item sold separately. GM3LVG, 10d Scott House, Seafar, Cumbernauld. Tel Cumbernauld 20850.

HEATH HW-101 tx/rx and HP-23 psu, factory built, as new condition, complete with mic, loudspkr, and keyer, £185. G3YJH, QTHR. Tel 021-358 3174.

18AVT/WB vertical aerial, fine condition complete with all parts and instructions, £24 inc carriage. P. R. Barker, 141 Falmouth Rd, Redruth, Cornwall TR15 2QU.

Pye Reporter working on 4m, modified, in good condition, with mic and handbook, £7.50; UR-1A fet, rx, mint, £18; 1625s 30p to 60p (12V 80s). *Wanted* good 4m converter in working order. Russell, 13 New Rd, Bolter End, High Wycombe, Bucks HP14 3NA.

Emsac TX2 2m tx and power supply £25. R. J. Neilson, 18 Willow Close, Penarth, Glam CF6 2NG. Tel 0222-707964.

About April next, 3 bedroom house with highly productive $\frac{1}{4}$ acre gdn, excellent QTH for dx, offers around 22k. G5GH, QTHR.

Low band solid state Cossor CC701 12½kHz spec, a.m., brand new, xtalled on 4m, offers; type 61 sig gen, 90-160MHz, new, £5; 24V/240 ac generator £5; xtals, 1987·6kHz £1, 3674·57kHz (2) £1; 2N5245s 38p ea; QQZO6/40 quick heat, new, £6; *YL*1130, unused, £1.50; *YL*1000, new, £2; QQVO2/6, new, £1.50; QQVO3/10, used, 50p; quick heat low and high band tx strips, 3/10 & 6/40 £10. G4BSN/G8GAP, QTHR.

Transistor rx—NovaTech Aviator 11, a.m. 180-400kHz/500-1,600 kHz/100-135MHz, df rotary ferrite aerials and multi-whips, very good cond. GM3KHH, QTHR. Tel Clochan 247.

FTdx401, mint, new October 1972, delivery by arrangement, £200 ono. G3JBU, QTHR. Tel 0604 43020.

UHF cavity, vernier tuning, contains STC V235A/1K (SV221), no details of unit and tube condition not known, £2.50 ono plus p & p, or collect. G8AKT, QTHR. Tel Potton 260462.

KW2000E £260; KW107 £40; KW1000 £130; only six months old; two R220s, tunable, cased, Eddystone 940 & 770R, a.m. tx; BC221 with charts; Class D wavemeter; Heath gdo, all in exc condition. GI4AOD, QTHR.

Trio JR500S, 160-10, immaculate, £40; Vespa mk1 and psu, immaculate, £65; Green and Davis lin, 600 p.e.p. £45; mobile psu, suit Heath, KW etc, 800V ht, 250/350 ht, —130V bias, £20, all perfect. G3VCJ, QTHR. Tel Cooden 4726.

FT2 auto with six channels, 144·48, 144·80, 145·00, 145·500, 145·525, GB3PI, £136 ono; Liner 2, 144·10 to 144·33 £115, will sell together for £235 or separate, will deliver up to 50 miles. G8FCK, QTHR.

Bungalow, 2 bed, bath, kitchen, dining room and lounge, conservatory, garage, greenhouse, attic boarded could be converted, 2½ acres clay soil. Baleane, Farney Fields, Horley, Surrey, £19,500 ono. G3XWZ, QTHR.

Variacs—give any voltage 0-270V at 15A, strong rugged construction, operate your station during voltage reduction only six left, £20 carriage extra. GM2AHD, QTHR. Tel Dumfries 2240.

Geloso G209 rx, nearly new, £50; Pye Ranger, mic etc, not tuned, £10 ono; vfo, homebrew, £7 ono. *Wanted* portable set; Yaesu SP400 speaker; aerial for 20 and 80m. M. Allison, 5 The Furlong, Beds. Tel Bedford 52944.

HW32A (with cw) and HP23 idle—interested fmd or why. GM3RKO, QTHR. Tel 059-275 6504.

Sphinx ssb tx £25, fair cond; homebrew rx, Electroniques front end, 898 dial, xtal calib, £15. G3TIS, QTHR. Tel 0233 20497.

Yaesu FL50 with hand mic £65; FR50 with calibrator £65 or £125 pr, both as new; BC221, ac psu, £15; Creed 7E as new £20; DL6EQ ac psu £20; all carr extra. GW3FSW. "Ty celyn", Axton, Holywell, Flint CH8 9DH. Tel Dyserth 538.

Hy-gain 18AVT/WB vertical aerial, 10-80m, as new, £30. G3XVF, QTHR. Tel Norwich 56782.

KW2000E tx/rx, complete with psu, £260; KW107 aerial tuning unit £40; KW1000 linear amplifiers £130, all only six months old; two only, R220 vhf RXs in cases and made tunable; Eddystone RX940 and Eddystone RX77OR; a.m. tx 80 to 10m; frequency meter with charts; Class D wavemeter; Heath gdo complete with coils; all in excellent condition. GI4AOD, QTHR.

Going QRT, Heath SB400E deluxe, tx SB301E, rx BC221AE, Shure 444 atu, handbooks, offers about £200 the lot, would deliver reasonable distance Exeter. G3AMB, QTHR. Tel Hele 253.

Xtal filter, 10·7MHz ± 3·75kHz £7.50; xtals 10·7 (1), 9 (1) 1·572 (2) 50p ea; QQVO6-40A (2) £2.50 ea; Heathkit swr meter HM15 £5; p & p extra. GM3POK, QTHR. Tel Boness 3377.

Xtals, HC-6U, large pins, new, unused, boxed, 10·50, 17·50, 24·50, 25·00MHz, £1.50. Tel Headley Down 3326.

Bird rf 50Ω load type 82A, 500W, £35; absorption wattmeter type TS118/AP, 20-750MHz, 5-500W, complete, £8, carriage extra. Tel Park Street 73074.
2m fm tx, 48W, £18; 70cm freq meter, TS184A, £8; Jason sine/square wave generator, 10Hz-100kHz, £5; DET24 valve £1; Dalo 33 pc pens 40p each. Postage extra. G8AWV, QTHR.
KW2000A plus ac psu, xtal for 21·2 to 21·4MHz recently realigned and in good condition, £150 ono. G3TWE, QTHR. Tel Gt Yarmouth 64497.
BC221Q, charts, psu, £15; new Texas 7490 45p; 7400 10p; 7475 40p; 74121 30p; 3N140, 3N141, 50p; 813 bases 50p; BYX38-900 diodes 20p; 2N3866 50p. *Wanted* P40/60 Versatower, also new 813s. G3UJE, QTHR.
Trio JR500S rx, xtal filter, stable vfo, with handbook, £45. GM8BOV, QTHR. Tel Bathgate 54025.
Hy-gain 18AVT/wb, 10-80m vertical, as new, £30; Hustler 4BTV 10-40m vertical, 80m loading coil and whip, needs attention, £10; AR22 rotator with 60ft cable £20. *Wanted* TR44 or Ham-M rotator, deliver 30 miles. Rev H. R. Davis, The Vicarage, Eaton Bray, Dunstable, Beds. Tel Eaton Bray 220261.
HW17 £37.50; AT5/T28, PSUs, control unit, £35; Philips 4-track tape recorder £8; Philips RP305 car/portable radio, new, £11; Pye CAT rx, 2m converter, £25. G3WZD, QTHR.
Withers TW2 mobile tx and psu £17; KW2000 dc psu £18; Pye transistor hi-band a.m. base rx and psu £8; eight HRO coils, inc five bandspread, £10; Minimitter Top Band whip £1; all ono. G3OHC, QTHR. Tel 021-308 2512.
HR05T, mtchng stab psu, all gc coils, £20; AR88D, mtchng spkr, 2 sets new spare valves, £30; Viceroy mk2, full lat filter, £55; TF144G £12. G2AQJ, QTHR.
HA600A with nbfm discriminator £40; 70cm Parabeam with 30ft BBC2 coaxial cable £5.50 carriage extra. GM3ZVL QTHR. Tel 031-667-3366.
EICO 753 Tri-band ssb a.m./cw tx/rx, 80m, 40m, 20m, 220W input, vox, ptt, rx offset tune ± 10kHz, complete with mic and Courier commercial power supply, buyer collect, £65. G3OXV, QTHR. Tel Daventry 2265.

WANTED

Pye Ranger 2107 circuit diagram, purchase or loan to photocopy. G8FHN, QTHR. Tel Medway 63365.
Usable junk etc for oap, B'ham area. BRS33179. G. Thompson, 49 Widney Ave, Selly Oak, B'ham B29 6QE.
Edison "Voicewriter" disc dictaphone playback type for restoration, also other *early* dictation machines. Buy or borrow manual/circuit for above. Also spares, discs etc. A. J. Bullock, "The Frith", Far Oakridge, Stroud, Glos. Tel Frampton Mansell 204.
12V dc psu, ex Pye ssb 125 unit. G3JSB, QTHR. Tel Harrogate 82361.
G8 stuck at 9wpm would appreciate loan of G3HSC or similar course. Great care exercised until return. G8GZL. A. Russell, 3 Goss Close, Mailsea, Bristol BS19 2XB. Tel Nailsea 4351.
XF9B filter; transistors; B12-12 (2), B25-12 (2), or B40-12 (2), also BLY38(2), BLY53a (2), BLX69(2); tilt-over tower. G8EPH, QTHR. Tel Sheffield 0742 345572.
B2 spy set, unmodified, working order, G3HDB, QTHR. Tel 0926 53524.
Drake T4X tx, companion for R4A rx. G3PTN, QTHR.
Eddystone miniature 4-pin threaded coil formers, cat number 765, also FT243 xtals 3·5 to 3·525MHz. Fenwick, 28 Gimble Way, Pembury, Tunbridge Wells, Tel Pembury 2836.
Circuit diagram of R1475 and/or Hudson FM109 base for photocopy and return. G8DRS, QTHR. Tel Dover 203000 evenings.
Line output transformer for Ekco T141 (TC138, TRC139), complete set collected London. J. M. Pryor, 27 Hollickwood Ave, London N12 0LS. Tel 01-368 5717.
VHF to UHF converter for tv dxing; mains psu for 19 set mark 3, please state price. M. B. Hahn, 21 Stanley Rd South, Rainham, Essex RM13 8AJ.
Faulty CR100 or B28 rx, any condition acceptable, even incomplete anywhere. Briscoe, 27 De Vere Gdns, Ilford, Essex. Tel 01-554 6631.
Drake T-4XB and AC4 power supply, good price paid for late model in first class cond, will collect. G3GHB, QTHR. Tel Inkberrow 792582.
Vibroplex bug key; xtals (10x pref.) 3·5-3·6 and 7·00-7·04MHz; book of papers IEE Convention on hf communications, March 1963, all items any condition if complete. GW3OYN, QTHR.
Xtals 65·55MHz, 43·7MHz 32·775MHz or near frequency. G8FUR, QTHR. Tel 01-850 9418.
7·3-14MHz and 14-30MHz gc HRO coils. G8HJZ, QTHR. Tel 051-677 3179.
VT91 valves, four, or equivalent in good working condition, new if poss, will acknowledge all replies. BRS33179, 49 Widney Ave, Selly Oak, B'ham B29 6QE. Tel 021-472 4678.
QRP 1W or less 2m tx, tunable rx to go hiking in rucsack. G8ERQ, QTHR. Tel Harrogate 69801.
Hewlett Packard HP-35 pocket calculator, also main frame of Cossor CDH110 scope for spares. *For sale* Sharp EL-814 pocket calculator with memory. BRS3351B, QTHR. H. Richardson, 18 Forestdale, London N14 7DT. Tel 01-886 4186.
Transistor gc rx, good image ratio essential, G8DLQ, QTHR. Tel Medway 67211 weekends. "The services text book of radio vol 5 transmission and propagation." K. Beesley, G3XUE, Eliot College, Canterbury CT2 7NS.
SWL wants Eddystone 840C or 840A, state price and condition. G2BSU, QTHR. Tel 43063.
AM1OP portable version of Pye Cambridge, or any other high-band portable unit; 70cm converter and varactor tripler; aerial rotator. G8GHZ, QTHR. Tel Northampton 61794.

Contests calendar

12-13 January	—AFS (Rules in December issue)
12-13 January	—DL QRP CW
20 January	—432MHz SSB (Rules in January issue)
25-27 January	—CQ WW 160m CW
26-27 January	—70MHz Fixed (Rules in January issue)
26-27 January	—REF CW
2-3 February	—ARRL DX Phone
3 February	—144MHz Fixed CW (Rules in January issue)
9-10 February	—First 1·8MHz (Rules in January issue)
16-17 February	—ARRL DX CW
23-24 February	—REF Phone
2-3 March	—144MHz Open & SWL
2-3 March	—ARRL DX Phone
9-10 March	—BERU (Rules in November 1973 issue)
16-17 March	—ARRL DX CW
30-13 March	—CQ WW WPX SSB
23-25 March	—BARTG Spring RTTY Contest (Rules in December issue
30-31 March	—432MHz Open
7 April	—80m Low Power
21 April	—70MHz Open
4-5 May	—144MHz Open & SWL
25 May	—1,296MHz Open
26 May	—432MHz Open
1-2 June	—NFD
9 June	—70MHz Portable
15-16 June	—Microwave Field Day
22-23 June	—Summer 1·8MHz
6-7 July	—"Jubilee" VHF/UHF & SWL
13-14 July	—SSB Field Day
21 July	—432MHz Open
28 July	—70MHz Open
18 August	—144MHz QRP
7-8 September	—VHF NFD & SWL
15 September	—80m Field Day
5-6 October	—UHF NFD & SWL
5 October	—Start of 70MHz Cumulative
5 October	—Start of 432MHz Cumulative
19-20 October	—7MHz CW
2-3 November	—7MHz Phone
2-3 November	—144MHz CW
9-10 November	—Second 1·8MHz
8 December	—144MHz Fixed

For January **70MHz Cumulative Contest** rules see September issue.
For **432MHz Spring Cumulative Contest** rules, see January issue.

Looking ahead

4 January 1974—RSGB Presidential Installation, Bonnington Hotel, Southampton Row, London WC1.
6-7 April 1974—VHF Convention. "Winning Post", Whitton, Twickenham.

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- KW 103 SWR/Power Meter
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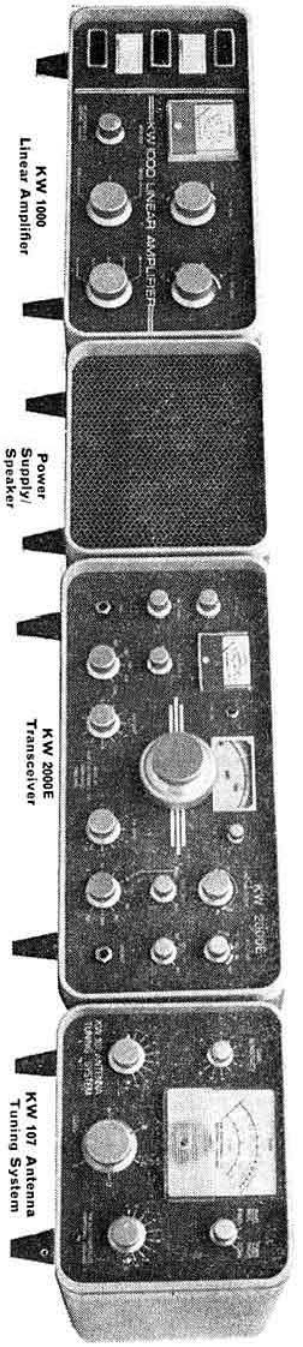

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Season's Greetings To All

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Most important is the surprisingly low level of spurious emissions which sets a new standard. This low level is achieved by very careful design and alignment and owners are most strongly urged not to attempt alignment without a laboratory spectrum analyser.

For the first time, here is a completely solid state, fully tuneable 2m SSB rig with an electronically protected PA at a reasonable price which truly performs with the utmost reliability.

SPECIFICATIONS

Frequency Coverage:	145·25–145·49MHz*
Final Input:	20W (10W PEP output)
Carrier Supression:	Better than —45dB rel. 10W
Side Band Suppression:	Better than —45dB rel. 10W
Spurious Emissions:	Better than —60dB rel. 10W
Audio Response:	300–2,700Hz (—6dB)
Selectivity:	2·4KHz (—6dB) ±3KHz (—60dB)
AF output:	More than 2W (built-in speaker 4ohm)
Mode of Operation:	SSB (A3J)
Antenna Impedance:	50ohms
Microphone:	600ohm dynamic
Receiving Sensitivity:	Antenna input 0·5 microvolt for 10dB S + N/N ratio
Image Rejection:	Better than 60dB
Power Source:	12–16V DC (NEGATIVE EARTH ONLY)
Current drain:	200mA receive 2·5A max transmit
Semiconductors:	27 transistors, 6 FETs, 1 IC, 44 diodes
Size:	220(W) × 70(H) × 250(D) mm
Weight:	3Kg

* Note that this coverage may be altered to any 240kHz within the band simply by altering the fourth oscillator crystal X12. As an optional extra we stock the crystal and perspex dial to enable coverage of 144·10 to 144·34MHz to conform with the I.A.R.U. Regional recommendation planned for 1975.

Price: Including microphone and bracket, spare d.c. power lead, mobile mount, spare dial lamp and fuse. **£132.**

Matching Mains Power Supply giving 13·8V DC. **£15**
Optional crystal and dial for 144·10 to 144·34MHz. **£4.40.**

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Speaker cabinet accoustic wadding, 12" × 2", **28p**/yd.
PL259 ptfe plugs 25p with reducer **31p** + 6p p.p.
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Nearly all components now available for this award-winning design for a portable 2m transceiver. Reprint of the original article—20p plus large SAE (included free in MiniKit 1).

P.C. Boards—Rx, 90p; Tx, 60p; 3 gang × 17pF, £1.10; Drive drum, cord drive spindle & tension spring, 45p; Trimmers—10pF, 10p; 35pF, 50p; 4mm formers, 4p ea or 35p/10; VHF cores, 1½p ea or 12p/10; Loudspeaker, 90p; IF Filter, 50p; Ferrite beads, 1p ea or 35p/50.

Above components available as MiniKit 1—Rx. £5.20; Tx, £1.60.

AC187, 26p; AC188, 23p; BA102, 29p; BC108, 12p; BC109, 16p; BC178, 17p; BC301, 35p; BD131, 42p; BD132, 52p; NKT279, 17p; 1N914, 6p; 1N4003, 9p; 2N918, 5Cp; 2N3553, £1.20; 2N3819, 30p; 40290, £1.40; 40673, 56p; Zener 6·8V, 16p; TAD100, £1.55. **All semi-conductors available as MiniKit 2—Rx, £5.00; Tx, £3.40; Modulator, £1.80.**

All resistors and fixed capacitors available as MiniKit 3—Rx, £2.20; Tx, 45p; Modulator, £1.10.

Special price for MiniKits 1, 2 and 3 if ordered together—Rx, £12.00; Tx, £5.25; Modulator (2 & 3), £2.90. (Modulator kits do not include PCB or transformers as many constructors prefer to use an i.c. amplifier.) Set of 10 NiCad batteries, £17 post free ! !

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NE562B	3·15	3·05	FM/FSK separate outputs
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LM380	1·30	1·27	National 2w/12V audio amp.
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LM309K	1·80	1·70	5V/1 amp. regulator
NE550A	·80	·76	Variable power supply i.c.
LM370	2·30	2·20	AGC/Squelch amplifier
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COMPONENTS

Assembled, all transistor, printed circuit boards, with circuits, and conversion data, if applicable.

FM (Phase mod.) RF driver board. Xtal osc., phase mod. (requires low-level audio) and multipliers. Suitable for AM or AM/FM tx.
Type A: 12MHz xtal input, 24MHz at ½W out. No mods required. **£4.85**
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AF board provides audio for phase mod. board also audio preamp for Rx New **£1.85** Good used **90p**

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0·15 pitch 21 way + key, closed ends. 0·1 pitch 31 way + key, open ends. Gold plated contacts. **15p** each, any 8 for **£1.**
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Reed relay coils to match above, 24V (2·5k res.) **15p** each, 4 for **50p**

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With 12V start relay, **30p** extra. Ideal for HW-17 or Tx with QQV03-20A pa
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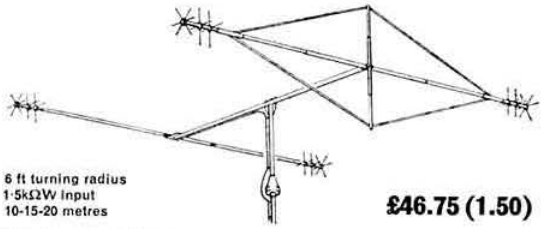

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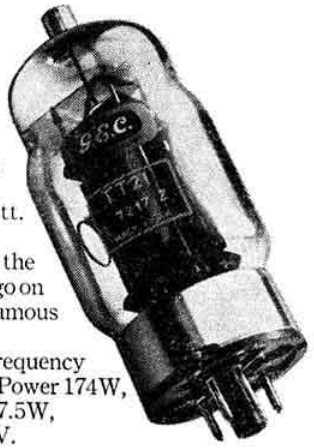

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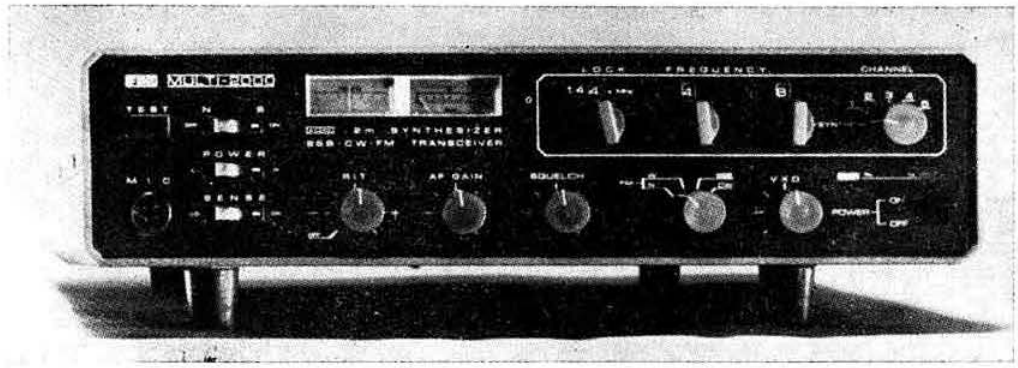

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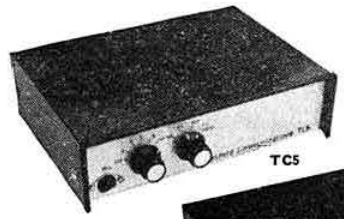

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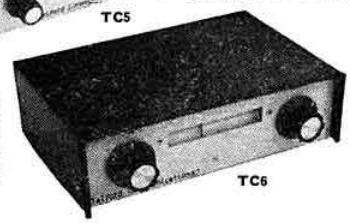

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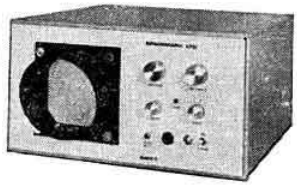

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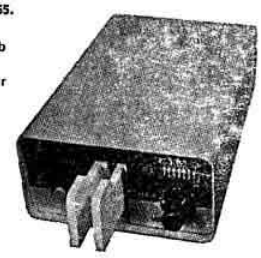

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