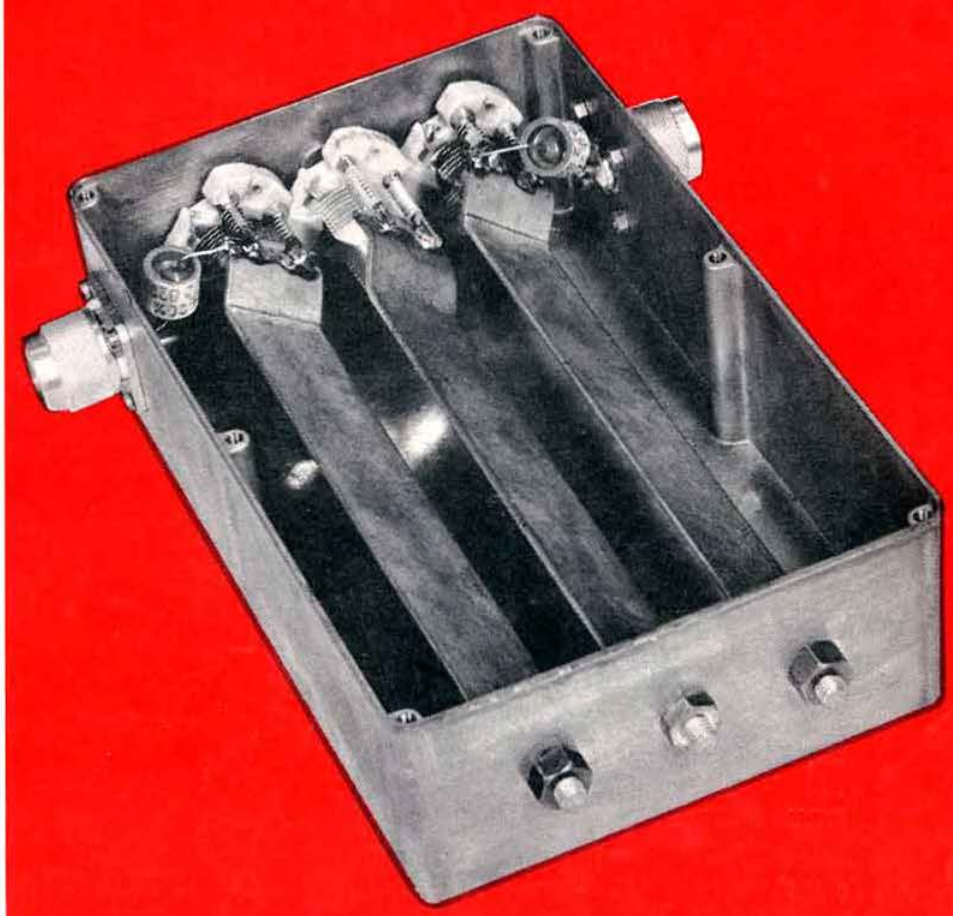
JULY 1969

RADIO COMMUNICATION

Included in this issue



vhf · uhf strip line filters — page 460

Journal of the Radio Society of Great Britain

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EDDYSTONE 770U/2 Receiver, 150-500 MHz ...	125	0	0
COLLINS 30L Linear	200	0	0
SOMMERKAMP FR 100B	95	0	0
HEATHKIT HP-24 AC Power Supply for HA-14 Linear	45	0	0
AR 88D with S Meter	45	0	0
PYE RANGERS. Low-Band for 4 metres, unmod. with mic.	15	0	0
TW -4, 4m Converter	10	0	0
CREED 445 Morse-Perforator, 230 volts	10	0	0
B-40 Receiver	20	0	0
TIGER TR-60 Transmitter. AM/CW, good order	20	0	0
PYE MARINE TX/RX PTC 791. 8 Crystal control channels with about 14 crystals. 24V Power Supply. Charging panel and Ballast Resistor. Including Handset	60	0	0
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LOWE ELECTRONICS

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And lo, there will be a wailing and a weeping and a gnashing of teeth (and them with no teeth will gnash their gums), Sommerkamp have standardised the FR-500. No more optional extras. In many ways this is a very good thing —I hate this business of a basic price and then "two-bitting" you to death with extras you just have to have. Now you get the optional extras as standard (and you have to pay for them!) The standard FR-500 now has:

1. All xtals fitted.
2. FM discriminator fitted.
3. 2m converter fitted,

and the price is £160.0.0. If you happen to be a VHF man and want 2m plus FM, you are indeed chortling as the options under the old system would cost you more than £160.0.0. If, on the other hand, you don't want 2m and the thought of FM makes you puke, then things are indeed tough. (Never mind, buy an Inoue instead!) Anyway, there it is lads—the factory have decided to standardise (increased efficiency and that jazz) and so some people gain while others lose. From the flogging point of view it is of course, much more attractive to quote a basic price then gently, in small print, mention all the optional extras, than to include the extras and give the true price, but if it's any consolation the extras are worth more than the increase in price, so the FR-500 is STILL top value. Mark you, Twain, I will be the first to admit that, at first glance, one hundrd and sixty nicker is enough to shake the stoutest heart, but all I can say, Gentlemen, is look a bit beyond the price and see what you get for it. I myself am a bit disappointed because I was really going to shout the odds about prices—prices going up left right and centre and yet we haven't increased a price since devaluation. Sommerkamp has to go and spoil it! Although, actually if you look closely it really isn't a price increase, but obviously most guys are going to look at the price, not what you get for it, so I'll shut up and not press the point!

Anyway, what else is new? Oh, yes, what about more expansion for Lowe Electronics—about time we sprouted a bit more. Alan Whitford, down in Polegate is doing pretty well, flogging away like mad. Incidentally he is moving any time so if you're going to visit him (evenings and weekends) it would be as well to check with me where he is. Anyway, for you lads in the deep south, he is happy to demonstrate all the stuff I flog. For you lads in the West we have just enlisted the aid of Vic Newport, G3CHW, 38 Huckford Road, Winterbourne, Bristol (Winterbourne 3086 or STD 04-547 3086). Now Vic, as you Westerners know, is a pretty genned-up kiddo when it comes to Electronics, so if you want to see the stuff I flog and play with it, trot along and see Vic. He one plenty busy fella though, so best give him a call first. Very handy for S. Wales too, being just off the M4, so no need for you Westerners to travel enormous distances to see the latest and best—Vic has it in stock and is ready to snatch the loot out of your hot, sweaty little palm. He will of course like Alan and me, have all the Sommerkamp line—FR-500, FL-500, FT-150, FT-500 and may possibly by the time you read this, have the FT-250. I have a few coming, but these have been snatched by the lads who know what's what, and I don't know when the next lot wil come, (anyway, I want one myself!) Also of course, the Inoue line—an excellent Rx (all transistor, bags of FET's, 9 mc/s xtal filter, AC or DC psu built-in) for £85.0.0. or the whole works, Rx, Tx and psu for £180.0.0. And of course, all the other stuff I flog.

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Katsumi EK-9X keyer, 5-30 w.p.m.	£7 15 0
Bug keys	£4 0 0
CW Monitor, the output relay has a spare contact for RX muting	£7 15 0
VHF/UHF 50 ohm dummy loads (new surplus)	£2 10 0

Tubular trimmers, either ½-5pF or 3-15pF 1/- each, 10/- doz. Feedthroughs 1000pF screw type, 1/- each, 10/- doz: disc ceramics, ·001 3/6d doz., ·01 5/- doz: Standard coax sockets, 1/- each, standard coax plugs 1/4d each. Plugs, (OCTAL, B7G, B9A) 2/6d each, Electrolytics, brand spanking new can types, complete with mounting clips, 100mF 350V, 5/6d each; 100-100mF 350V, 6/8d each: 100mF 450V 7/2d: 40-40mF 500V 7/3d; 100mF 500V 7/9d; 100-100mF 450V 13/2d; Silicon rectifiers, current manufacture, not surplus, not seconds, you can rely on these. SE-05 1000piv 500mA 4/6d, panel indicator lamps for standard lilliput bulbs, red or green, 2/6d each, switches, jack plugs, miniature tantalum electrolytic ¼W sub miniature metal oxide resistors, etc. PL259 plugs 5/0d each, 100kHz crystals, series resonant, very accurate to mil. spec. £2.0.0. 300 ohm ribbon, 6d yard.

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All the lovely new stuff can also be inspected at Alan Whitford's, G3MME, 37 Chestnut Drive, Polegate, Sussex. Telephone No. Polegate 4659, evenings and week-ends, or Vic Newport, G3CHW, Huckford Road, Winterbourne, Bristol, Winterbourne 3086, STD 04-547 3086. for those who can't get over to Matlock. If you can't get over to either Alan or myself, send me a s.a.e. and I'll send you my latest lists.

Postage: Please allow lots for postage, we will refund any excess.

73, THE BANDIT,
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QTC

AMATEUR RADIO NEWS

IARC Convention

The 1969 Convention of the **International Amateur Radio Club** will commence on the evening of Friday, 12 September continuing until the afternoon of Sunday, 14 September. The technical sessions of the Convention will be held in the ITU building and the programme includes many well known speakers who will be coming to Geneva from other European countries and N. America. Particulars of registration for the Convention and further details may be obtained from the IARC, P.O. Box 6, 1211 Geneva 20, Switzerland.

Ashford Foxhunt

A foxhunt will be held at Ashford, Kent, on 27 July at 1500. This will be on two metres and the relevant map is OS 1 inch number 172. Full details can be obtained from G3EMU or G3TDP.

Shetland Islands 500th Anniversary

This year marks the 500th anniversary of the pledging of the Shetland Islands by the King of Denmark to the Scottish crown. To commemorate this anniversary there are several special events being held during the summer including an international exhibition with exhibits from several European countries. The recently formed Lerwick Radio Club will be putting on a special exhibition station for this event.

This will be the first special call station to operate from the Shetland Islands and it is hoped to have a distinctive callsign. The station will be active throughout the whole month of August with all bands from 160 to 10 metres, and possibly two metres being used on SSB and CW. There will be several operators working on a rota system during the operation. A special QSL card will commemorate all contacts.

RSGB Dinner Club

A meeting of the Dinner Club will be held at 7.30 for 8 pm on Friday, 18 July 1969. The venue, as always, will be the Kingsley Hotel, Bloomsbury Way, London WC1, about five minutes' walk from Holborn (Piccadilly and Central Lines) station. The meeting is completely informal and all members will be welcome. Overseas Amateurs who may be visiting London will find the occasion is an opportunity of meeting Society members. The cost of the dinner is 25s and bookings (accompanied by remittances) should be sent to Mrs M. Jardine at Headquarters. *see page 474*

Among the 42 members and guests attending the April Dinner Club meeting were June Harding, G3STS, WA5GLD, G2UV, G2IS, G3WRU, Mrs. Edwards and WA5GLC

Round-Britain powerboat race

Special telephone links will be provided by the Post Office for this event which starts from Portsmouth on 26 July. At each of the ten ports of call a control boat will provide communication facilities. For radio communication between the control boat and competitors the channel 2236 kHz will be used. This should ensure non-interference with the international distress frequency of 2182 kHz.

2m MOSFET Converter

It is regretted that three small errors appeared in last month's article by Arnold Mynett, G3HBW. In Fig 1b the resistor shown as 390 K ohm placed beneath the right hand Philips trimmer should be 220 K ohm. Similarly in Fig 2a, R11 should read 220 K ohm and so should the 390 K ohm resistor to the lower left of the right hand Philips trimmer.

TVI Lectures

A number of replies have been received to the notice that appeared recently in *Radio Communication* asking club secretaries to contact G2BVN. However, the clubs that would like to have a speaker on this subject are widely dispersed. Whilst it is hoped to arrange visits to certain clubs, the distances involved make other visits somewhat difficult. However as a partial substitute it is hoped to compile a tape/slide lecture on TVI which will be available to all affiliated clubs and societies.

Affiliated Societies

The following society is now affiliated to RSGB:

ST LAWRENCE'S AMATEUR RADIO CLUB. Secretary: W. F. Swain, BRS31270, St Lawrence's Hospital, Bodmin, Cornwall.

Area Representative

BLACKPOOL. (Re-election).

H. G. Newland, G5ND, 161 Penrose Ave., Marton, Blackpool, Lancs.

RSGB News Bulletin Service

There will be an alteration in news times for the London area, starting on the first Sunday in August.

The London Area VHF transmission, conducted on alternate weeks by G6OX and G3FRV, will be broadcast at 12 pm BST, instead of at the present time of 9.30 pm. It can be mentioned that we are most interested in any critical comments on the News Bulletin Service, both from the content and reception angles. If you have any ideas, send them to the General Manager at RSGB Headquarters.

Map for Predicting Beam Directions when using Auroral VHF Propagation

Geoff Mills, G3EDM, a Scientific Studies Committee member, is working on the possibility of producing a map to enable optimum beam aerial directions for two stations trying to establish contact to be predicted to make maximum use of auroral vhf propagation conditions. The work is at a stage where some assistance from a mathematician well versed in three-dimensional trigonometry or similar techniques is necessary to bring the project to a satisfactory conclusion. It is subsequently hoped to evaluate the results on a computer. Anyone interested is invited to write directly to G3EDM at 47 Highfield Road, Billericay, Essex.

Amateur Radio Kit Service

A most useful service to the home constructor has just been brought to our notice. A. C. Mansell, 46 Hedley Road, Woodley, Reading RG5 4JE produces special kits of parts designed primarily for articles in the amateur radio press. For instance, for our Snowflake Two Metre transmitter, £5 8s 9d will buy a special printed circuit board with turret lugs attached, plus all capacitances, all inductances except the modulation transformer, 2N1613 and 2N2218 transistors and a crystal holder. A crystal and special metalwork are available at extra cost. Listed are complete or partial kits of parts for a dozen projects from Radio Communication and QST with several more in the offing. It is suggested that those interested write to Mr Mansell with an sase for his latest list.

URE Convention

Those who want to combine an exotic holiday with an amateur radio convention have an ideal opportunity this September. The Spanish Amateur Radio Society, Union de Radioaficionados Espanoles (URE) are holding their Third International Convention at Tenerife in the Canary Islands between 12 and 17 September, 1969. A really fabulous programme is arranged over the long weekend, starting with a reception by the Governor and ending with a grand dinner.

It seems that there will be special airline rates to get to Tenerife and it is suggested that those interested contact Thos. Cook and Son to enquire about these.

It is strongly recommended that those interested immediately contact EA8AH, D. Jacinto Casariego Caprario, Delegacion Provincial, Union de Radioaficionados Espanoles, Apartado Postal 215, Santa Cruz de Tenerife, Islas Canarias, Spain.

International London Electronic Components Show

The 1969 RECMF/ILEC Show, held at Olympia in mid-May, showed primarily the enormous advances that are taking place in miniaturization. Nowhere did this object come across more clearly than in the lengths of the receptionists' skirts. They lowered your resistance by several orders of magnitude.

The greater part of this exhibition was on a scale above amateur radio, since this is now the main airing for the electronics industry in this country. Nevertheless, much was of direct relevance to amateurs, especially in the semi-conductor field. ITT had a highly impressive display of their products and it was infuriating to see all those unobtainable transistors sitting pretty in perspex and polystyrene. Cathodeon had an especially attractive display but it is hardly surprising that Plessey and Marconi had the most cavernous stands. The former had a mouth-watering line-up of Garrard turntables while Marconi's included the extensive range of Eddystone receivers in their empire.

A number of familiar faces were seen. G5DJ was busy with BICC and G8DF circulated amongst the gleaming Imhof display. Alan Richmond, GC3ONJ, of Tektronix Guernsey, related how £20,000 worth of digitalized, decantroned, oscilloscoped, micro-circuited shf test gear had been dropped at London Airport. Remarkably, it still looked good.

BBC Radio Feature

Amateur Radio plays a large part in popular BBC Radio 4 programme "Home This Afternoon" on Wednesday, 9 July. There will be a large feature in the magazine-style programme devoted to many aspects of the hobby. Amongst those taking part will be RSGB President John Swinnerton, G2YS, Spen Valley Amateur Radio Society Vice-President Gladstone Law, Rev. Roger Davis, G3IUZ plus a number of well-known DX stations in on-the-air recordings. The feature will be written and presented by the Society's Public Relations Officer Mrs Sylvia Margolis. The time of the broadcast will be sometime after 4 pm on 9 July.

Components for the G3PDM Wattmeters

Following requests from several members, experiencing difficulty in obtaining some of the parts for the wattmeters and SWR meter described in last month's *Radio Communication*, the author has made up kits of the less readily available components. These include one ferrite toroid—Mullard FX1596—two 27 ohm 2 watt carbon resistors matched to one per cent, and three 15 K ohm 2 watt carbon resistors. These kits are available at 6s 6d each, post paid, from P. G. Martin, G3PDM, Oak Cottage, Witton Gilbert, Durham.

W1BB Lecture

The W1BB mk II lecture, entitled "DX-ing The Hard Way," is now in circulation in the United Kingdom. Arthur Robinson, G3MDW, brought back a duplicate set of slides from W1BB during his recent visit to the United States.

Silent Keys

It is with much regret that we record the passing of the following Radio Amateurs.

R. G. Stevens, G3KRV, of Taunton, Somerset.

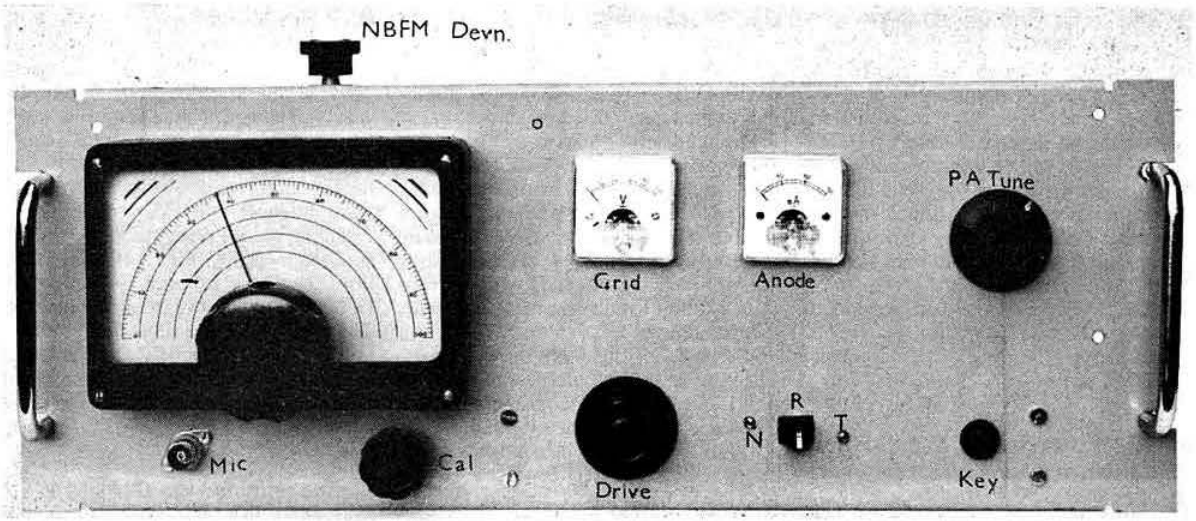
R. E. Sedgwick, G2BSN, of Chelmsford, Essex.

G. W. Theaker, G3JOH, of Goole, Yorkshire.

T. C. Wylie, G3MEF, of Barnstaple, Devon.

J. Robinson, G5UP, of Ashton-under-Lyne, Lancs.

J. Grogan, BRS30879, of Dundee, Scotland.



A VFO-Controlled 2m Transmitter

By G. D. EDDOWES, G3NOH*

VFO control on 2m is becoming more popular, and for those who have not yet made the change, the following is a description of a transmitter employing vfo control for use with cw, am or nbfm.

Circuit Description

The heart of the transmitter, the vfo, is made to the design by G3GFN (RSGB BULLETIN, March 1964). The output tunes 18·18 to 16·18 MHz and is fed by coaxial cable to a pentode buffer amplifier, V1, which provides adequate level for high-level mixing. The anode of this amplifier is resonated by L1 at 17·18 MHz, and is inductively coupled to the cathode of a double tetrode balanced mixer, V2, Fig 1. Bandwidth of this tuned-circuit is sufficient to provide output over the range of the vfo, without re-tuning L1. The frequency with which the vfo is mixed is derived from the oscillator and multiplier chain, a double triode, V5 and a pentode V6. V5a is a crystal controlled oscillator, its anode resonated by L10 to the frequency of the crystal, i.e. 27·03 MHz. V5b triples to produce 81·09 MHz in the anode tuned circuit, L11, C24. V6 then doubles to 162·18 MHz in the series tuned circuit, L2, C10, and is inductively coupled into the control grids of the mixer, V2, by L3. The tuned circuit, L4, C14, in the anodes of the mixer, selects the difference frequency of 145 $\pm$ 1 MHz. In order to provide rejection of unwanted mixer products, and to provide an adequate drive level, for the pa, the output of the mixer is inductively coupled into the grids of a double tetrode buffer amplifier, V3, whose anodes are tuned to 145 MHz by L6, C18. There is more than enough drive available to drive the pa into class C.

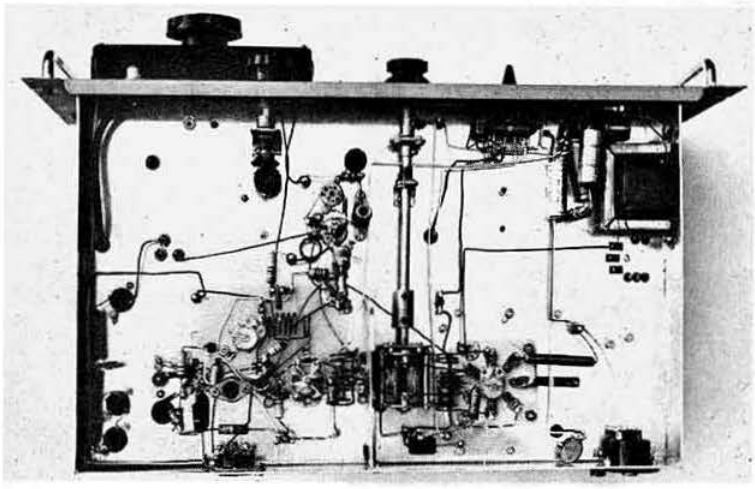
(The -22volt bias supply for V2 could be eliminated by inserting a suitable resistor in the cathode of V2 or "X").

Construction

Sound mechanical construction of the vfo is of the utmost importance, in order to obtain the required frequency stability, and every care should be taken to ensure rigidity of all the components, as well as securely soldered joints. The unit is built into an Eddystone die-cast box, 4½ in × 3½ in × 2 in, and good quality components are used throughout. C1, 3, 5 are silvered mica. All wiring associated with the tuned circuit is made with 14 swg copper wire. When the vfo was first constructed, it was found that the frequency jumped about 1 kHz intermittently; this was traced to the variable capacitor, C4, which was ex-equipment, and when replaced by a new item, the stability was then satisfactory. The choice of 6U8 affected the quality of the note; two out of four tried produced a T7 oscillation, so if this should happen, it would be well worth trying two or three others, before looking for a faulty component or supply. (I changed every component in the vfo until I was left with only the valve!) I have since been informed that this could possibly have been due to microphony. An OB2 is used to provide 108 volts, stabilized, for the vfo ht supply.

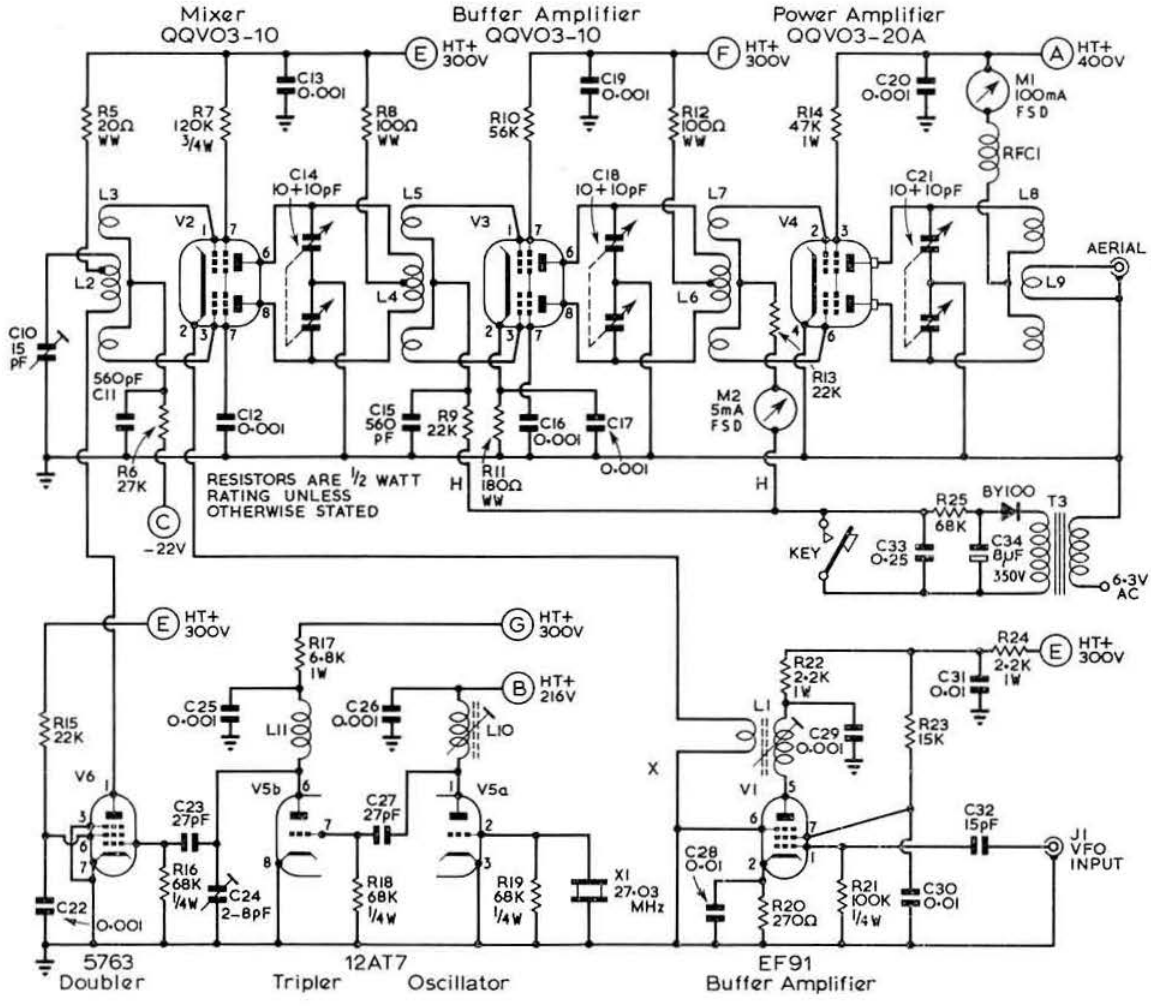
The general layout is shown opposite. It would be preferable to re-arrange V1, V5, V6, in order to provide a symmetrical grid circuit for the mixer, V2, but the layout adopted functions satisfactorily. (In the first instance, the

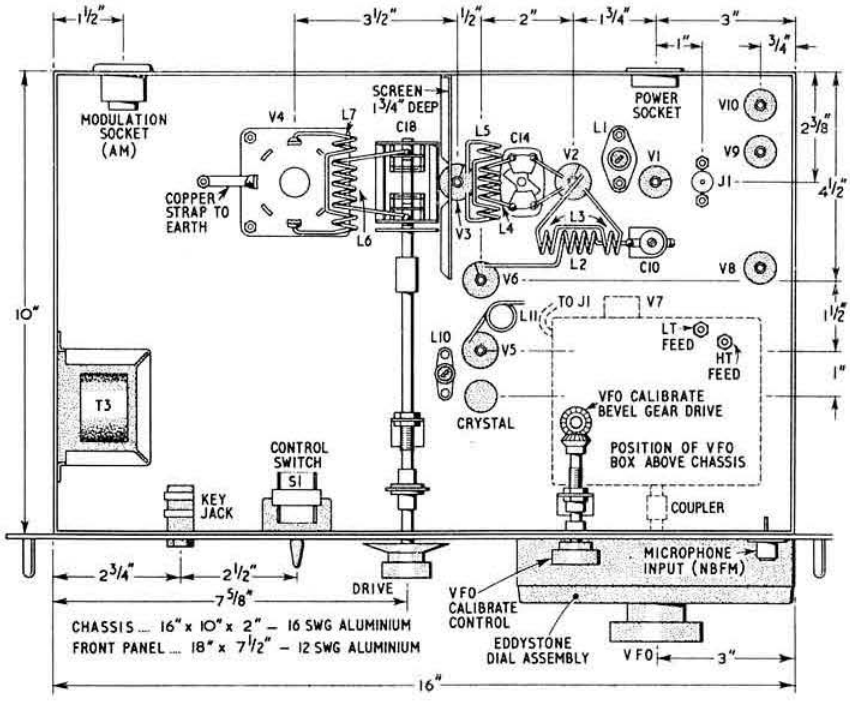
* 11 East Drive, Watford, Herts.



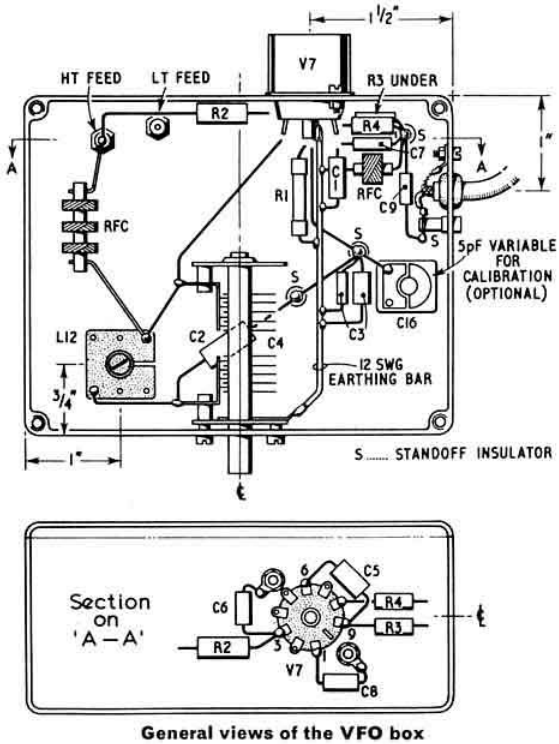
Underside chassis view showing layout of components

In this circuit C34 is shown inverted. The lower rail to which C34 is connected should also be earthed

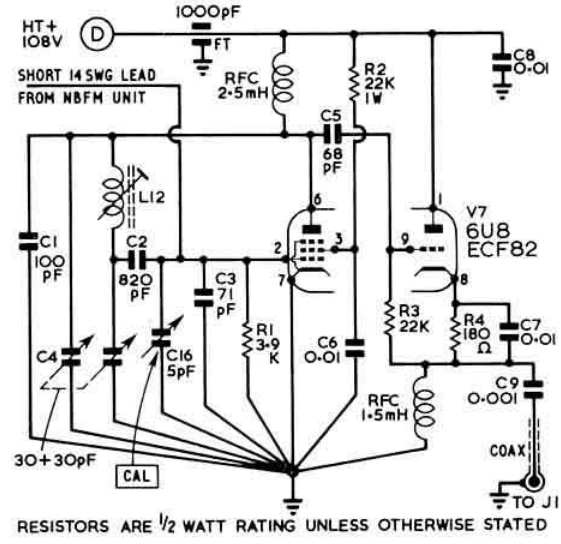




Under chassis layout



General views of the VFO box



Ed. Some reduction in the capacitance of C2 might contribute to stability—see G6HD's letter in RSGB Bulletin of March 1965

vfo output was applied to the mixer grids, but the mixer acted as a multiplier, and output was being obtained from the mixer without crystal controlled input being present. Hence the layout shown.)

The crystal oscillator is stabilized by two OB2s in series, as it was found that when switching on the supply to V1, V2, V3, V6, the voltage drop on the 300 volt line resulted in a slight frequency shift. The two oscillators run continuously to ensure maximum stability. The receive, net, transmit switch is a 3-way multi-contact type, but an ordinary rotary switch may be used.

A T9X note is produced using grid block keying of the pa and driver. If cw is not required, points H on the circuit diagram are connected to earth, and T3 plus its associated circuitry are not needed.

The small die-cast box attached to the vfo lid is for nbfm, and is constructed to the circuit in the *RSGB Radio Communication Handbook* (4th ed, p 9.43). The reports received indicate that the nbfm is of good quality, and it would appear that the circuit used for the modulator is a very good one.

The Eddystone vfo dial stands out from the front panel by 1 in, because the width of the chassis does not allow the vfo to be placed far enough back without the 6U8 coming very close to V1 and V2.

Only one control is needed to peak the drive to the pa and this is in the anode of V3, the previous tuned circuits being preset. The pa anode tuning is brought out to the front panel by using two 45° bevel gears.

A coaxial relay is included on the transmitter chassis. The type used is a 24 volt Londex, its coil being connected in series with the ht supply to V1, V2, and V6. On transmit, the relay is energized, but when S1 is in the net position, the relay coil is bypassed, making netting on an incoming signal possible.

Alignment

During alignment, the ht supply is connected only to the valve being dealt with and any previous stage(s). The vfo coil slug is adjusted to give 17·18 MHz with C4 at mid-capacity. The swing will then be about 160°, for coverage of 144 to 146 MHz. Remember, that as subtractive mixing is being used, 144 MHz will be produced when the vfo is set at 18·18 MHz. The anode coil of L1, V1 is resonated at 17·18 MHz.

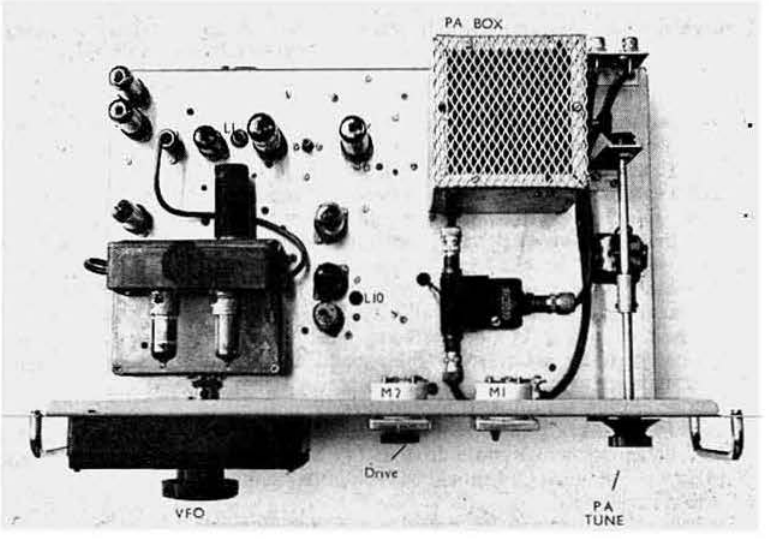
Check that the crystal is oscillating on 27·03 MHz by listening on a receiver, and then tune the anode coil, L10, for maximum drive into V5b. C24 then tunes L11 to 81·09 MHz and finally, C10 is tuned to give 162·18 MHz into the grids of V2. Each stage of multiplication must be checked, using a sensitive absorption wave-meter. There should now be 162·18 MHz at V2 grid, and 17·18 MHz at V2 cathode.

Coil Details

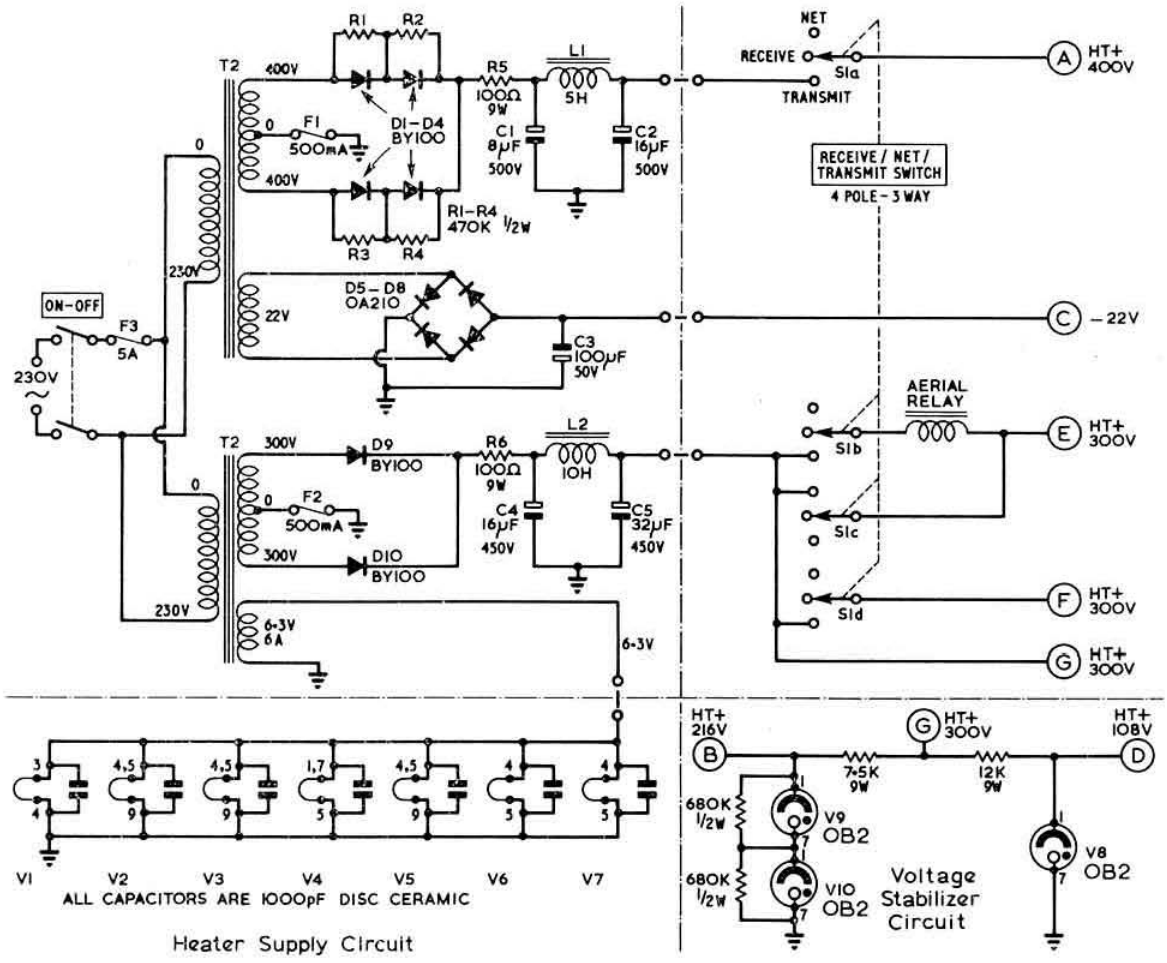
L1	14 turns close wound. Coupling winding 5 turns close wound over cold end of main winding. $\frac{9}{16}$ in dia former with slug. 24 swg enamel.
L2	4½ turns, 18 swg enamel, ½ in dia, spaced to ⅜ in long centre tapped.
L3	2 + 2 turns, 18 swg enamel, ½ in dia, ¾ in gap between sections, centre tapped.
L4	4 turns 18 swg enamel, ½ in dia., spaced to ¾ in long centre tapped.
L5	As L3.
L6	5 turns, 18 swg enamel, ½ in dia, spaced to ¾ in long centre tapped.
L7	As L3.
L8	3 + 3 turns, 14 swg tinned copper, ½ in dia, ½ in gap between sections centre tapped.
L9	2 turns, 20 swg pvc insulated ⅜ in dia.
L10	12 turns, 20 swg enamel, ⅜ dia former with slug. Close wound.
L11	4 turns, 18 swg enamel, ½ in dia, spaced to ½ in long.
L12	15 turns, 20 swg enamel, close wound, ¼ in dia former with slug.
RFC1	19 in 24 swg enamel, close wound, ¼ in dia former.

Valve Complement

V1	EF91, 6AM6	V5	12AT7
V2	QQV03/10	V6	5763
V3	QQV03/10	V7	6U8, ECF82.
V4	QQV03/20A	V8, V9, V10.	OB2



The above chassis view of the transmitter. The vfo and nbfm module can be seen



Here is a suitable power supply unit. If a transformer giving 22V is not available, a battery may be used, or a voltage doubler working from a 12·6V winding

C14 is tuned for output on 145 MHz. *Care should be taken to ensure that this output IS on 145 MHz and NOT on 162·18 MHz.* C18 is then peaked on 145 MHz. Ht should now be connected to all stages except the pa. All the previous adjustments are now repeated to peak the pa grid current to about 4 mA. If this figure is not achieved, adjust the spacing of the turns on the grid coils L3, L5, L7. The vfo is then set at approximately 17·88 MHz (144·2 MHz), and C18 adjusted for maximum grid current. Next, adjust L5 for maximum grid current by closing or opening turns. Set the vfo to approximately 16·38 MHz (145·8 MHz), and again peak C18. L7 is now adjusted for maximum grid current by opening or closing the turns. It should now be possible to obtain at least 3mA of grid current at any setting of the vfo. If it is found that there is more drive at 144 MHz than at 146 MHz, or vice versa, C14 should be re-adjusted in favour of the lower reading.

The ht to the pa may now be applied, and output obtained into a dummy load. Check that the output is only on 2m by the use of a sensitive absorption wave-meter.

Calibration

This is carried out when the transmitter has been switched on for an hour or so. The crystal frequency is first of all measured accurately using a BC221, and the output on 162·18 MHz found by multiplying the figure by six. Set the calibration capacitor C16 to half value, and using the BC221, set the frequency of the vfo to that which will produce, when mixed, the frequency of a beacon that can be received in the 2m band. (This will enable a check to be made on calculations.) If all is well, the remainder of the dial can be calibrated; it is desirable to mark, in red, the guard channels between 144 and 145 MHz.

Continued on page 455

Book Review

THE RADIO AMATEUR'S HANDBOOK (46th edition: 1969). Revised by ARRL HQ Staff; 657 pages, copiously illustrated. Price 52s., postage paid, from RSGB Publications.

The ARRL Executive Committee in 1925 directed its Communication Manager, Mr F. E. Handy, to produce a small manual of amateur operating procedure. It was thought desirable to include some technical information, and it was published in November, 1926. This was the first Handbook; only 5000 copies were printed, and it sold for $1. It was an instant success, and since then it has been published continuously. More than 4 million copies have gone all over the world, into the hands of scientists and professional engineers as well as radio amateurs, and its 46th edition is now available. What is new in it this year?

Once again the development and increasing use of semiconductor devices is reflected in almost every section of the new edition. The treatment is thoroughly practical but sound and up-to-date. If, for example, the subject is mixers, one finds—alongside the theory of operation—typical pentode, pentagrid, beam-deflection tube, bipolar transistor, JFET, and dual-gate MOSFET circuits, with device number and component values specified.

The qualitative operation of circuits and devices is always described clearly, and with only such reference to "theoretical" considerations as may be necessary for good understanding and proper operation; in this way mathematical analysis is avoided while explaining fundamentals, and giving a good picture of modern practice.

The alterations and additions to the explanatory theory chapters are too numerous to list, but especially one notices the Zener-regulated dc filament supply to improve oscillator stability, transistor oscillator circuits (bipolar, JFET, and MOSFET); half lattice, double half lattice, and mechanical filters in receivers; the T-Notch filter; valve and transistor squelch circuits.

In "receiver construction" there is an FET preselector for 20, 15, and 10 metres; a simple beginner's receiver using an FET as oscillating detector, and an IC as audio stage; a Mighty Midget receiver using 3 dual valves in a 6-valve mains superhet circuit on 80 and 40 metres. There is an advanced 6-valve receiver which is fundamentally an 80 metre one, which uses crystal controlled converters to cover also 40, 20, 15, and 10 metres: it is based on the W1DX HB-67 receiver.

The transmitter side has a new one-valve crystal controlled transmitter for 80 and 40m; a general purpose transistor VFO with buffer stage; a QRP phone/CW rig for 160 metres; also two linear amplifiers and a compact grounded grid amplifier, all for high power.

Audio amplifier theory now covers the several types of transistors in speech amplifiers, microphone circuits, phase-inverter circuits, compressor circuits, and clippers; the construction of an 8 watt transistor modulator is described.

Control-grid and screen-grid modulation are still described but only the latter is shown in circuit form; cathode modulation is absent.

There has been considerable reorganization and expansion of the SSB Phone chapter, and a revised treatment of balanced modulators of valve and transistor types.

There is a detailed description of a new 175 watt mechanical-filter SSB exciter; and a very interesting 2m ssb/cw transmitting converter for any 14 MHz ssb transmitter capable of about 20 watts, peak, output. It is followed, going the other way, by a transmitting converter for 1·8 MHz; it requires about 5 watts of drive for an input power of 35 watts, pep.

New items noticed in "antennas" were, an L-network coupler for end-fed wires; a windowsill aerial for the flat dweller; and a helically-wound short vertical aerial.

"VHF receivers" now has FET preamplifiers for 50, 144, and 220 MHz; a 2-stage transistor preamplifier for 1296 MHz.

"VHF transmitters" show a new 144 MHz exciter, and a resonant cavity amplifier for 432 MHz.

Another item which must be mentioned is a portable transceiver for 144 MHz. Built into a deed-box, it is really portable; it is powered by a 12-volt pack of flash-lamp batteries (or from an ac operated 12-volt dc pack).

An interesting instrument described is a band-edge marker using a 100 kHz crystal and an integrated-circuit dual flip-flop divider giving a choice of harmonics at 100-50-25 kHz intervals. But dare one wonder if anything could be more effective in taking the understanding and the pleasure out of reading circuit diagrams than the secrecy of the IC "black-box" symbol? This one has 14 connections, but from what?

This edition is a very worthy successor in the long line and perhaps the amateur needs a technical guide as never before: this one will not fail him. T P A

A VFO-Controlled 2m Transmitter

Continued from page 454

Conclusion

The choice of mixing frequencies is, of course, up to the individual; those used were selected in order to eliminate any TVI problems due to harmonic radiation. The only TVI experienced has been af breakthrough which can happen to any VHF transmitter. Some care is needed to ensure that not only TVI is avoided, but also no unwanted mixing takes place, producing secondary signals in addition to the wanted carrier.

Results on the air have been very encouraging, and the use of a vfo does save a great deal of time otherwise spent in calling a station, with crystal control. The vfo drifts about 1·5 kHz during the first 20 minutes after switching on from cold; after this initial drift, the stability is most satisfactory, no reports of drift having ever been received after the "warm up" period. No troubles have been experienced since the transmitter was built and it has been in regular use for about 11 months, including 24 hours non-stop operation on VHF NFD.

Anyone intending to build this design should realize that the utmost care has to be taken, to see that there are no emissions at the aerial other than the required frequency on 2 metres. The use of a filter in the aerial lead is a big help in this respect.

Some of the delegates at the Opening Plenary Meeting. Those seen are: YU1AF, Mr Goustov (USSR interpreter), UA3AF, RAEM, G3BVG, G6NZ, HB9RG, HB9DX, SM4GL and SM0BDS.

IARU Region 1 Brussels Conference

By ROY STEVENS, G2BVN*

THE eighth triennial Region 1 Division Conference was held between 5 and 9 May this year in Brussels. Previous Conferences had been held in Paris, Lausanne, Stresa, Bad Godesburg, Folkestone, Malmo and Opatija.

Of the 34 subscribing member societies 20 were represented by delegates and a further seven by proxy. The societies and countries represented were:

ARA	— Algeria	PZK	— Poland
ARAI	— Ivory Coast	RAL	— Lebanon
ARI	— Italy	REF	— France
ARM	— Monaco	RL	— Luxembourg
CRCC	— Czechoslovakia	RSF	— USSR
DARC	— Germany	RSR	— Rhodesia
EDR	— Denmark	RSGB	— United Kingdom
FRA	— Faeroes	SRAL	— Finland
IRTS	— Ireland	SRJ	— Yugoslavia
MARS	— Malta	SSA	— Sweden
NARS	— Nigeria	UBA	— Belgium
NRRL	— Norway	URE	— Spain
OeVSV	— Austria	USKA	— Switzerland

VERON — Netherlands

Also in attendance as observers were the President of ARRL/IARU, Mr R. Denniston; the Secretary of IARU, Mr J. Huntoon; the Secretary of Region II, Mr G. Reusens (OA4AV) and the Treasurer of Region II, Mr N. Eaton. Mr T. Robinson and Mr G. Lander were present as observers from the IARC.

* Conference Secretary and Secretary IARU Region 1 Division.

The Conference was held in the Hotel Metropole, located in the centre of Brussels. One of the leading hotels of the City, the Metropole can provide accommodation for up to 500 visitors. The rooms that were provided for the meetings of the Committees of the Conference ensured excellent working conditions. It is interesting to note that in 1911 the Conseil de Physique Solvay held a meeting in the Metropole and the distinguished gathering included such names as Madame Curie, Planck and Einstein.

Opening Ceremony

The Conference was opened at 10 am on Monday, 5 May, 1969 by Mr P. C. M. Bouchier, Director General of the Radio Communications of the PTT of Belgium. He spoke of his interest in the activities of radio amateurs, saying that they formed a valuable part of the world of radio communication. He urged amateurs to take part in scientific interests in addition to establishing long distance contacts.

The following persons were also present at the Opening Ceremony: Mr Grainson (representing the Minister of PTT), Messrs van den Bulke, Vermeylen and Dierickx, representing the Central Committee and the Council of the Red Cross of Belgium, Lt-Col Debruyn, representing the communications service of the Gendarmerie and Mr Pixon representing the Mayor of Brussels.

The chair at the opening ceremony was taken by Lt-Col P-A Kinnman in his capacity as Chairman of the Executive Committee.

An appreciation of the attendance and interest of Mr Bouchier was given by Mr Roy F. Stevens.

The Chairman of the Conference, Per-Anders Kinnman, SM5ZD, addressing the Opening Plenary Meeting. Also seen are members of the Executive Committee PA0DD, G2BVN and DL3NE.

First Plenary Meeting

At this meeting, held after the conclusion of the opening ceremony, Mr Per-Anders Kinnman paid tribute to the work of the late John Clarricoats, G6CL, the late Secretary of the Region 1 Division, and called for one minute's silence in his memory.

Mr Kinnman outlined the purpose of the work of the Conference and expressed his appreciation for the preparatory tasks that had already been carried out.

The Conference Secretary read a greeting from the South Africa Radio League and a letter from Mr J. Znidarsic, YU1AA, a member of the Executive Committee, who was unable to be present owing to illness.

It was announced that during the week before the Conference the Mauritius Amateur Radio Society had joined the Region 1 Division bringing the number of Subscribing Member Societies to 34.

The Chairman then called for nominations for the office of Chairman and Secretary of the various Committees. The following were elected:

Administrative and Operational
Chairman—Mr W. J. L. Dalmijn, PA0DD
Secretary—Mr Roy F. Stevens, G2BVN

VHF
Chairman—Mr C. J. van Dijk, PA0QC
Secretary—Mr F. G. Lambeth, G2AIW

Credentials and Finance
Chairman—Mr N. Caws, G3BVG
Secretary (ex officio)—Mr Roy F. Stevens, G2BVN
Messrs E. G. Ingram (RSGB)
U. A. Kluge (DARC)
F. Stoffel (OeVSV)
L. Vercruysse (UBA)

were elected to serve on the Credentials and Finance Committee.

The Meeting then considered proposals, which were adopted, concerning the election of the Executive Committee. Mr A. Deschodt, ON4AK, was nominated as Chairman of the Election Committee.

Social Events

Immediately after the opening ceremony the visiting authorities were invited by the President of UBA, Mr Deschodt, to a reception in the Hotel Metropole. During the reception Mr Bouchier was presented with a specially bound volume of the RSGB *Radio Communication Handbook*.

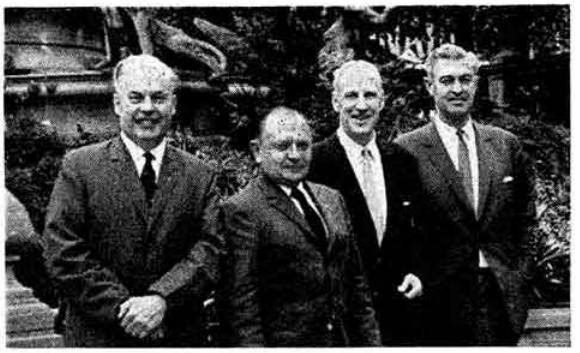
During the evening of Monday, 5 May, a reception was held in the Martini Club on the 29th floor of a modern building, a short distance from the Hotel Metropole. During the course of the reception the members of the Executive Committee and the national delegations were introduced to representatives of the sections of the UBA.

On the following evening (Tuesday) a reception was held in the Hotel de Ville (Town Hall) of Brussels. After the reception the visitors were shown through the magnificent rooms of this famous building.

During the afternoon and evening of Thursday 8 May, delegates and ladies participated in a visit to the historic town of Bruges. The visit, which was organized by the local section of the UBA, was made by coach and included a journey along the canals of the city which is known as the Venice of the north.

The End of Conference Dinner was held in the magnificent ballroom of the Hotel Metropole. During the evening Mr Deschodt, President of UBA spoke of the valuable work which had been accomplished during the previous days and

Three members of the RSGB delegation during an interval of a meeting of the Administrative and Operational Committee, G6NZ, GM6IZ and G3BVG.



Four of the members of the new Executive Committee of Region 1, (right to left) PA0DD (Treasurer), SM5ZD (Chairman) F3FA (Vice-Chairman) and G2BVN (Secretary). YU1AA and DL3NE are also members of the Committee.

expressed the hope that the visitors had enjoyed their stay in Belgium.

Replying Mr P-A Kinnman thanked the UBA for their hospitality, for their organization of the Conference itself and of the social functions and ladies' programme. He expressed the hope that delegates to the Conference would promote greater activity in IARU affairs from their respective National Societies.

Country	Society	National Licensed Members	Total Members
Algeria	ARA	26	—
Ivory Coast	ARAI	25	—
Italy	ARI	2500	4000
Monaco	ARM	19	22
Cyprus	CARS	14	—
Bulgaria	CRCB	406	—
Czechoslovakia	CRCC	1970	—
Germany	DARC	11,599	19,705
Denmark	EDR	2857	3900
Faeroes	FRA	55	100
Ghana	GARS	45	—
Ireland	IRTS	196	308
Malta	MARS	16	44
Mauritius	MARS	44	86
Nigeria	NARS	12	41
Norway	NRRL	1220	1484
Austria	OeVSV	1174	—
Poland	PZK	2141	—
Greece	RAAG	70	200
Lebanon	RAL	50	50
France	REF	2807	6512
Portugal	REP	250	—
Luxembourg	RL	87	134
East Africa	RSEA	50	113
USSR	RSF	5008	114,000
Gt. Britain	RSGB	7836	15,260
Rhodesia	RSR	133	209
Finland	SRAL	2000	2232
Yugoslavia	SRJ	5200	30,000
Sweden	SSA	2361	2867
Belgium	UBA	800	1200
Spain	URE	1068	2500
Switzerland	USKA	750	1413
Holland	VERON	1299	2900

Conference Comments

- Mr Andre Jacob, F3FA, President of REF, was elected Vice-Chairman of the Executive Committee. He replaces Roy F. Stevens, G2BVN, who now assumes the duties of Secretary of the Region 1 Division.
- The former annual contribution made by Region 1 Societies of 75 Sw. centimes per licensed member was reduced to 60 Sw. centimes. This move reflects the healthy financial state of the Division.
- The implications of the forthcoming Space Conference were considered and methods of representation discussed. A co-ordinated approach will be made by all Region 1 Societies for the extension of amateur space communication facilities.
- The RSF of the USSR believe that their authorities will agree to launch a satellite carrying amateur radio equipment.
- The IARU Region 1 booklet Amateur Radio has been published in English and French editions. Information about amateur radio to developing countries will be conveyed by articles, radio programmes and films.
- The activities of all Societies with an Intruder Watch are to be co-ordinated by the RSGB. The ITU will again be asked to give approval to the Region 1 Intruder Watch organisation.
- Revised Rules for European Foxhunting Championships were agreed.
- A group of 12 Societies expressed a desire to co-operate in the development of emergency networks. The RSGB will act as convenor of this group.
- Band Plan—portions between 3500–3510 and 3790–3800 kHz to be used exclusively for inter continental working.
- The World-wide Amateur Beacon Plan of DARC was approved, this calls for co-ordination in the setting up of beacon stations and the evaluation of results.
- HF Contests—An annual Region 1 IARU Contest will be held. This will replace a national contest in each year.
- An agreement was reached to further amateur radio interests of handicapped persons.
- VHF-UHF Band Plan. Amendments to this were agreed.
- VHF-UHF-SHF Contests. Alterations and additions were made to existing arrangements.
- VHF-UHF Certificates. The ARRL DXCC list will be used as a basis for claims.
- Certificates shall be issued on the basis of a signed declaration by a QSL or Traffic Manager.
- The Region 1 Bulletin is to be continued. Articles in languages, other than English, will be welcome.
- Representatives of IARU Headquarters (W0DX and W1LVQ) and Region II (OA4AV and VE3CJ) attended the Conference as observers.
- The next Conference will be held in Czechoslovakia during 1972.

The dinner was followed by dancing and the opportunity for informal talks between the visitors.

Committee Meetings

Meetings of the Administrative and Operational Committee (whose terms of reference include matters relating to the bands below 30 MHz) and the VHF Committee were held during the afternoon of Monday, 5 May and throughout the mornings and afternoons of the next two days. In addition, meetings took place of two ad hoc working groups concerning Foxhunting and HF Contests. A meeting of the Credentials and Finance Committee was held on 5 May.

The Recommendations and Reports of the three Committees were recorded in Conference documents which were presented to the Final Plenary Meeting on 9 May.

A detailed account of the work of the three committees will be given in the August issue of *Radio Communication*.

Executive Committee

At the Final Plenary Meeting the members of the Exeeutive Committee were elected as follows:

Chairman—Mr Per-Anders Kinnman, SM5ZD
Vice Chairman—Mr A. Jacob, F3FA
Secretary—Mr R. F. Stevens, G2BVN
Treasurer—Mr W. J. L. Dalmijn, PA0DD
Members—Messrs J. Znidarsic, YU1AA and Herbert Picolin, DL3NE

The Members of the Executive Committee will continue in their offices until 15 June, 1972. The committee meets at least once a year, and the venue for 1970 will probably be in the Netherlands.

Next Conference

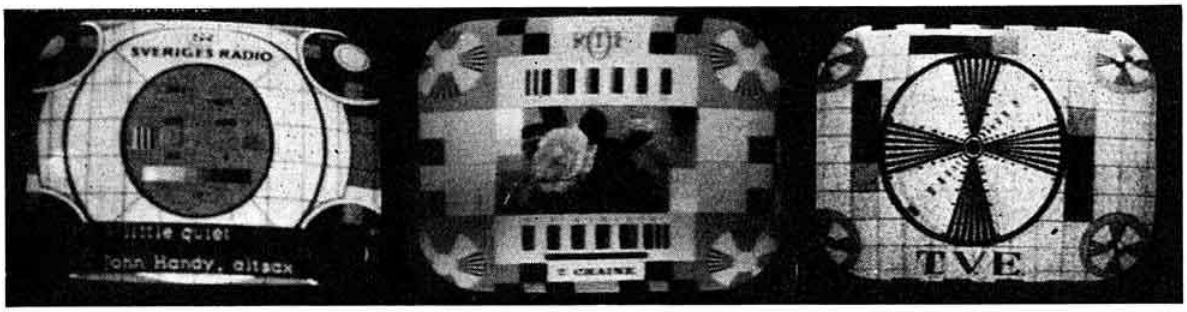
The delegation of CRCC, Czechoslovakia, offered the hospitality of their Society for the next Conference in 1972. This offer was accepted with acclamation.

DX TV

HERE ARE SOME EXCELLENT EXAMPLES OF LONG DISTANT TV RECEPTION

TOP ROW FROM DOUG BOWERS, BRS26760, 95 GRENFALL AVENUE, SALTASH, CORNWALL.

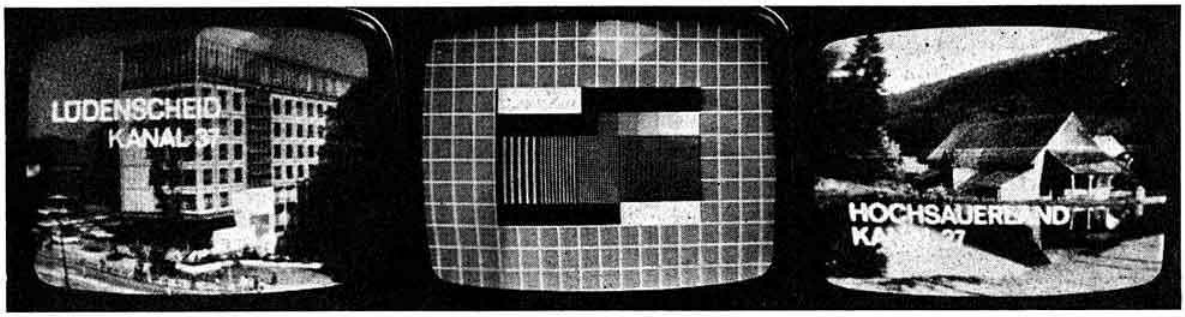
BOTTOM ROW FROM RICHARD FUSNIAK, G3TFX, 44 TENNISON ROAD, CAMBRIDGE, CB1-2DW.



SWEDEN: Channel E4-62·25 MHz received for 20 minutes.

FRANCE: Channel 21 UHF — Test Card, five minutes prior to evening programme.

SPAIN: Channel E3-55·25 MHz received for 2 hours, followed by programme.



GERMANY: Colour Channel 37, UHF.

HOLLAND: 750 MHz UHF.

GERMANY: Channel 27 UHF.

Simple Filters for Transmitters on 144 and 432 MHz

By G. R. JESSOP, C.Eng., MIERE, G6JP*

The use of filters in the output of transmitters has been advocated on many occasions, certainly on hf bands, but in recent times the need for these devices has been recommended for use on vhf and uhf bands.

SOME time ago some simple designs were described but these were of the single circuit type and mechanically large.

The filters described here are mechanically small and have adequate band-pass characteristics with low insertion loss for the bands concerned without need for adjustment. They will handle more than 100 watts output and can be built into a standard die-cast box.

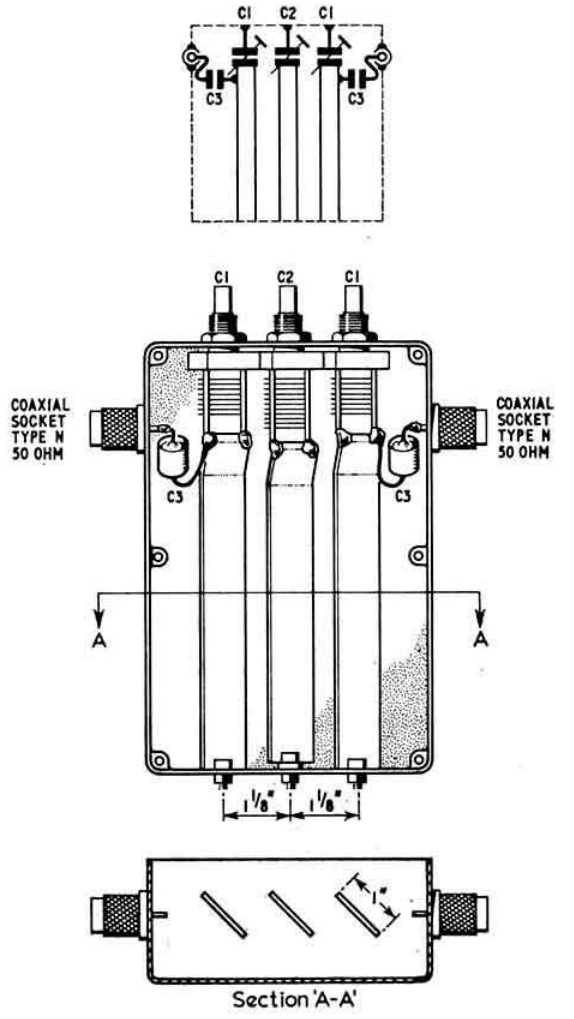
The arrangement is of three shortened strip lines tuned by capacitors at the top end, input and output coupling is through small fixed capacitors to the top end of the outer lines, the third (central) line is free and couples the input and output circuits.

The strip lines are made of 1 in wide copper and in order to get these large units into the box without over coupling they are set at an angle of 45 degrees (incidentally this angle will be provided naturally if the standard type of trimmer is used with the centres given). Fixing of the line to the end wall of the box is provided by 0BA brass cheesehead bolts with saw cut opened to allow the line to be brazed centrally to the end.

The top end of the line is bent to make contact with both the capacitor stator pillars, which are soldered directly to the line after assembly—a fairly large soldering iron will be needed for this.

Input and output capacitors are taken directly from the connectors to the top of the respective line. Setting up is straightforward provided an output power measuring device of some form is available. Initially C2 should be set near maximum capacity, this and the C1's are then adjusted for maximum output, taking care to keep the C1's value similar. If this is not done an asymmetrical response will result.

In the 432 MHz filter there is a response at 288 MHz, this is some 13dB down on the wanted frequency but it should be borne in mind in cases where this frequency is likely to appear in the transmitter output such as in the case of a Varactor tripler directly feeding the aerial.



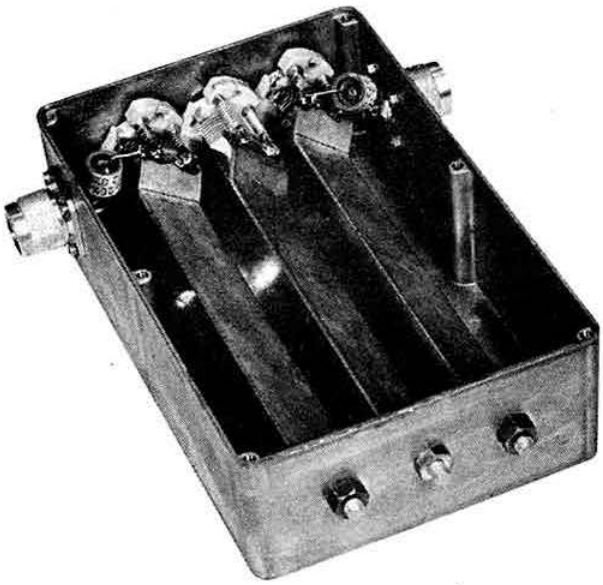
Mechanical layout and electrical circuit of the 144 MHz filter. For 432 MHz a smaller, 4½ × 3½ in box is used.

	144 MHz	432 MHz
Line length, inches	6⅛*	2½
Line size, inches	1 × 1/16	1 × 1/32
Line centres, inches	1⅛ in	1⅛ in
C1 pF (Jackson C804)	50	50
C2 pF (Jackson C804)	60	15–0·045 in spacing
C3 pF	5	5
Insertion loss, dB	0·6	1·2
Bandwidth, MHz	6	10
Out of band attenuation, dB	26	26
VSWR–50 ohms	1·1	1·1
Connectors	Type N	Type N

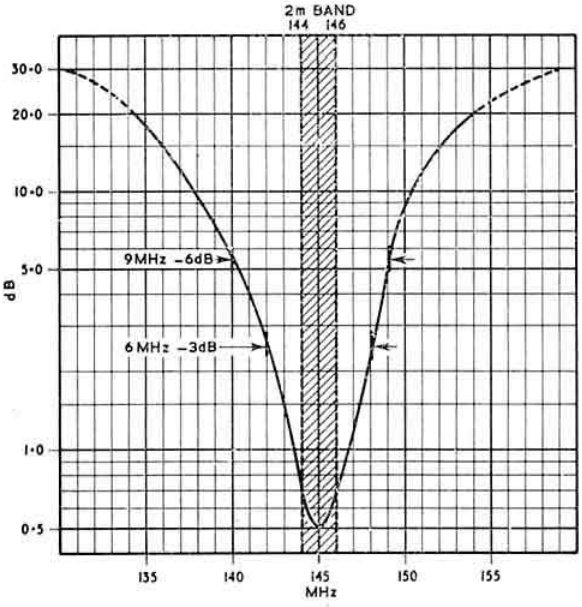
* Centre line approx. 3/16 in shorter to allow for rib in cast box and longer capacitor.

* 32 North View, Eastcote, Pinner, Middlesex. Member of RSGB Technical Committtee.

New Products



Layout of the strip line filter.



Performance curve of the 144 MHz strip line filter.

From the curve of the 144 MHz filter the insertion loss (at the band centre) is less than 1dB. On actual power measurement this was found to be a loss of approximately 10 per cent or 0·5dB which is a small price to pay for keeping your harmonics under control.

Although this filter is intended for use at 144 MHz the tunable range is approximately 130–175 MHz. Similar percentage tuning is of course available in the 432 MHz filter.

Towers and Masts

If your problem is one of supporting an aerial then it is probable that the newly established firm of **Western Electronics** can help you. In addition to being sole agents for the well known *Hamtower* produced by Francis and Lewis, *Teletowers* and *Telemasts* manufactured by Hills, a firm with a good reputation in Australia, will be available. The current range of towers produced in the USA can be supplied and especially recommended are the *Tristao* and *Tri-ex* towers. Prices of the Australian made towers are surprisingly competitive and the 57 ft winch-up *Teletower*, complete with rigging kit and guys is £83 (ex-Swindon). Proprietor of the new concern is well-known DX operator G3NMH and who better to evaluate the requirements of the hf bands operator. For full details and prices write to Western Electronics at 24 Hook Street, Hook, Swindon, Wilts.

A New Low Pass Filter

The elimination of television interference does not depend on any one factor but rather on a combination which in the aggregate will avoid this all-too-prevalent problem. One of the pieces of equipment which is regarded as essential in a modern amateur station operating on the hf bands is an efficient low pass filter. Miniature Electronic Developments have produced a filter which is available in three types: FL50A, 50 ohm impedance with Belling-Lee sockets; FL50B, 50 ohm impedance with SO239 sockets, and FL75A, 75 ohm impedance with Belling-Lee sockets. The passband of the filter is 1·8 to 30 MHz and the stopband is 41 to 70 MHz. The attenuation is of the order of 80dB on Band 1 television channels. The filter will handle maximum allowed input on all modes providing the swr is not greater than 2:1. Obviously an aerial tuning unit is highly desirable in order to give the filter a chance to achieve the performance of which it is capable. The size of the filter is 7″ × 2″ × 2″ and the unit appears to be robust and is of attractive appearance. The price of the FL50A and FL75A filters is £4 10s and that of the FL50B is £5. A modest investment when one considers the value of the equipment with which the filter will be used. The MEDCO filters are available from: Miniature Electronic Developments of 39 Rodney Road, Cheltenham, Glos.

Conversion of Circuit Diagrams to Veroboard, Tag-Board and Printed Circuit Layout

By A. T. Campbell, G3PEQ*

WE have all had the frustration of wiring up a circuit from a diagram, painfully trying to avoid errors and to miss nothing out. Then after a quick check through, the circuit has been connected to power—and it hasn't worked. Frequently more time is now spent in finding and correcting the fault than was occupied in the actual construction.

The method I am going to describe avoids all this. It enables the layout to be achieved automatically, except for printed circuit boards where a *little* thought is required. Checking is easy and thorough, and can be done systematically on paper without the need for poking about among a complex of wires and, according to Murphy's Law, missing the one thing one is looking for.

Normally one traces through a part of the circuit, taking the components involved one by one and connecting them, one hopes, to the right places. Let us forget all that, relegate the components to a secondary position, and concentrate on the junction points. We will illustrate this with a simple one-transistor amplifier which we will lay out for Veroboard construction.

Fig 1 shows seven junction points, for the negative and

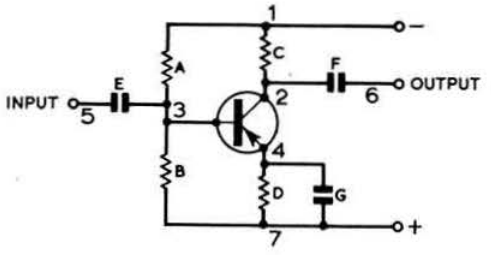


Fig. 1. A simple amplifier

positive lines can be considered as extended points, as shown in Fig 2. It does not matter how we number these points, except that it is advisable to number the leads of the transistor in the same order as they emerge from the case so as to avoid twisting them, with risk of breaking off or shorting when we insert the transistor. In the diagram I have not put in the value of the components, but have lettered them in order to make reference easier in the following descriptions.

After a little practice, you can now immediately wire up the circuit; but until experienced it is well to go through the following stages, first laying out on paper and then checking.

On a sheet of paper, draw seven lines, numbering them from 1 to 7 to correspond with the junction points of Fig 1 (see

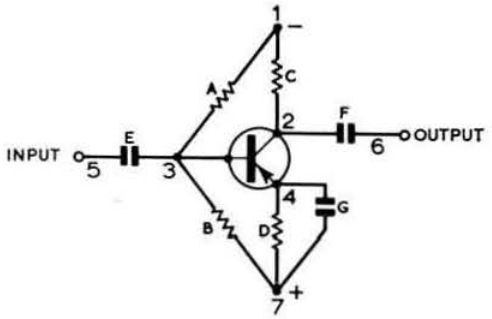


Fig. 2. Amplifier circuit redrawn to show positive and negative rails as points

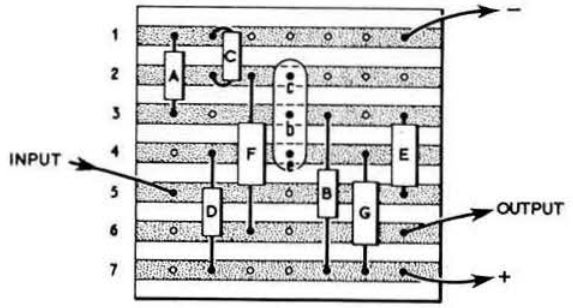


Fig. 3. Veroboard layout of the amplifier

Fig 3). Now proceed to draw in the components: you may do so in the literal order, A to G, to avoid the possibility of missing any; or, if you have any spatial imagery, insert them in the order which will waste least space, which is what I have done here.

Taking then the resistor A, we note it is connected between 1 and 3. Mark clear dots on lines 1 and 3, join them with the resistor symbol and label A (in practice, of course, with the actual value). C is connected between 1 and 2 in the same way, and the capacitor F between 2 and 6. Now mark in the transistor at 2, 3 and 4, indicating either the collector or emitter: if you have labelled the transistor leads con-

* 25 Woodsland Road, Hassocks, Sussex.

secutively you need label nothing else because the leads will automatically come in the right place. Similarly we mark in B, D, G and E and indicate four points for the connection of input, output and power. It does not matter, of course, at which end of the lines you mark these last four points: you suit your own convenience entirely.

The layout is finished: checking must begin.

Quick check. Count the number of components on the diagram and layout: if these do not agree, find the error. If they agree, refer to point 1. There are three connections at this point: there should be three dots on line 1. At point 2 there are three connections and again three dots; at point 3 there are four connections and should be four dots; and so on for the remaining junction points. This is a sufficient check in most circumstances, but you can, if you wish, proceed to the:

Certain check. Consider component A: one end is connected to C and the negative line; the other to B, E and the base of the transistor. Check that these connections actually take place in the layout diagram, and proceed to check each component in the same way; finally checking that positive and negative lines, input and output are correctly connected. If everything tallies, you cannot be wrong!

Cut a piece of Veroboard to size. Select the components required and check them thoroughly. This is a point often overlooked (through laziness!) and causes more trouble than anything else. You can spend hours looking for a wiring fault, when it is a component that is faulty, or wrong value. Resistors are easily verified with a test-meter, but if you have no method of checking capacitors, which are much more likely to be faulty, build yourself a capacity bridge: it will repay the time spent on it over and over again. Measure at least the forward and reverse resistances of the transistor diodes; but if you are using it in, say, a phase shift oscillator circuit, you must measure the gain also—a simple thing to do with a quick hook-up.

Having checked components, label the rows of Veroboard in some way to show the numbering. A strip of gummed paper may be stuck on, or a piece of Sellotape-X, or they may be marked with a reed pen or a grease pencil. Do not omit this, unless you are less fallible than I am! Now bend the leads to fit into the right holes, remembering that the vertical positioning of resistors is often a great help; clean the leads where they will make contact with the foil; bend them over; cut off, leaving about $\frac{1}{8}$ in of wire; and solder. Conclude by soldering in either pins or wires for the connections to power, input and output and mark them with a piece of gummed paper, grease crayon, or other means.

You have finished and YOU CAN'T BE WRONG!

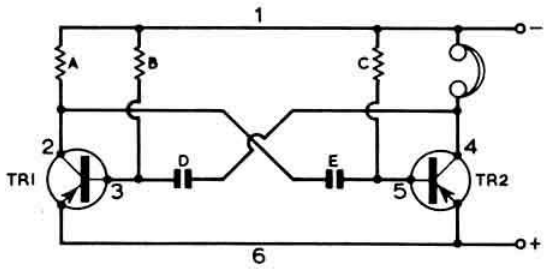


Fig. 4. A multi-vibrator as an audio oscillator

Now let us tackle a multi-vibrator used as an audio oscillator. The snag here is that as both transistors have a common connection to the emitter, we cannot number the leads consecutively; but we get over this by numbering the collector and base of TR1 as 2 and 3 and follow immediately with TR2 numbered 4, 5 and 6. Then the emitter of TR1 will also go to 6, the length of the leads normally being more than enough to do this. So Fig 5 becomes the layout of Fig 4.

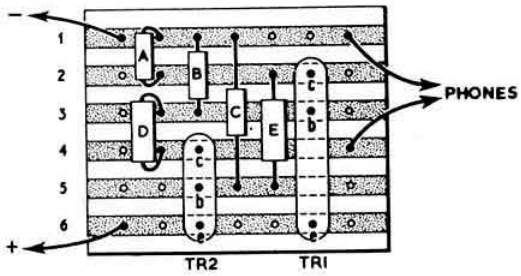


Fig. 5. Veroboard layout of the oscillator

In anything more complicated than these two simple circuits, one difficulty sure to occur is that the number of junction points is greater than the number of strips of copper available. To cope with this we break a number of strips at one or more points to provide the requisite number of connections, obviously choosing strips for breaking which have only a small number of connections going to them. If the strips are carefully numbered on the Veroboard, no difficulty in connection can arise. If much Veroboard work is done, a spot face cutter should certainly be acquired as it saves much work and makes a good job; but if this is lacking, a $\frac{3}{16}$ in twist drill rotated in the fingers will break the strip easily and cleanly.

It may be found advisable, in order to get a leadout in a more suitable position, to break a short strip where required for the lead-out and connect with a link of insulated wire to the point it derives from. The same method can be adopted if the lead of TR1 is not long enough to reach to strip 6. This, and many other useful dodges will quickly be realized as soon as you have laid out and built one or two Veroboard circuits.

I was so pleased with the above method of construction that I built several dozen small and large pieces of apparatus, quite satisfied that this was the ultimate in building methods. But gradually disadvantages from the experimenter's, rather than the builder's point of view began to appear. The experimenter wishes to change components to examine the effect of varying values, and to make measurements from different points of the circuit. Neither of these is easy with Veroboard construction. For these purposes, tag-board construction has many advantages; but in my opinion, it is ungainly in appearance; one seldom has the right size of group-board available; and connecting up and checking is a tedious procedure. The last of these difficulties disappeared on a little reflection, and an adaptation of the methods used for Veroboard made layout and checking completely straightforward: how to get over the difficulty of the awkwardness of group-boards?

The first approach was to drill paxolin sheet to take turret tags in the required positions and thus to build up a tailor-made group-board. The result was pleasing and satis-

factory, but time-consuming. The method I invariably use now is to build up my group-board with soldering pins on plain Veroboard, achieving quick construction and one which looks really well when finished and in which the components are more securely fixed whilst at the same time they can be easily removed and changed, and measurements are quickly made from any required pin.

The most convenient board I find is the Lektrokit Chassis Plate no. 4, LK-141, obtained from Home Radio at 3s each. These are approximately 5 × 4 in and contain 40 rows of 35 holes spaced $\frac{1}{10}$ in apart. Each will provide three 20-way group-boards or half a dozen or more smaller ones. The soldering pins are sold in packets of 100, their ordering number being LK-3011. The plate is most easily cut with a pair of side-cutters: if each edge of the plate is cut with them at the required spot, the whole separates neatly.

But let us first deal with the layout, then the construction. For convenience, we will use the circuit of Fig 1 for our design.

The first step again is to number the junctions, but this time we need pay no attention to the transistor leads, but may number them in any order we like. However, to save another diagram, we will use the same numbering already on the figure.

There are eight components, so we draw an 8-way group-board, as in Fig 6, and then draw in the symbols for the

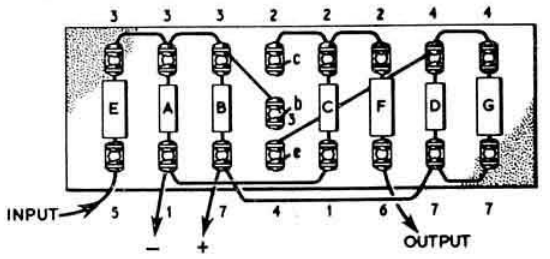


Fig. 6. The amplifier arranged for group board

components. It will ease wiring if we group together components connected to each other, so we begin with the components associated with junction point 3, where there are four leads connected. Note that it is perfectly easy to insert another pin for the base connection of the transistor, so we do so, offsetting the base pin towards the emitter to prevent error when we come to put the transistor into circuit. The top (or bottom) ends of E, A and B are labelled with their number, 3, and the other ends will be 5, 1 and 7 respectively, and the transistor 2, 3 and 4.

The other components are drawn in, keeping together so far as is possible those connected to each other, and numbering the ends in the way which seems likely to need least wiring. Follow all this in Fig 6.

The complications of wiring reduce to one simple rule: join all the corresponding numbers! I use a red pen for this, but I have no doubt it will be reproduced in black.

One thing remains to ease our work; take a piece of tracing paper and trace the tags and joining wires and then reverse the paper. This is how the wiring will appear on the back of our group-board.

Checking is as with the Veroboard. Take point 1, observe what is connected in the circuit diagram and check that they are all wired together on the tag-board. Checking each component similarly can be done if thought necessary, but it is a work of supererogation.

Take a piece of plain Veroboard and with the fingers insert the pins as in Fig 6. I leave one space between each pair of pins and seven spaces between the two rows, giving a width of 0·9 in, which is about right for $\frac{1}{4}$ watt resistors and miniature capacitors, but you may, of course, modify the spacing as you wish. Having inserted the pins, take a pair of small pliers and press them in firmly, keeping the heads at a uniform height above the board.

Reverse the board and wire up. Tinned copper wire 26 swg is just right for this: it is easy to work and sufficiently rigid for there to be no danger of the loops 1 and 7 touching each other if bent away in the first place. When there appears a danger of wires touching, slip a piece of sleeving over one of them.

If you are ultra-cautious, restore the board to its original position and with an ohm-meter check that the pins are connected as in Fig 6. This should reveal any dry joints.

Nothing remains now but to check all components (YES!) and solder them into position as in Fig 6.

The method is fool-proof—but I admit there are fools *and* fools!

I think one should refrain from connecting components across the board between separated tags, as is a very common practice, but there are times when a departure from this rule

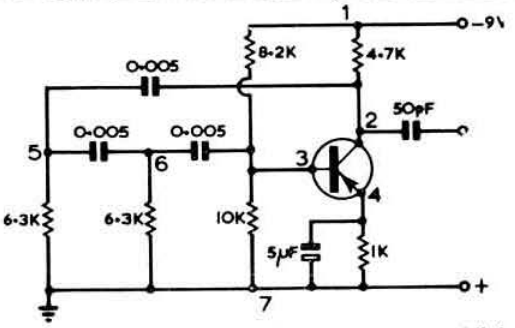


Fig. 7. A phase-shift oscillator. Unmarked units are kilohms or microfarads

can be advantageous. A good example is the phase-shift oscillator, Fig 7. Here connecting the two 0·005 capacitors between the ends of the resistors (see Fig 8) is obviously economical of space, time and wiring and by allowing two

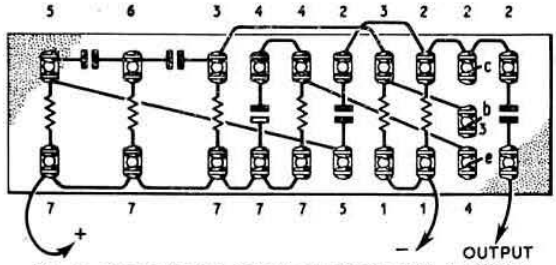


Fig. 8. Group board layout or phase-shift oscillator

spaces between tags 5, 6 and 3, instead of the usual one on the plain Veroboard, the fitting-in of the components becomes physically easy.

If you build this phase-shift oscillator, don't forget you *must* use a high-gain transistor to overcome the attenuation introduced by the three phase-shift circuits.

And so we come to what many regard as the ultimate in lay-out difficulty—the printed circuit. Using our methods, this involves no more difficulty than the other layouts, but does require a little thought and care in arrangement.

Turning again to our audio amplifier, Fig 1, we first evolve the tag-board layout of Fig 6. This obviously cannot be used as it stands for a printed circuit as two leads cross, but it is a simple matter to re-arrange them as in Fig 9, from which is immediately derived the printed circuit of Fig 10. Place a piece of tracing paper over Fig 10, trace it, reverse

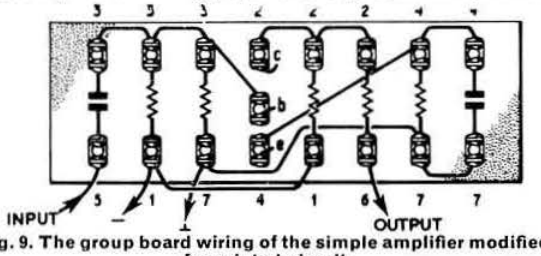


Fig. 9. The group board wiring of the simple amplifier modified for printed circuit

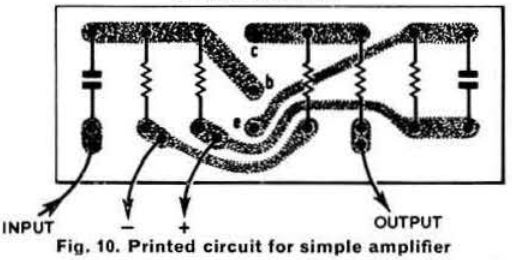


Fig. 10. Printed circuit for simple amplifier

the paper, mark through on to the copper foil of the printed circuit and you are all set for etching, drilling, etc.

Similarly the circuit of the phase-shift oscillator first becomes the tag-board of Fig 8 and is then easily transformed into the printed circuit of Fig 11.

With a complicated circuit you may easily find that the avoidance of crossing wires involves a complicated circum-

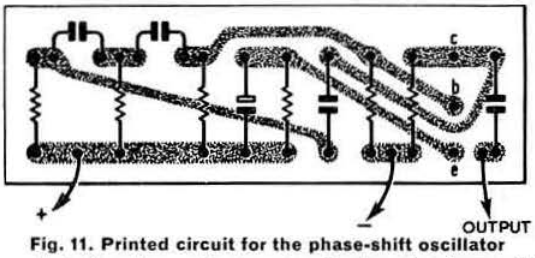


Fig. 11. Printed circuit for the phase-shift oscillator

perambulation all over the board, or is altogether impossible. This may be sometimes cured by a simple re-arrangement of the components; but a very simple, and always certain, cure is to solder a link of insulated wire between the two points to be connected.

Using the above methods, especially the first two, I find myself much freer to experiment when an interesting circuit swims into my ken. Unless it is complicated, I can have the circuit built and working in an hour—often in half an hour. I usually confine my construction now to the tag-board method, and if the finished item is not needed to be retained, the components are easily unsoldered and ready for use again, all leads cut to the right length, tinned and ready to be soldered directly into the next bit of equipment built.

TECHNICAL TOPICS

By PAT HAWKER, G3VA

SOMETIMES a new device, component or technique rapidly gains acceptance in amateur practice; while others, which initially may seem equally promising, tend to generate only a ripple rather than a tidal wave. It is still less than three years since, in presenting the first published FET front-end for British amateurs, the G3UMF design, we predicted that the emergence of the FET family of devices might prove to be the outstanding contribution to amateur receiver practice of the 1960s (*TT*, September, 1966). And the extent to which JFETs, MOSFETs, dual-gate MOSFETs now appear regularly in designs has fully justified this forecast.

On the other hand, linear semiconductor integrated circuits (SICs and LICs) and high-power rf transistors have so far made much less impact than might have been anticipated a few years back. In both these instances, the reason is basically a matter of cost; despite the steady reduction in price of such devices, it is still usually cheaper to use alternative methods of obtaining equivalent performance. There can be little doubt that rf power transistors remain the problem children of the semiconductor revolution, not only on account of cost, but also the technical problems posed by the low impedances, and their proneness to destructive instability. In the case of SICs, the main limitation is price; though, for some battery-powered applications, another problem is that total power consumption tends to come to more than with the fewer active devices of conventional construction.

SIC Transceiver

Yet, searching through many amateur journals, there is evidence that more and more designs are beginning to include at least some SICs. For instance, one feels that the complete audio package now possible using a SIC with built-in heat sink will soon prove an easy way of dealing with the post-detector sections of receivers. A good two-part article by P. W. Johnson, ZL4LV in *Break-in* (December, 1968 and January/February 1969) describes a number of tested circuits based on the RCA CA3020 and CA3028 LICs. It then indicates how these, together with 13 bipolar discrete transistors, can be incorporated into a battery-operated 500 mW 3·5 MHz ssb transceiver, intended to form also an exciter for higher power. Several CA3028 or CA3028A are used as balanced modulators/mixers and rf change-over switch, and the rather more complex CA3020 as the 550 mW linear amplifier. ZL4LV comments that, despite the small size of these devices, they are proving extremely robust and reliable, provided that maximum ratings are observed. With an hf balanced modulator (Fig. 1) he was able to obtain 40dB

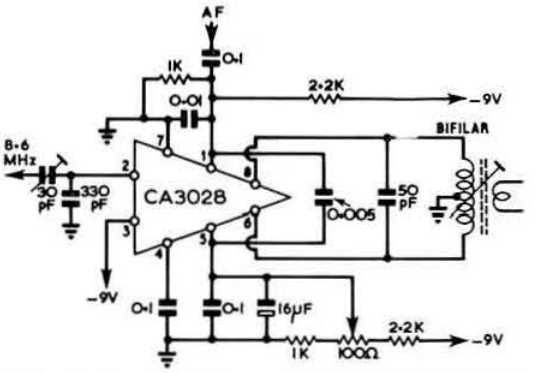


Fig 1. HF balanced modulator used by ZL4LV in his hybrid transceiver based on the RCA linear integrated circuit type CA3028 or CA3028A.

carrier suppression at 8·6 MHz, and 60dB at 450 kHz. A balanced mixer (4·1 MHz to 3·5 MHz) gave a vfo suppression of 58dB. As we mention later, W1CER has been investigating the RCA CA3028A and Motorola MC1550G as product detectors for direct-conversion receivers.

While the ZL4LV transceiver is clearly a useful pioneer exercise in the use of LICs, it is by no means certain that the integrated circuits make a unique contribution to such equipments, and at present one must be in some quandary as to the extent to which LIC circuits deserve extensive treatment in *TT*. Yet, there can be little doubt that the lower cost digital SICs (some of which can be used in certain linear applications as described from time to time in *TT*) are becoming useful in a variety of ways—not least in frequency calibrators and counters, frequency synthesizers and electronic keyers.

Line Output Valves as Linear Amplifiers

Colour television, with its requirement for line-output valves capable of providing high peak currents and appreciable deflection power, has proved one of the main providers of power amplifier valves for ssb operation. Such types as 6DQ5, 6GB5, 6GE5, 6JE6, 6JS6, 6KD6, 6LQ6 and the

European PL505 have frequently been used, though sometimes presenting UK amateurs with problems in obtaining replacements.

Some of the precautions which have to be taken to achieve long life with these valves have already been described in *TT* (November, 1965 or page 94 of *Amateur Radio Techniques*), but it seems well worth drawing attention to an article on this subject by Doug DeMaw, W1CER (*Old Man*, May, 1969 reprinted from *QST*, July 1968). In this he examines the factors involved in using four 6KD6 valves in a grounded-grid, parallel-connected, 800-watt dc-input linear, though the information applies equally to lower power stages.

In particular, he provides useful guidance on the question of parallel operation *without* using specially selected and matched valves to assure equal or near equal load-sharing. While the transmitter manufacturer can handpick and grade his valves before putting them into his equipments, the average amateur will not normally be able to do this (a fact which should be borne in mind when fitting replacements in factory-built rigs using more than one valve in the power amplifier).

W1CER suggests that this problem can be minimized by arranging for individual adjustments of bias to each valve in order to match the no-signal currents; he indicates that if this is done the dynamic track of the valves will usually be within 10 per cent up to maximum signal output. To facilitate such adjustments, he advocates fitting individual low-cost meters in the anode circuit of each valve (or alternatively being able to switch a single meter into each anode circuit). Further he stresses the point that bulb and anode temperatures are usually the limiting parameters with these valves, and that some type of forced air cooling will be advisable in confined spaces if maximum valve life is to be attained. Envelope bulbs should, if possible, be operated at temperatures well below the 225°C usually specified by the manufacturers. Anode temperatures above 500°C, which he says can easily occur with valves in compact transmitters not having effective cooling, have been shown definitely to shorten valve life.

Some details of the high-power linear described by W1CER can be gathered from the simplified circuit of Fig. 2, though it should be noted that for bands 14 MHz upwards,

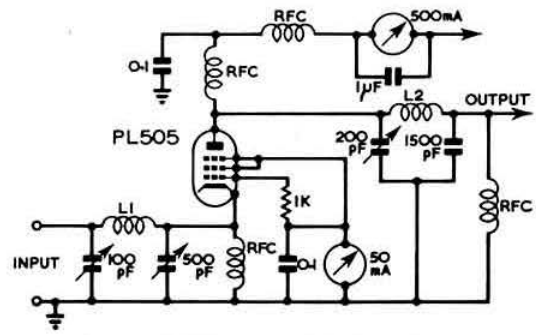


Fig 3. A single PL505 linear amplifier described by ON5JI.

Note: the usual 0·005 μf high voltage blocking capacitor should be included in the connection between the PL505 anode and LZ

bifiliar heater chokes are advisable. Because of the heater current rating (2·8-amp for each 6KD6), W1CER put his heaters in series and uses a 25·2V, 2·8 amp heater transformer.

If higher voltage heater transformers are available, it is possible to use the European PL505 with its 40V 0·3 amp heater for linear service. Ideas for a 3·5 MHz linear with input and output pi-networks are given in the January, 1969 issue of the Belgian *CQ/QSO* journal by ON5JI: Fig. 3. Operational details are given as: grid current 30 mA; anode current 250 mA; anode potential 450 volts.

RF Power Transistors

Today there are state-of-the-art devices such as the RCA TA2758 which can put out 85 watts pep at 30 MHz with a power gain of 13dB, or the ITT type 3TE610 for 100 watts at 150 MHz, and various devices capable of 20 watts at 1 GHz, and a promised 2 watts at 3 GHz by TRW this year. But these are expensive and often handle-with-care devices, few of which are likely to be found in amateur rigs. A useful review of the pros and cons of rf power transistors appears in *Electronics* (26 May) together with a list of trend setting types. But the article points out (and this is a comment one

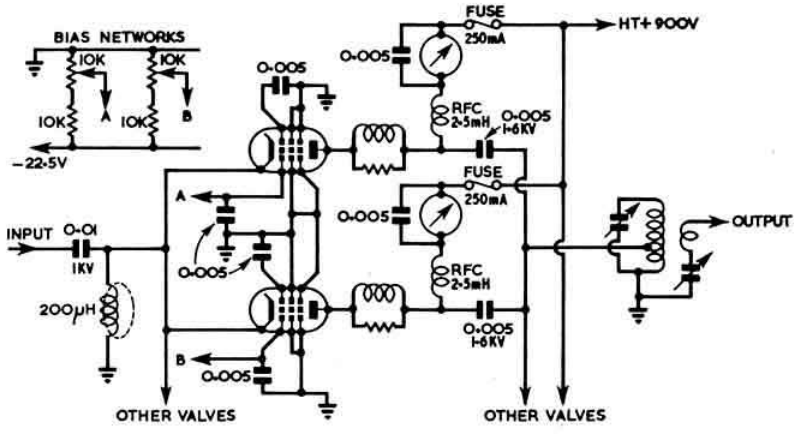


Fig 2. Simplified circuit diagram of the high-power linear amplifier using four 6KD6 line-output valves in parallel indicating the form of individual bias networks and the separate anode current metering.

often hears from equipment designers) that it is one thing for a semiconductor manufacturer to claim a high output figure, rather different in practice to achieve this in reproducible designs. Low impedances, low power gains, hot-spot problems, need for good aerial matching and relatively high collector voltages (28 and 40 volts, for example) still combine to make high-power mobile operation very much a matter of at least one old-fashioned valve. Despite all the progress in transistors over the past 22 years, their place remains usually in the exciter rather than the QRO power amplifier—and there seems no immediate prospect of any new breakthrough.

For those, however, interested in power levels of a few watts at vhf and uhf the situation is far better. A most useful article by RCA engineer H. C. Lee "Microwave power transistors" is published in *Microwave Journal*, February, 1969 (Ray Hills, G3HRH, kindly brought this to my notice), and much of the same information appears in *RCA Application Note AN3755* "UHF power generation using rf power transistors" (available from RCA Electronic Components, Harrison, NJ, 07029, USA). I do not intend to try to digest this long article here but rather to advise readers interested in this subject to refer to one or other of these documents. This really covers modern design practices for solid state power amplification on frequencies from about 450 MHz right up to 2000 MHz and the various types of transistor packages now being offered; there is also a useful section on microwave power oscillators and another on the use of quarter-wave hybrid rings to combine several individual amplifiers.

Copper and Iron—A question of Duty Cycle

One of the problems with transmitters intended to give equally effective operation on ssb, cw and rtty is the very different duty cycle of these three modes. One American firm (Herbert W. Gordon Company) specializing in the supply of older, reconditioned equipments, has recently been inserting advertisements pointing out that some present-day rigs, intended primarily for ssb, have cw facilities as something of an afterthought, and "fail to perform adequately on cw." If only equipment manufacturers, the message continues, would enlarge the copper and steel content of their power supplies, these problems would be minimized. Typical sideband rigs, it is suggested, have power transformers weighing only about 8 to 11 lb, yet they are expected to sustain up to 500 watts pep on ssb or 400 watts on cw. Is it any wonder, the copywriter comments, that cw performance leaves something to be desired . . . and even more so with rtty? The advertisement points out that rtty requires from a transmitter nearly 100 per cent duty cycle, cw some 45 per cent, and ssb (with its near pulse waveforms) only about 12 per cent.

This seems a valid point. But—in fairness to factory-built rigs—many of these, including some transceivers, do put out nice-sounding cw without any obvious sign of poor power regulation. With a hefty transformer, silicon-diode bridge rectifiers, and a generously sized reservoir smoothing capacitor, there is no real reason today for other than excellent power regulation. But it is worth remembering that ssb, far from being the most critical mode, is really by far the least demanding on power amplifier valves and power supplies, once the basic requirements for linear operation have been achieved. It is thus rtty or cw which should call the design tune.

Capacitor or Choke-input Smoothing?

On this subject, it is worth recalling that, in another publication, we once started off quite a furious argument by suggesting that too many designers are content to plod along "well-worn ruts" in continuing to use choke-input smoothing filters for high-voltage transmitter supplies, despite having changed to silicon diodes.

The main purpose of the traditional choke-input filter (which came into use in the early thirties) is in limiting peak emission of vacuum and gas-filled valve rectifiers; it has little value as a safeguard to silicon diodes which can usually handle repeated current peaks up to about 12 times rated average during short-duration charging surges.

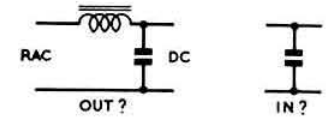


Fig. 4. Has the time come to abandon the choke-input smoothing filter for the capacitor input arrangement?

Excellently regulated supplies can be obtained with high capacitance electrolytics without chokes or bleeder resistors (though higher-value resistors are still valuable in discharging capacitors with the supply switched off) and with voltages which stay above 90 per cent of supply voltage peaks at all rated loads. Small surge-suppression resistors are normally fitted.

The swinging input choke, instead of assisting, may actually help destroy silicon diodes at their most sensitive characteristic—the peak inverse voltage rating—by setting up oscillatory voltage swings.

Not all designers accept this view that the choke-input filter has now outlived its usefulness—but it seems true to say that for most amateur applications capacitor filters are probably the better choice if silicon diodes are used. And for most purposes, the silicon diode string is a better and more economical choice than any alternative high-voltage rectifier.

MOSFET Product Detector and Direct-conversion

Interest continues in the homodyne, direct-conversion techniques; in the April *QST*, Doug DeMaw, W1CER, reviews a considerable number of basic solid state heterodyne linear detectors, including some based on SICs such as the CA3028A and MC1550G as mentioned earlier. He also provides a dual-gate MOSFET circuit which is basically similar to that reported by David Lovecock, G3WHC (*TT*, July, 1968). This circuit is shown in Fig. 5 and the comment is made by W1CER that signal isolation between the two gates is good, thus helping to confine the bfo signal to the desired part of the circuit. With this detector, it is claimed, a 0·5 μV signal produces a perfectly audible cw note at the output of the audio amplifier. Noise figure is reported as extremely low and conversion gain as good. The circuit is equally applicable to direct-conversion receivers or as product detector at the end of an i.f. strip. In the May *QST*, he gives full details of a direct conversion 3·5 MHz receiver (CA3028A detector, 2N3391A af, MPF105 oscillator) with plug-in FET converters for all other bands up to 30 MHz

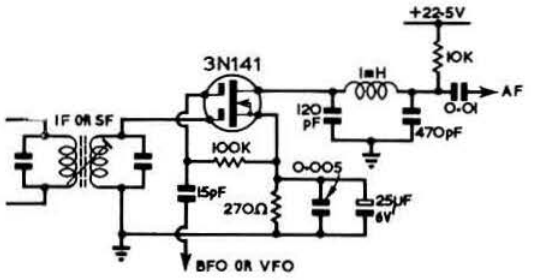


Fig 5. MOSFET heterodyne detector for use in conventional superhets or for direct conversion receivers.

and says "the operator of this direct conversion receiver will be hard pressed to tell this equipment from a conventional superhet as he scans the bands." Although the Americans took up this type of semiconductor receiver almost two years later than Europe (PA0KSB and *TT*) they are more than making amends by pursuing this low-cost technique now with tremendous energy.

VHF Transverters and Spurii—what the computer says

In view of the controversy about spurious mixer products when using vhf ssb transverters, some information from R. C. Marshall, G3SBA, is of topical interest. Recently he took advantage of finding a conversational computer on display at an exhibition to obtain print-outs of all mixer outputs in the form $mF_a \pm nF_b$ that lay between half and double the desired output frequency F_o.

Apart from thus checking out his own ssb transceiver, the computer was specifically asked to list spurii for 144 MHz transverters, using high and low conversion frequencies, from both 21 and 28 MHz transceiver operation. In other words, F_o is 144 MHz and four lists provide the following conditions: (1) F_a 21, F_b 123; (2) F_a 21, F_b 165; (3) F_a 28, F_b 116; and (4) F_a 28, F_b 172.

G3SBA notes that for both (3) and (4) (that is with the transceiver on 28 MHz) the lists show dangerous fifth-order products tending to move across the 144 MHz band as the 28 MHz transceiver is tuned. There are two of these fifth-order products for (3), one for (4), plus in this case a similar ninth-order product. No such conditions are found in the two 21 MHz lists (although we note that some fairly close-in out-of-band spurii could occur). G3SBA points out that the only measurements he has ever made on fifth-order outputs were from a double-balanced silicon diode modulator; these proved to be about 35dB down, which would not be satisfactory for in-band spurii. These results thus seem to indicate fairly clearly that it is better to start from 21 MHz than from 28 MHz.

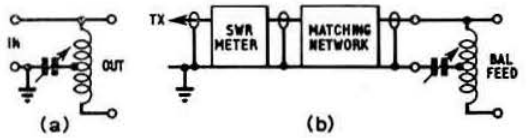


Fig 6. Resonant balun for feeding balanced feeders.

Simple Balun

In a letter to *QST* (April, 1969), old-timer Walter van Roberts, W2CHO/K4EA (whose part in the development of the Seiler oscillator we noted some years ago) draws attention to a neglected lumped-constant resonant balun—the Alford circuit. This he believes could usefully be revived to assist in changing from 50-ohm coax to open-wire or other balanced feeder lines.

The arrangement is shown in Fig 6 and consists of just one variable capacitor and a centre-tapped coil (or two equal inductively coupled coils). Since this is a fixed impedance arrangement, ideally it should be preceded by a matching network and swr meter, though one suspects that it might often be possible to use the Pi or Pi-L matching network built into the transmitter. The system is a bit more bother, in having to adjust for resonance and changing coils for different bands, than some of the wideband balun techniques, but it could still be a handy circuit to know.

Low-loss Cubicle Quad

Another article in the May, 1969 issue of *Old Man* (reprinted from *73 Magazine*) is one by H. A. Rideout, WA6IPD showing how lower losses in feeder lines to quads can often be achieved by using a folded driven element. This provides a feed point of 600 ohms impedance, which is reduced by the usual reflector loop to roughly 300 ohms, thus providing a good match to 300-ohm open wire transmission line having lower losses than the more usual coax feeder. In construction, 300-ohm open line is used not only for the feeder but also conveniently to form the double loop: Fig 7. WA6IPD notes that insulation will be required on the open wire line where it circumvents a rotator and also suggests that 300-ohm ribbon feeder should be avoided on account of its varying characteristics with weather, unless in a very dry site.

Fig 7. Folded driven element for quad aerials allows use of low-loss open line. Feed point impedance is reduced to about 300 ohms when a reflector loop is used.

Technical Topics Mark II

With restraint, I have resisted a temptation to suggest renaming this feature "Ye Olde Technical Topics" to distinguish it from a brash new column in one of the large circulation, American publications. This newcomer, with an approach which, to say the least, shows us "the sincerest flattery" is—surprise, surprise—called "Technical Topics."

We do not, of course, claim to have originated the title of this column—*QST* for many years has used it for a very different type of staff-contributed occasional notes.

So we send fraternal (if mildly jaundiced) greetings to Technical Topics. *Radio-Electronics* please copy.

On the other hand, may I take the opportunity of thanking the many overseas publications—and especially *Electronics Australia* and *The Australian EEB*—for giving *Amateur Radio Techniques* such a warm welcome. I particularly appreciated the evidence that both these reviewers had clearly studied the contents carefully before summing up their advice to their readers in the identical words "Buy it".

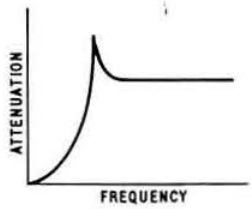
Which Filter?

By KAY PRIESTLEY, G3XIW*

REMEMBER John? He got TVI on 20m with his home-brew 20W transmitter when he used it without a filter. So he made himself a filter—and he still got TVI! Not so badly as before, but bad enough. Then he read "How much Harmonic!" and worked out how many dBs of attenuation he really needed! Now he has made himself a low pass filter which gives him all the attenuation required to continue his 20m activities while the rest of the family tune in to "Z Cars" or "The Newcomers."

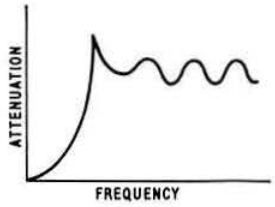
By the time he had finished turning up filter circuits and finding out how much attenuation could be got from them, there was enough material for an article—so here it is. To make comparison easy there is a graph of attentuation vs frequency for each filter and in case anyone wants to make any of them, a table of component values and coil data is included with each circuit. It must be emphasized that the graphs are meant as a practical guide—this is what may be achieved with careful tuning and correct termination. It is not a "guaranteed performance." The impedance is 75 ohms and any other load impedance will degrade the performance.

Suppose a filter gives a performance like this



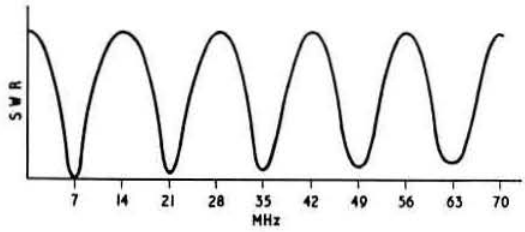
when correctly terminated in 75 ohms.

If the termination is say 150 ohms, then there is a 2 : 1 SWR, but the load seen by the filter depends on the length of feeder to the load. When this is an odd number of quarter waves the filter sees 37·5 ohms and when it is an even number the filter sees 150 ohms. This produces a ripple in the attenuation, the frequency of which depends on the length of the feeder, the longer the feeder the more rapid the ripple. It looks like this.



* 43 Raymond Road, Langley, Slough, Bucks.

In practice the load is an aerial and with a 7 MHz dipole, for example, the SWR varies with frequency like this.



This adds another ripple pattern to the filter characteristic and results in something like a cross secton of the alps! Fortunately the effect on overall attenuation is not too serious because if the aerial SWR is bad enough to reduce the filter attenuation appreciably it will reflect back most of whatever harmonics leak through the filter! When a filter has been designed with a notch at a particular frequency this will still attenuate powerfully in spite of large variations in SWR which degrade performance between notches.

So choose a filter which gives about 10dB more attenuation than is needed. In a fringe area, have a notch at the local TV frequency, or add a stub to back up the filter. If the ripple pattern gives trouble, try pruning the feeder a few inches to shift it.

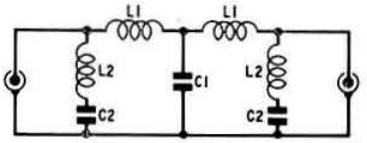
Low Pass Filters

The first section deals with low pass filters. The first six are all well known, well used amateur designs (see Appendix for sources) and then for anyone who prefers to buy rather than build, there is the Medco low pass filter, available from Lowe Electronics. This filter looks good for any situation where extreme attentuation is necessary. The manufacturers specification is brief and modest. The insertion loss is certainly much less than 1dB, (20 per cent loss at 400 watts isn't good for any filter!) a bench test indicated 0·3dB or less and in a full power test only the dummy load got warm. The dip in the graph at 45 MHz is unfortunate, but not at all serious, 73dB is still plenty of attenuation.

High Pass Filters

The second section gives a similar list of well tried amateur designs for high pass filters, with graphs and component details. Again the graphs are a practical guide and indicate

Low Pass Filters



CHAN No	C1 pF	C2 pF	L1 µH	L1 TURNS	L1 WDG LENGTH	L2 µH	L2 TURNS	L2 WDG LENGTH
1	110	30·2	0·55	9	7/8"	0·44	8	7/8"
2	110	38·2	0·56	9	7/8"	0·26	6	3/4"
3 & 4	103	38·3	0·58	9	7/8"	0·2	5	3/4"
5	93·5	34·8	0·52	9	7/8"	0·18	5	1"

SELF-SUPPORTING COILS ..... INTERNAL DIA 1/2" ..... LEAD LENGTH 1" ..... 16 SWG COPPER WIRE

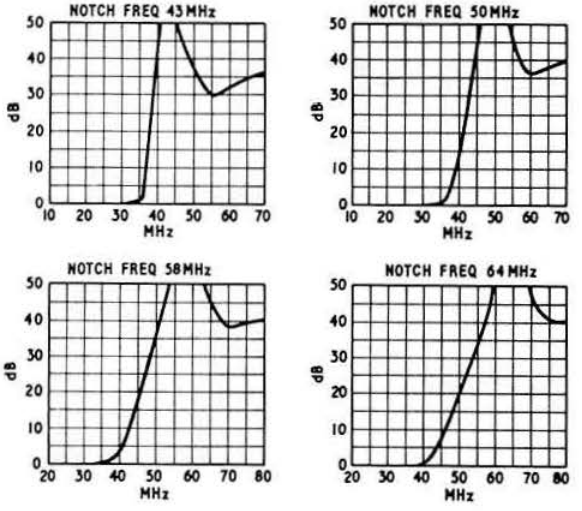
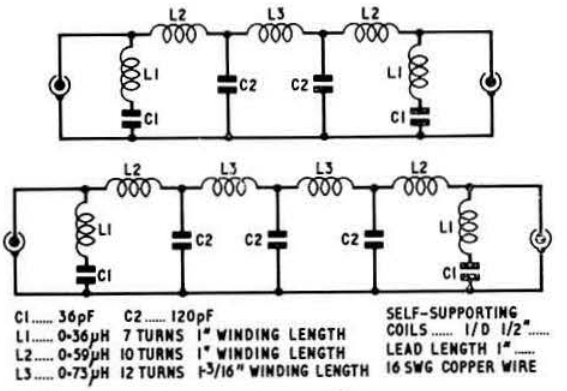


Fig 1. A single channel low pass filter in four versions.



C1 ..... 36pF C2 ..... 120pF
L1 ..... 0·36µH 7 TURNS 1" WINDING LENGTH
L2 ..... 0·59µH 10 TURNS 1" WINDING LENGTH
L3 ..... 0·73µH 12 TURNS 1-3/16" WINDING LENGTH

SELF-SUPPORTING COILS ..... I/D 1/2" ..... LEAD LENGTH 1" ..... 16 SWG COPPER WIRE

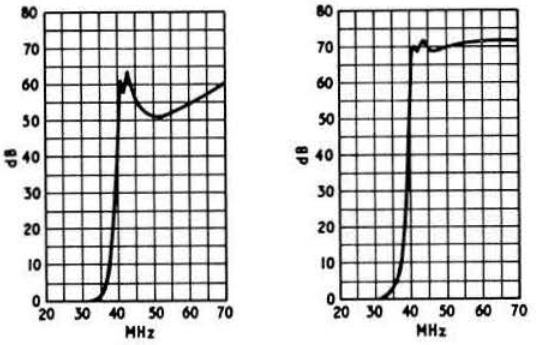


Fig 2. Two M derived filters useful on all channels.

MANUFACTURERS SPECIFICATION	
PASSBAND ..... 1·8–30MHz	INSERTION LOSS LESS THAN 1dB THROUGHOUT RANGE
STOP BAND 41–70MHz	ATTENUATION IN ORDER OF 80dB ON ALL BAND I TV CHANNELS WITHOUT ADJUSTMENT
POWER HANDLING	MAXIMUM LEGAL INPUT ALL MODES SWR NOT GREATER THAN 2:1
50 OHM VERSIONS ALSO AVAILABLE	

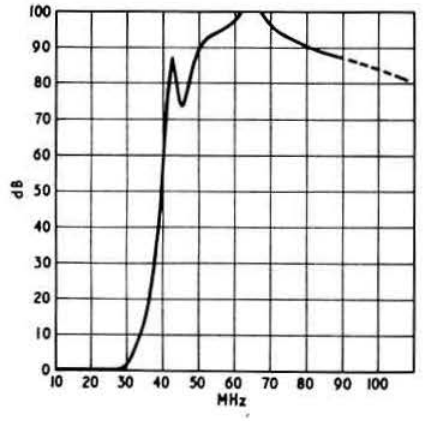


Fig 3. Miniature Electronic Developments Co filter type FL75A.

High Pass Filters

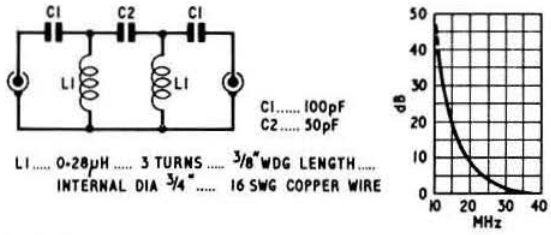


Fig 4. Elementary filter useful for lower frequency bands

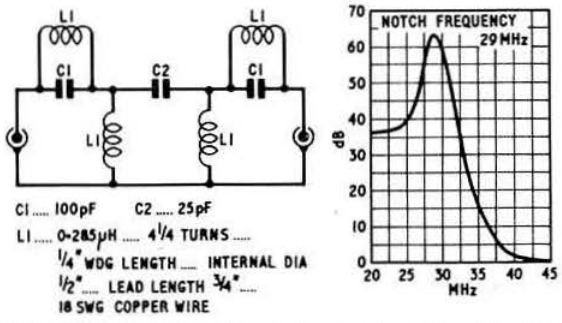


Fig 6. High pass filter with maximum attenuation at 29 MHz.

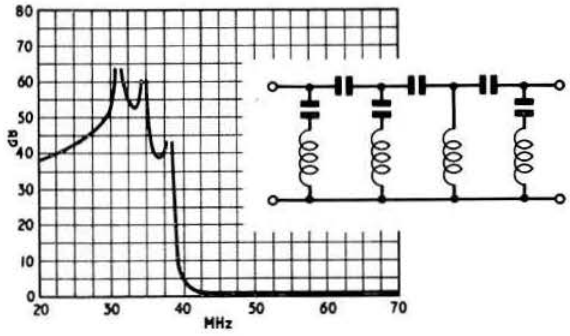


Fig 8. Telegraph Condenser Co filter type C 263.

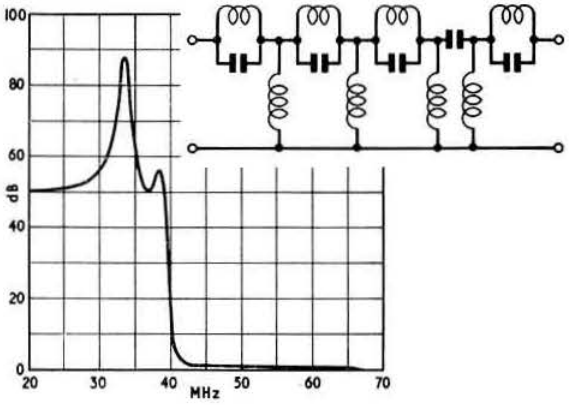
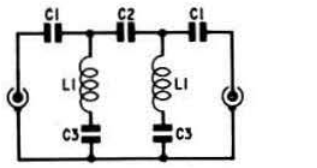


Fig 9. Belling and Lee filter type L 1425.



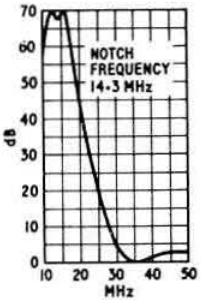
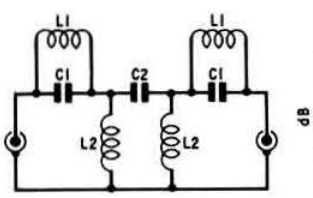
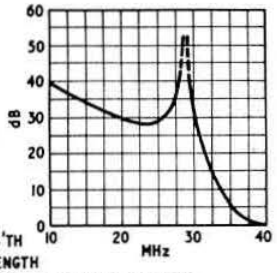


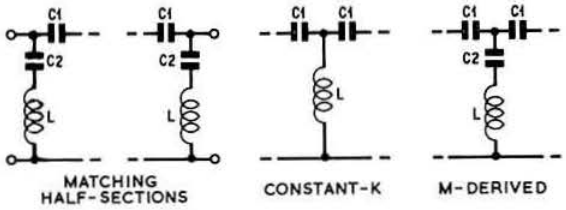
Fig 6. High pass filter with maximum attenuation at 29 MHz





C1..... 100pF C2..... 33pF
L1..... 0·3μH..... 9 TURNS ..... 1 1/4" WDG LG'TH
L2..... 0·2μH..... 6 TURNS ..... 3/4" WDG LENGTH
INTERNAL DIA 3/8"..... LEAD LENGTH 1/4"..... 16 SWG COPPER WIRE

Fig 7. The Tobacco Tin Filter.



	HALF-SECTION	CONSTANT K	28 MHz	21 MHz	14 MHz	7 MHz
C1	98·5pF	54pF	98·5pF	74pF	64pF	60pF
C2	53pF	——	107pF	300pF	700pF	3000pF
L	0·55μH	0·16μH	0·28μH	0·21μH	0·18μH	0·17μH
TURNS	10	3 1/2	5 1/2	4	4	4

INTERNAL DIA 1/2" ..... WOUND ON WHITWORTH BOLT WITH 16 SWG WIRE

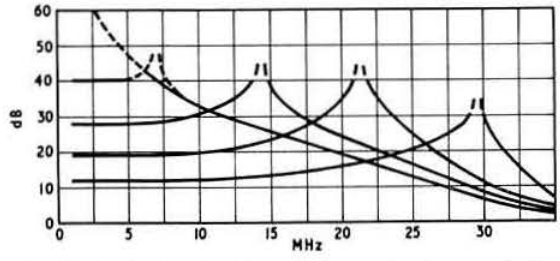
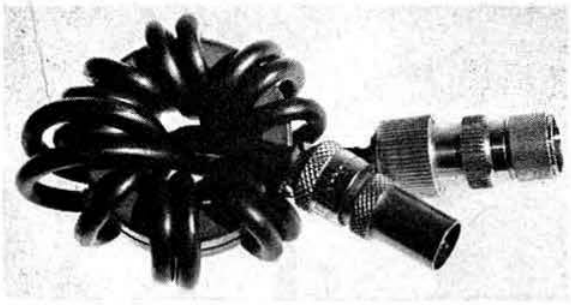


Fig 10. "Building Blocks" for tailoring a filter for a particular situation.



Toroidal Filter—see Braid Filters below

only the kind of results which may be achieved by careful attention to detail.

Two manufactured devices are included. The TCC type C263 high pass filter, alias PO type 38A (Fig 8) and the Belling and Lee type L 1425 (Fig 9). The graphs of these last two are taken from the manufacturers data. They are both aimed at protecting the TV at its i.f. and so may not be as effective in suppressing breakthrough from an amateur transmitter as a device aimed directly at the frequency causing the trouble.

Indeed the requirements for a high pass filter vary so much that possibly the best solution is to use the " Building Blocks " to create a special filter for a particular situation. (Fig 10). This is a simple method of tailoring the filter to suit any given requirements. Full details can be found in chapter 18 of *Radio Communication Handbook*. The graph in this case is based on the theoretical figures given in the Handbook. The attentuation of each unit selected for the filter should be added together and 6dB subtracted from the total to give the practical values.

Braid Filters

When one's own harmonics have been subdued with a low pass filter and any vulnerable TV set has been protected from unwanted signals entering in the normal way with a high pass filter, one may still be left with the problem of signals coming in on the outside of the coax sheathing. The coax itself becomes a Marconi aerial with the TV aerial providing some top loading. The third section deals with braid filters which are designed to attenuate signals on the outer of the coax. They do this by putting a high impedance in series with the current path down the outer sheathing.

The solutions are of three types. As in the photographs, overleaf coiling up the coax, either with a capacitor to tune the coil to the offending frequency as in the GPO type 49A filter—this is a simple but narrow band device—or using ferrite toroids to make a broadly resonant choke as in the above picture. Thin coax and small toroids cause some attentuation of TV signals, larger toroids to take several turns of normal sized coax cost more but avoid this loss of signal. In fringe areas stacking two such filters has proved effective, one recipe was a braid filter of 15 turns on a 1½ in dia former, tuned, then a high pass filter, then two, toroidal filters, each 8 turns round three FX1588 ferrite rings.

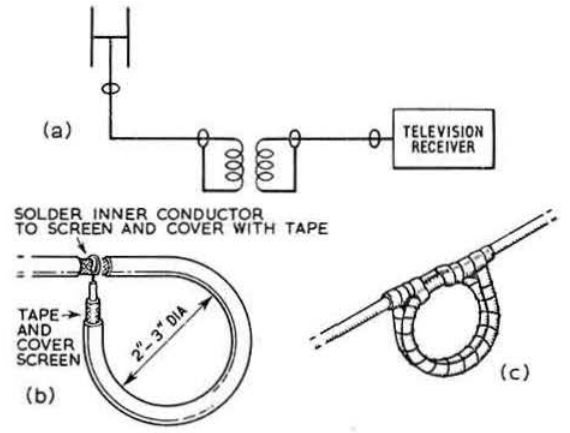


Fig 11. Faraday double loop television receiver filter. (a) Basic arrangement of filter; (b) detail of one loop; (b) two identical loops are put together, taking care to insulate all wires/screens and taped or laced firmly.

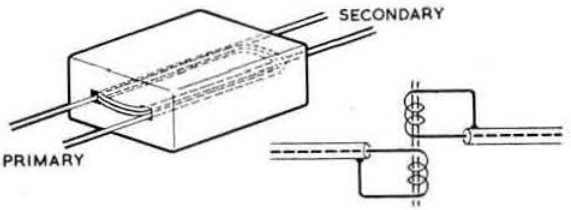


Fig 12. Transformer for removing current from the outer braid of coaxial cable feeder. The primary and secondary are two turns of 24 swg enamelled wire on a TV balun core.

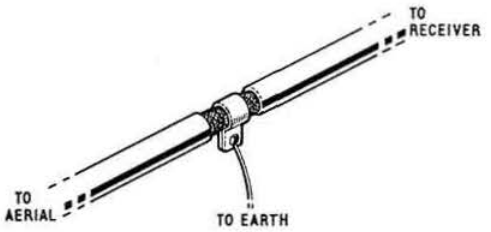
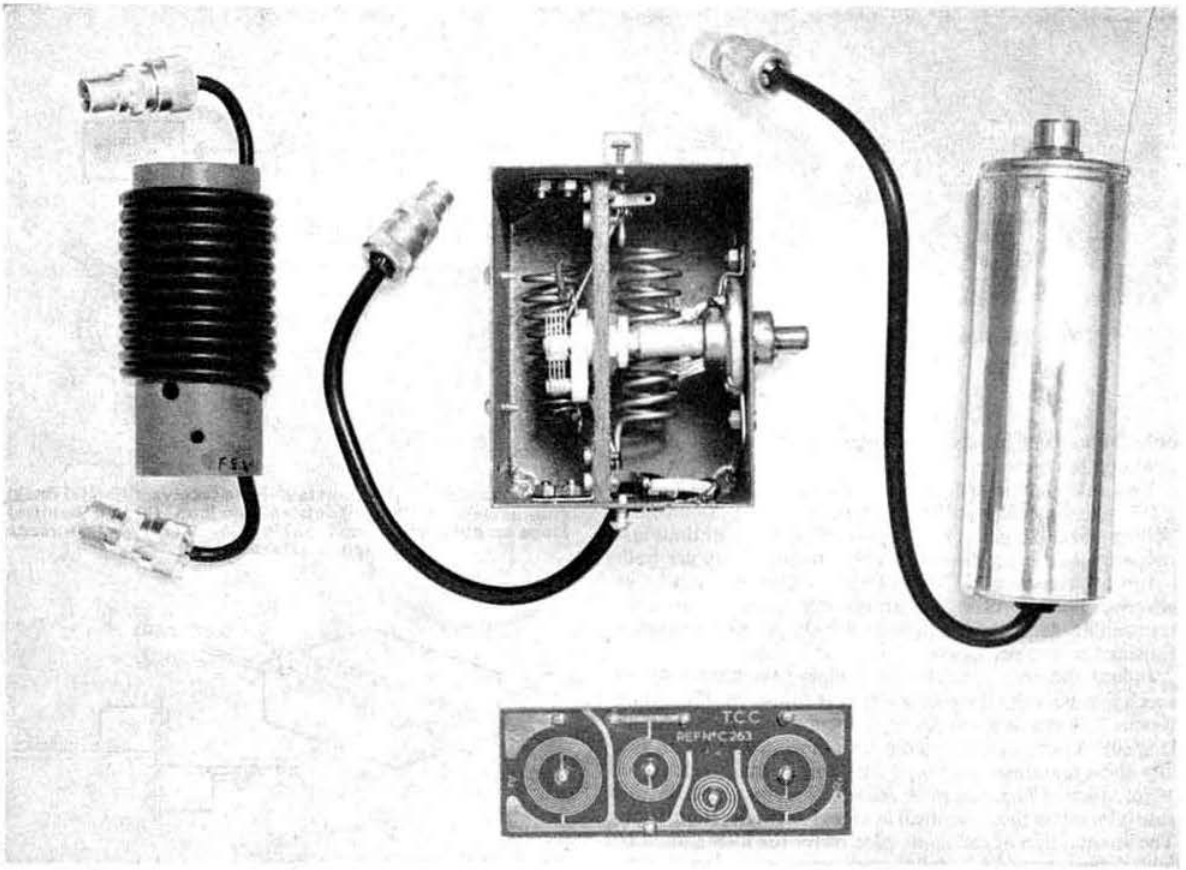


Fig 13. Bypassing interference currents on a TV coaxial cable to earth outside the receiver.

Secondly, a complete break is made and the two sections of feeder joined by Faraday links (Fig. 11) or a ferrite transformer (Fig. 12). The Faraday loop is simple, cheap in money, but dear in TV signal attenuation—6–10dB. G3BA's ferrite transformer needs care in construction and matching but with FX2249, minimum lead length and accurate impedance



Left to right: Filter type 49/A; the braid of the coaxial cable is used as the inductor of a tuned circuit and a preset capacitor is adjusted through the larger hole in the former. Type 48/2A, a tunable reject filter. Type 38A, which contains the printed circuit element shown at the foot of the photograph.

matching can give only 1dB loss at 200 MHz. Tests indicate that it is not as good as coax round torroids for fringe areas but it is certainly useful where a small loss of signal is acceptable.

Thirdly, earth the braid outside the TV set (Fig. 13) thus diverting the unwanted signal. This may usefully be employed in conjunction with any of the other methods.

Acknowledgements

Thanks are due to Mr J. B. Lowe, G3UBO, who kindly lent a filter for evaluation and to G3JGO who did the tests on it.

Thanks also to G3FPD and G3WZT who did some tests on braid filters.

Appendix

Figs 1, 5 and 6 from "Television Interference" an RSGB booklet written by J. W. Mathews, G6LL, 1951. Out of print.

Figs 2 and 10 from *Radio Communication Handbook*.

Fig 4 from *ARRL Radio Amateur's Handbook*, 1961.

Fig 7 from *RSGB Bulletin*, April 1967, "3 Cases of TVI" by D. A. Pilley, G3HLW.

Fig 11 from "*Technical Topics*" *Radio Communication*, January 1969.

For a very readable account of filter theory see chapter 22 of "Second Thoughts on Radio Theory" by "Cathode Ray" published 1955.

Aerial Erection Problem?

Well, Allan Papworth, G3WUW had one and solved it thus: For the modest sum of £2 he employed professional aerial riggers who are prepared to take just one or two more risks than the average radio amateur! As shown in the photograph the Mosley TA33 jnr was lifted in assembled form to the roof where one of the riggers walked unassisted along the tiles to the position shown. The aerial is working well on 20, 15 and 10m with rotation by the *armstrong* method. Above the beam is a 8 ele beam for 2m.

QTC—Amateur Radio News

continued from page 449

QRA Locator Maps

As reported in Four Metres and Down this month RSGB is following Europe and supporting the QRA Locator system. Three maps are available, the four-sheet Region 1 large-scale map, a map based on the ON4IB version which has proved so popular in the UK and a handy map suitable for general DX operating when it is not necessary to calculate the distance precisely. The four-sheet map is available now from Headquarters at 32s 6d, the ON4IB at 7s and the handy map should be arriving shortly when an announcement will be made.

Recent visitors from Kaliningrad, USSR, were Anetoly Moskalenko, UA2AO pictured left with SWL colleague Sacka

Region 14 ORM

Region 14 ORM was held on 16 May in the Arts Guild, Greenock with Greenock and District Amateur Radio Club as host.

The Society was represented by Mr J. Swinnerton, G2YS, Mr A. Hunter, GM3LTW, zonal representative, with Mr N. G. Cox RR 14 in the chair. Talking to members prior to question time, the President surveyed in broad terms, Society affairs, present and future, during which he stressed the need and advantages from increased membership, asked for more two metre activity, and an assessment of listeners to News Bulletins, hinting at possible changes in this service.

Questions from the floor indicated members' concern about band conditions and usage. Questions on Headquarter's assistance with TVI, and points scoring for Scottish stations in NFD were raised. A number of resolutions for submission to Headquarters were approved.

The ORM was not too well patronised, probably owing to lack of advance notice, for which the RR apologized, weather, and possibly the televising of a certain sporting occasion may also have contributed.

A Digital Clock

The Author, Alan Gibbs, G3PHG has pointed out a number of errors that appeared when the article was published last May. Amendments now follow.

Circuit Diagram, page 319

Strap PA 24 to PA 14 and delete the strap from PA 24 to PA 25.

Uniselector Strapping Chart, page 321

Position 10—RA delete 10 insert 20
Position 21—RC delete 15 insert 25
Position 24—PA delete 25 insert 14 3
Position 23—PB delete 1 insert 2
Position 24—PB delete 25 insert 23

Parts List, page 321

Delete resistor 300 ohm 6W and replace with 330 ohm 6W.
Add One 10 uF 50V dc wkg from Radiospares.

THE MONTH ON THE AIR

By JOHN ALLAWAY, G3FKM*

A NUMBER of correspondents mention the fact that it seems to be increasingly difficult and expensive to obtain QSL confirmation of DX contacts. Unfortunately due to the phenomenal increase in the number of stations after " rare " cards the operators of stations in remote and much sought after places have been compelled to arrange for their QSL chores to be looked after by QSL managers. What does not seem to be generally appreciated is that in most instances these good Samaritans do not have use of an outgoing QSL bureau and therefore require to be supplied with addressed envelopes and return postage so that they can send out their cards direct. It is surely too much to expect any QSL manager to spend a great deal on postage as well as donate time and effort to his self-imposed task, and an addressed envelope saves him a lot of work. Those looking for a higher percentage of QSL returns might well attempt to contact stations with obviously lower signal strength who may possibly be using more modest equipment and whose operators are still happy to QSL their own contacts in the old way.

Readers will be interested to know that a bill has been introduced in the US Senate requesting the Postmaster General to seek revision of postal treaties and conventions " for the purpose of providing special reduced rates of postage for postal cards mailed by an amateur radio operator to another such operator in another country."

Congratulations to Dick Spenceley, KV4AA, on being nominated by *CQ Magazine* as the fourth member of their DX Hall of Fame. The other three are Gus Browning, W4BPD, Jack Cummings, W2CTN, and Stew Perry, W1BB—a very distinguished quartet!

G3HCT reports that he has been unable to obtain logs from 5A1TA and asks that no further requests for QSL's should be directed to him.

Anyone who has worked the Guernsey Radio and Electronics Society station GC3HFN during the last three years and not received a QSL is invited to reapply to Dick Allisett, A5154, who is now acting as QSL manager for the station. The cards are $5\frac{1}{2} \times 4$ in. in size, so an extra large envelope should be sent (with postage) if a direct reply is desired.

News from Overseas

9H1BE (ex G3VTU) writes from Malta to say that the Malta Amateur Radio Society still holds many QSL cards for amateurs who have now left the island without leaving a forwarding address. These are mainly Service personnel. It is intended to hold the cards until 30 September, 1969 after which they will be destroyed. There would appear to be several unlicensed stations currently active from the island, most of these appear to be well informed in amateur radio procedure and in one case the operator uses excellent cw! A serious attempt is being made to locate and deal with the offenders—9H1BE does not give the pirate calls but does mention that there are no YL operators on the island, nor in fact has there ever been one.

Ray Mills, VQ8CR, has been on the air from Mauritius since the beginning of May and although only equipped for 80, 20 and 15m operation at the time of writing he was hoping to have a 10, 15, and 20m quad and dipoles for 40 and 80m by early July. At present the best openings into the UK seem to be at about 13.00 on 15m and 18.00 on 20m. Most activity to date has been on cw but Ray occasionally joins the Royal Signals net and the Commonwealth net on 21,354 kHz ssb. QSL's should be sent via the bureau, but direct cards will be dealt with if sent to the address in *QTH Corner*. It is pointed out that surface mail is rather slow, and that patience should be exercised when using this route.

URE announce that the Third International Convention of Radio Amateurs will be held in Santa Cruz de Tenerife (Canary Islands) from 12 to 17 September. An interesting programme of sightseeing etc., has been arranged and anyone who may be fortunate enough to be in EA8 at the time of the Convention may be interested in writing to URE, PO Box 215, Santa Cruz de Tenerife for more details and a registration form.

EL0B/MM has passed along information on the newly formed International Maritime Mobile Club. This was constituted by G3RSP/MM, LA2PH/MM, EL0A and himself in order to try to bring together all the world's /MM stations. A net frequency of 21,100 kHz has been chosen as being " between the phone and cw sections of the band " and a suitable place for cross mode working as many /MM operators are on cw. It is suggested that check-ins use 21,100 kHz ssb (upper) and 21,101 kHz cw and these frequencies will be monitored throughout the day. (It should be noted that according to the European Band Plan these frequencies are in the cw exclusive band which extends up to 21,150 kHz. Your scribe would respectfully suggest that it would be better to use 21,150 and 21,151 kHz.) EL0B/MM is Secretary of the Club and is compiling a register of /MM stations and already has over 700 listed. When skip is unsuitable on 21 MHz and when ships are nearing their home ports the frequency of 14,100 kHz will be used. Regular meeting schedules have been arranged which do not interfere with the H8 watch system used by most ships. These are at 02.00 and every 4 hours thereafter and last for 10 minutes.

G2DHV reports that he attended the Whitsun VERON Radio Camp at Amersfoort, and operated from there as PA9DHV/P. He also operated from W. Brabant province as PA9DHV and worked stations as far away as California. He

* 10 Knightlow Road, Birmingham 17. Closing date for the August issue is 15 July, for the September issue 5 August and for the October issue 2 September.

was given the call-sign ON8IR for use in Belgium. The next UBA Convention at Knokke will be held in September, 1971.

OY9LV wishes it to be known that pending the arrival of his 160m licence he will be happy to work cross band (with his own signal on 80m) for those who would like a report on their Top Band signals.

Alan Hemmings, ZD9BE, will be arriving back in the UK in mid-June. The new operator on Tristan da Cunha is Ray Folgate, G3KDY, who will use the call-sign ZD9BM. His equipment will consist of a Swan 350, with an assortment of aerials for 20, 15 and 10m. Operation on 160m is also under consideration. Ray is ex-RAF and has a wife and two children, and his post on the island will be Master of Posts and Telegraphs. Most activity will be on Sunday afternoons and in the evenings as conditions permit, and ragchews would be preferred rather than " rubber stamp " type QSO's.

During the National Jamboree of the Boy Scouts of America (16 to 22 July) at Farragut State Park, Idaho, there will be a special amateur station on the air with the call-sign KF7BSA. The times of operation are expected to be 16.00 to 05,00 and activity may start on 14 July. The operators will mostly be Scouts, and up to three rigs may be on the air at a time. Frequencies given are 3590, 7050, 14,090, 21,140 and 28,190 kHz (cw) and 3940, 7240, 14,290, 21,360, and 28,990 kHz ssb. All contacts will be QSLed with special full colour cards despatched via the world bureaux.

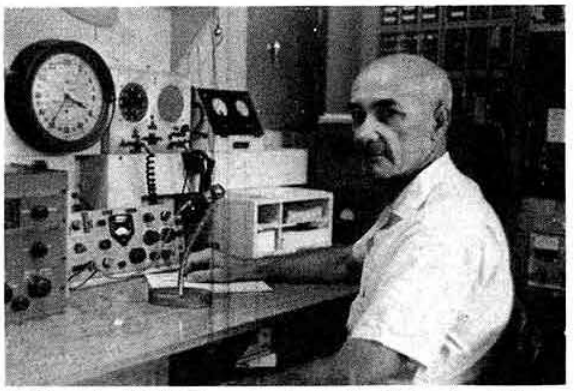
VE3DLC (Ron Kreger, 30 Zenith Drive, Scarboro, Ontario, Canada) now acts as QSL manager for the following stations: HI8XJA, HI8XPM, HS3DR, OX5AY, VP1FW, VP1TM, VP2GBG, VP2GBH, VP2GN, VP2KF, VP2MY/A, VP8JI, YV5ACL, 5H3MA, 5Z4KL, 6Y5CB, 6Y5GB, 6Y5GM, 6Y5RM, 7X0AH, 8P6AH, 8P6AZ, 8P6BM, 8P6BN, 8P6BX, 8P6CD, 8P6CP, 8R1S, 8R1U, 8R1X, 8R1Z, 9Q5EP.

W0VXO (KV4FZ) has so far paid visits to FG7TI/FS7, VP2LZ, and VP2LI this " season " and is due to accompany the expedition to Navassa Is in late June. After this he will be visiting Brazil, but this time without any intention of radio operation. He hopes to resume his " one night stop " type of operation (especially on Top Band) next autumn.

DXpeditions

G3KDB and G3LNS hope to operate from the **Isle of Man** as GD3KDB/A and GD3LNS/A respectively between 10 and 14 July. They will be active on all bands 80 to 10m especially for those working for the five band DXCC, and hope to run two stations simultaneously for part of the time. Frequencies to be used will be 3505, 7001, 14,045, 21,045, and 28,045 kHz (cw)—tuning 5 kHz higher, and 3785, 7085, 14,105, 14,195, 21,245 and 28,605 kHz on ssb listening as announced. QSL's should be sent via the bureau or to the operator's home QTH (see *QTH Corner*).

Pete, K2RBT/6, is a keen 3·5 MHz addict and has been heard and worked on that band from Europe. His QTH is 500 ft asl and his equipment includes a TR4, RV4, 75A4, and a 4CX1000 linear—not to mention a 2 element ½ wave vertical beam.



Al Edwards, KR6TAB, concentrates his HF band activity on 28 MHz and has given many UK. stations their first QSO with Okinawa on that band. He hopes to continue his good work in the Autumn.

OH2AM and a group of other Finnish amateurs hope to be on the air from the **Aaland Is** (OH0) between 4 and 13 July.

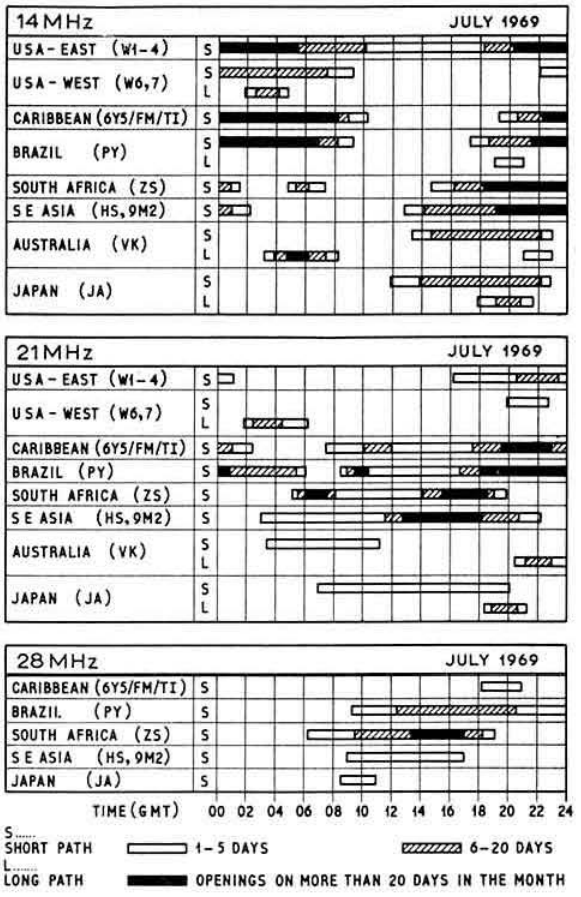
VE2AFC is due to be active from **Guadeloupe** as FG7EB from 1 to 6 July, from **Martinique** as FM7EB between 7 and 13 July, and from **French Guiana** sa FY7EB between 14 and 16 July. This will be followed by a three day stint from the **British Virgin Is** as VP2VT from 17 to 20 July. All QSL's should be sent to the address in *QTH Corner*.

The recent short operation by 5Z4KL from **Uganda** as 5Z4KL/5X5 may be repeated sometime during July in order to help those who still need a contact with 5X5. It is understood that the proposed Roncador Cay (KS4) sortie by WA6AHF has had to be temporarily postponed due to difficulty in obtaining suitable transport.

G3KFT hopes to repeat his last year's visit to **Corsica.** This year he will be there from 14 July to 14 August and will be on all bands 80 to 10m ssb with his HW100 transceiver, mostly between 06.00 and 08.00 . He also hopes to be on 2m each Sunday with an HW17, and although contact with the UK seems a rather remote possibility BBC TV has been received there and there are some very high spots to operate from. Jack's callsign will be F0HI/FC/M.

Another UK station who will be on the air from the European continent soon is G3LSF who expects to sign OE7ZUJ from Innsbruck during the period 30 July to 9 August. He has obtained permission to operate on Top Band between 1879 and 1900 kHz on cw or ssb and hopes to be on between 22.00 and 24.00 on 2 and 3 August. He will also be on 80m during the evenings and the HF bands during the day.

G3XTJ will be operating from Guernsey as GC3XTJ/A from 4 to 6 July specifically for the 1·8 MHz Summer Con-



PROPAGATION PREDICTIONS

Propagation conditions this month will differ little from last month. DX conditions on the high frequency bands are still not favourable, especially on **28 MHz**. A small compensation will be the more frequent short-skip conditions over distances of 500 to 2000 km. **14 MHz** will remain the predominant DX band, mainly at night. The possibility of DX contacts on the indirect path is predicted again, for both **21 MHz** and 14 MHz. As it is now winter in the southern hemisphere, traffic with South Africa (ZS) will cease early. Central African stations, even Tanzania and Rhodesia will be open longer on the whole than ZS. The same goes for conditions on 21 MHz. On 7 and **3·5 MHz** there will be no noticeable change compared with the previous month.

The provisional sunspot number for May 1969 from the Swiss Federal Observatory was 120. There was a period of high solar activity between 20 and 28 May. In accordance with the predicted conditions the average activity is gradually decreasing and the forecast smoothed sunspot numbers for September, October and November are 90, 89 and 88 respectively. Reference to previous predictions will show that these figures were originally forecast for April, May and June 1969 so that the rate of decline is indeed slow. There has been a suggestion that when all the figures are available the present cycle may show a double peak.

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test, but hopes to be on 6 July only from Alderney. G3UGK, G3YDX and G3XTJ hope to activate Rutland for the county hunters later in the year. All QSL's for GC3UJE and GC3UJE/A (Guernsey) should be sent to G3XTJ from now onwards—those with s.a.e.'s will be answered direct, those without via the bureau (please send marked " c/o G3XTJ ").

At the time of writing Gus, W4BPD, was due to commence a 40 day trip around the Indian Ocean islands by chartered boat (costing $50 a day). His itinerary was given as follows (with expected callsigns to be used): (1) **Desroches Is.**, VQ9/A/D. (2) **Etoile Cay**, AC1/EC. (3) **Baudeuse Cay**, AC2/BC. (4) **Wizard Reef**, AC5A/WR. (5) **Farquhar Is.**, VQ9/A/F. (6) **Aldabra Is.**, VQ9/A/A. (7) **Glorieuses Is.**, FR7. (8) **Geyser Reef**, AC6/GR. (9) **Juan de Nova Is.**, FR7/1. (10) **Comoro Is.**, FH8. Gus will then return to Madagascar but will not operate from there and will leave by light aircraft for **Zanzibar** where he will try to obtain permission to operate using his old callsign VQ1A. He will then return to the Seychelles and from there to **Chagos, Blenheim Reef, Agalega,** and **St. Brandon.** A new list of operating schedules is given as follows: 10.30 to 15.00 14 MHz, 15.00 to 17.00 21 MHz, 17.00 to 19.00 28 MHz (if closed 21 MHz), 19.00 to 21.00 21 MHz (if closed 14 MHz), 21.00 to 23.15 14 MHz, 23.15 to 23.45 7 MHz, 01.00 to 01.15 3·5 MHz. His cw frequency will be 025 on all bands and on ssb he will be found near 3790, 7090, 14,195, 21,245 and 28,595 kHz. This trip is expected to cost at least $2000 and as mentioned previously any financial assistance would be gratefully received (see page 337, May *MOTA*).

Don, K5AAD, will be travelling through the Caribbean area during July and hopes to get on the air especially to help the five band DXCC hunters. Approximate dates are given as 7 to 13 July from **Martinique** (FM7WQ), 14 to 20 July from **Grenada** (VP2GTL), and 21 to 27 July from **Trinidad** as 9Y4?? (call not yet known). QSL's from FM7WQ contacts should be sent via that station's usual QSL manager (W4OPM), for the other operations they go to Tom Taormina, WA5LES, 2010 McDuffie, Houston, Texas, 77019, USA. Frequencies to be used are 3550, 3790, 7050, 7190, 14,050, 14,190, 21,050, 21,240, 28,050 and 28,490 kHz

HK3VA, K6JGS/HK, and WB6KBK will be operating from **Bajo Nuevo** using the callsign HK0WO about 1 July, and will also operate from Roncador Cay (Serrana Bank for DXCC purposes) as WB6KBK/KS4.

QSL cards for the operation by KX6EQ/KC6 and KX6FN/KC6 from Yap (in the W. Caroline Is.) should be sent via W2GHK (DOTM).

Here are members of the Gambian Amateur Radio Society looking on as ZD3D is operated during the Boy Scout Jamboree on the Air. The Cubical Quad aerial is shown below.

Awards

The Mercury Award

Custodian: G3HZL, 153 Worple Road, Isleworth, Middlesex.

For confirmed QSO's with members of the Royal Naval ARS since 1/10/60. Class 1 (for UK stations) requires 20 points, Class 2 (other Europeans) 10 points, and Class 3 (all others) 5 points. Each contact counts as 1 point except for those with G3BZU and GB3RN which each count 2 points. Stations may be worked on additional bands/modes for further credit and stickers are available for each 10 points over basic requirements.

GCR list plus 2s. 6d. (or 5 IRCs) should be sent to G3HZL.

The Code Proficiency Award

Custodian: RNARS (QRQ Run), HMS Mercury, Leydene, Petersfield, Hants.

For correct copy of 3 minutes cw at 20 w.p.m. with stickers issued for each additional 5 wpm achieved. Special transmissions take place at 19.00 on the first Tuesday of each month from G3BZU on approximately 3520 kHz. A practice transmission precedes this at 18.00 on 1875 kHz.

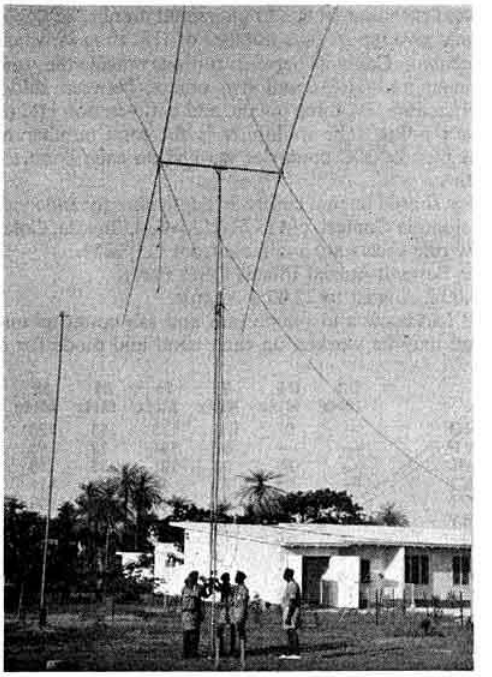
Applicants should send four 5d. stamps (or 5 IRCs) for the basic award, and one 5d. stamp or one IRC for each sticker.

Stations working for the Mercury Award will be interested to know that an RNARS "net" meets at 18.00 every Wednesday evening on 3720 kHz.

The Isle of Wight Award

Issued by the IOW Radio Society (G3SKY). Custodian: G3UCW, 18 Station Avenue, Sandown, IoW.

This award is in two classes—stations within 30 miles of Newport, IoW need 15/30 QSO's, other European stations 5/15, other 3/10 contacts with stations on the island for 2nd and 1st class awards respectively. All CHC *Directory* rules



apply, and listeners may apply. The fee of 5s., $1, or 8 IRC's should accompany full certified log data and sent to G3UCW. There is no charge to blind or paralyzed applicants.

The Royal Boroughs and Burghs Award

Sponsored by the Echelford ARS (Ashford).

For working stations in the Royal Boroughs and Burghs as follows (Europe):

Class 1—three English, two Welsh, and 10 Scottish. Class 2—two, one and eight ditto. Class 3—two English or Welsh and five Scottish. (Others) Class 1 requires four Scottish and one other.

A certified list plus 5s., 10 IRC's, or $1 should be sent to G3TBS, 52 Westmead, Windsor, Berks. Profits go to the British Diabetic Association Research Fund. The award is free to blind and paralyzed applicants, and is available to listeners. A list of Boroughs etc., may be obtained from G3TBS.

The Afghanistan Radio Award (ARA)

Wolfgang Renner, PO Box 279, Kabul.

Stations in Africa and Europe need three confirmed QSO's with different YA's. (Asian applicants need four and the rest of the world two.) Contacts must have been on at least two bands and since 1/1/1966. There are no endorsements.

Applicants should send QSL's and 10 IRC's or $1 to the address above; for a reply by registered air mail send two more IRC's. All profits go to " welfare organizations."

Contests

The **Independence of Colombia Contest.**

00.01 19 July to 23.59 20 July.

All bands 3·5 to 28 MHz ssb, am, and cw but not cross mode.

Usual exchange of RS(T) plus serial number of QSO. HK stations give report plus number of HK zone in which they are located. Contacts between stations outside the American continent and HK count five points, between stations in America and HK three points, and between non HK participants 1 point. The multiplier is the total number of HK zones plus DXCC countries worked on each band totalled together.

Logs should be sent before 30 September to: Independence of Colombia Contest, c/o LCRA, Ap 584, Bogota, Colombia. A few rule sheets are available from G3FKM.

The Seventh Annual Illinois QSO Party.

16.00 2 August to 22.00 3 August.

All bands cw and phone (am and ssb count as one). A station may be worked on each band and mode for credit.

	1·8 MHz	3·5 MHz	7 MHz	14 MHz	21 MHz	28 MHz	Total
G3LNS	—	97	120	173	155	128	673
G3XYP	—	—	37	134	72	63	306
G3UML	—	63	22	101	23	18	227
G3HCT	—	85	73	47	61	111	377
G3TZU	1	31	41	47	96	146	362
G3XBY	2	36	37	51	51	43	221
G3KS	1	16	12	66	55	58	208
G3VUM	4	4	8	70	51	57	194
G3VPS	3	15	15	61	27	20	141
G3JVJ	12	68	16	53	12	2	163
G3WPO	17	10	37	31	1	23	109
G4RS	4	21	10	56	61	21	173
G8VG	2	25	26	29	42	44	168
G3PEJ	—	2	19	34	43	33	131
G3IAR	2	23	21	25	23	26	120
G3PQF	6	13	12	30	8	5	74
G3VLM	1	10	11	28	2	27	79
G3VJG	—	2	18	5	5	40	70
A5390	9	30	47	162	144	104	496
BRS24529	4	48	63	140	69	56	380
BRS31164	4	50	43	117	96	75	385
A6254	6	24	15	118	139	79	381
A5662	18	28	27	102	97	85	357
A6148	7	49	45	84	24	67	276
A6431	9	34	31	92	83	46	295

QTH Corner

CE0AE	(Op. John) Det. 517, APO New York, NY 09877, USA.
EP3AM	W3GRY, Raymond Garvin, 705 Sherman Avenue, Willow Grove, Pa., USA.
F0HI/FC/M	G3KFT, Jesmond Cottage, Cowley, Nr. Cheltenham, Glos.
FG7EB, FM7EB, FY7EB	See VP2VT.
FR7ZL/T	FR7ZL, Lotissement Tanapin, Le Brule, St. Denis, Reunion Is.
GC3HFN	Dick Allisett, Springbank, Les Ozouets Rd, St Peter Port, Guernsey, CI.
G3UJE	via Edwin Hodson, 20 Spencer Av., Palmers Green, London N13.
GC8HT	PO Box 100, Guernsey, CI.
GD3KDB/A	P. A. Miles, 28 Scotch Orchard, Brownsfield Park Estate, Lichfield, Staffs.
GD3LNS/A	G. Beasley, 219 Moseley Rd, Birmingham 12.
HK0WO	via HK3VA.
K4IA/KC4	via WA4WIP, G. Tesar, 2666 Browning St., Sarasota, Fla., USA.
KX6FN/KC6	via W2GHK, Box 7388, Newark, NJ, 07107, USA.
KG4DO	via VE1ASJ, G. A. Mclellan, PO Box 41, E. Riverside, Kings, NB, Canada.
WB6KBK/KS4	via WB6KBK, 456 Lakeshire, Daly City, Calif., USA.
JW8MI	Gunnar Kvarsnes, Bodo Radio, Bodo, Norway.
LI2B	Box 21, Rasstad, Oslo 5, Norway.
MP4TCZ	BFPO 64, c/o GPO London.
OA4DX	W4TKN, 9304 Hamilton Drive, Fairfax, Va., USA.
OE7ZUJ	G3LSF, 5 Woodmoss Lane, Scarisbrick, Ormiskirk, Lancs.
VK9RY	c/o Box 2073, Konedobee, Papua.
VP2VT	via VE2AFC Lafleche St, Ste. Foy, Quebec 10, Que., Canada.
VP5AA	W1WQC, PO Box 368, Coventry, Conn., USA.
VQ8CR	R. J. L. Mills, Admiralty Office, Vacoas, Mauritius.
YB1BM	Box 8, Bandung, Indonesia.
YO3GK	Postbox 2825, Bucharest 20, Rumania.
ZD7AA	Box 876, St Helena, South Atlantic.
ZF1KV	WA0QOI, 437 Gabriel Drive, Kirkwood, Mo., USA.
5B4FD/P	English School Radio Club, Nicosia, Cyprus.
5H3MA, 5Z4KL/5X5	via VE3DLC, 20 Zenith Drive, Scarboro, Ont., Canada.
9J2RQ	via G3VYF, 11 Sturrocks Vange, Basildon, Essex.

RSGB QSL Bureau, G2MI, Bromley, Kent.

1969 Countries Table

	1·8 MHz	3·5 MHz	7 MHz	14 MHz	21 MHz	28 MHz	Total
A6278	1	6	7	113	22	5	154
A5154	2	35	16	103	73	62	291
BRS25429	4	39	39	79	48	30	239
A6337	4	38	25	89	70	35	261
BRS30694	7	23	28	67	89	45	259
BRS26870	5	30	24	66	54	49	228
BRS27806	6	35	20	67	64	4	236
A6242	1	8	7	80	58	35	189
A6248	1	19	11	72	30	1	134
A6023	4	32	15	67	54	28	200
A6220	1	15	21	56	13	14	130
A6144	—	4	15	62	—	—	81
A6003	5	25	24	45	90	61	250
A6923	4	29	14	54	40	27	168
A5466	8	24	27	41	30	37	167
A5489	—	18	8	57	55	25	143
A6201	—	31	15	48	—	—	94
BRS31172	1	5	12	42	7	5	72
A6098	5	8	13	29	—	—	55
A4253	1	13	8	28	25	11	86
A6179	1	5	10	25	5	3	49
BRS28198	2	27	32	1	—	20	82
A6553	1	12	8	19	53	56	149
A6498	4	14	2	17	8	11	56

(This month's table is in order of 7 plus 14 MHz scores)

Exchanges consist of QSO number, RS/RST, and county (or country for DX stations). Final total is total QSO points (one per contact) multiplied by the number of Illinois counties worked. Logs should show date, time, station worked, numbers sent and received, band, mode, and score claimed. Indicate whether single or multi-operator. They should be postmarked no later than 1 September and sent to: K9CJU, 3620 N. Oleander Av., Chicago, Ill., 60634, USA. Suggested frequencies to watch for contacts are 3560, 7060, 14,060, 14,275, 21,060, 21,110, 21,360, 28,060 and 28,700 kHz.

Results of the **1969 Spring RTTY Contest** are now to hand. There were 47 entrants and the two UK participants were **G3MWI** and G3IYG who came 2nd and 31st respectively. As in the " Flash " Contest G3MWI came second to W2RUI by a small margin. The BARTG committee wish to thank all those who supported this event and hope that they will continue to do so. They also give the news that GB3RS will be on the air on or near 14,090 kHz from 1 to 4 October from the RSGB International Radio and Communications Exhibition. Operation will be confined to exhibition hours and in conjunction with other transmissions on other modes but it is hoped that RTTY will be transmitted between 10.00 and 13.00 and again between 16.00 and 19.00. All contacts will be confirmed with special QSL cards.

The Medical Amateur Radio Council.

This organization—MARCO—has been formed to bring together members of the medical, dental, veterinary and related professions who are also licensed radio amateurs. Full membership to entrants from outside the USA costs $5 per annum, and full details are obtainable from William L. Sprague, MD, WA6CRN, Secretary, MARCO, 433 North 4th St, Montebello, California, 90640, USA. Applicants elected to membership between September and December are credited with their dues until the end of the following year. MARCO has a number of overseas " international counsellors "—in the UK this is Dr T. M. Newland, G3TMN, The Meads, Tollerton, Yorks. MARCO " nets " are held on Wednesdays, Thursdays, Saturdays and Sundays on 14,280 or 21,360 kHz (depending on propagation) between 18.00 and 20.00 on phone, and at 19.00 on 14,060 kHz cw. There is also a UK net which is held on 3750 kHz at 16.00 on Sundays and all UK members and those interested in becoming members are invited to join in. Ted, G3TMN, would be pleased to hear from members etc., who would like to arrange a net at another time or on another frequency. Finally a special amateur station will be on the air from 14 to 17 July from the Holiday Inn in New York, scene of MARCO's 3rd Annual Meeting, frequencies are given as 21,360, 14,280, 14,060 and 7060 kHz.

DX Miscellany

EP3AM is due to leave Iran and in future all QSL requests should be made to W3GRY (see *QTH Corner*).

QSL cards for Afghanistan stations may be sent via the Camel Driver's Radio Club, c/o Wolfgang Renner, YA5RG, PO Box 279, Kabul. An Afghanistan net is held at 18.00 on 14,345 kHz.

A list of " nets " in the *DX News Sheet* gives the Pacific DX net as taking place between 07.00 and 12.00 on Tuesdays and Fridays on 14,270 kHz—this is a change from it's old frequency of 14,240 kHz. Other nets of interest are the SE Asia on 14,320 kHz daily at 12.00, the YL-SSB (Oceania) on 14,332 kHz on Saturdays at 03.00, the Pacific Inter Island on 14,320 kHz at 08.30 (on Mondays, Wednesdays and Fridays), the Gecko (Marianas) on 14,240 kHz at 09.30 on Tuesdays and Thursdays, the Marine Corps on 21,380 kHz at 19.00 daily, and the Confusion net (!) on 21,400 kHz daily at 02.00.

VE3GMT is now QSL manager for PZ1DF, YV1OT, PJ2CA, PJ2CB, PJ3CD and PJ9VR.

Syd Waggoner, ex-TL8SW, is now in the Congo using the 9Q5WS callsign. He is due to be in the US on leave during August and will then return to 9Q5 to remain until June 1970.

HM1AY/XV5 has been reported as on the air from Hue, S. Vietnam. His name is Hill and he is using a TR4 transceiver and doublet antennas. A possible stay in Hue of two months has been mentioned. QSL's are requested via the HM bureau.

7G1CG (Guinea) is said to be fairly often to be found on Sundays between 14.00 and 16.00 around 21,175 kHz on ssb. His QSL manager WA3HUP has unfortunately not yet received any logs and is therefore unable to deal with requests for cards. Registered mail sent direct to PO Box 33 Conakry has been returned to the sender marked " inconnu." There must therefore be considerable doubt concerning this station's authenticity.

Between 22 July 1969 and 22 July 1970 Polish stations will be found using the prefixes 3Z1 to 3Z9. This is to commemorate the 25th Anniversary of the Liberation of the Polish People's Republic. Another new set of prefixes reported is the series C3A to C3Z which will be used by stations in Andorra instead of the old unofficial PX prefix.

The reed boat " *Ra* " currently in the S. Atlantic, operates on 14,234 kHz between 10.00 and 11.30. This follows a traffic sked on 14,217 kHz lower ssb. QSL's should be sent to the address in *QTH Corner* for LI2B.

ZD9BN is now on the air from Gough Is. and has replaced ZD9BK. He has been reported on 14 MHz cw.

HC8RS, located in the Galapagos Is. is reported to appear frequently around 13.00 at weekends on 21,200 and 21,400 kHz ssb, and at 23.00 on Wednesdays on 14,105 or 14,190 kHz. He asks for QSL's from Europe via HC2HM.

5B4FD/P was on the air for the weekend of NFD and was specially licensed for the period. Amateur radio for Cypriot nationals is still not normally permitted.

I1ICL/MM, Commander Valli, will be sailing a small rubber boat from Peru to Tahiti—a voyage which should take about 80 days—and he will be on 14 and 21 MHz with a Swan Cygnet and a balloon aerial.

JW8MI will be on the air from Spitzbergen for a 12 month period commencing 1 July. He will be using an SB300, SB400 and SB200 and will have an 18 AVQ vertical antenna which will enable him to operate on all bands 10 to 80m cw ssb. He is said to be most likely found around 14,050 kHz cw and 14,190–14,195 kHz ssb. QSL cards will be sent out by LA8FI.

continued on page 488

REGULAR FEATURE

FOUR METRES AND DOWN

By JACK HUM, G5UM*

Communications Today

A CORRESPONDENCE debate in *Practical Wireless* has illuminated in a significant way some of the present day attitudes towards amateur radio. On the one hand there has been a body of correspondents who asked that the road towards obtaining an amateur transmitting permit should be made even easier than it is now. On the other side, there was no dearth of repliers to the effect that those who want a licence badly enough will assuredly be prepared to undertake the necessary effort to get one.

It is arguable that getting a licence today is already too easy, and carries the danger of admitting into amateur radio people with little more than a peripheral interest in it.

Maybe this doesn't matter much if the peripherals of today are the drop-outs of tomorrow. What *does* matter is the damage they can do en route. When poor operating habits go along with ignorance of what happens inside the box on the operating desk, any claim to be a member of the Amateur Service in the sense intended in The Licence is doubtful, to say the least.

What is needed today is more radio amateurs and fewer hams. The proportion between the two is still weighted in the right direction; yet the antics of a small number of the less serious minded are bound to endanger the repute in which the Amateur Service as a whole is held.

* * *

What bearing does all this have on " Four Metres and Down "? Quite a substantial one.

Last month we reported the observations made by Colonel Severin at the VHF Convention Dinner that we on vhf should use our valuable allocations to the full for worthwhile experimental work. The implied warning is clear: that if *we* don't, others will.

There was no suggestion in the Colonel's speech that the Amateur Service is failing to make adequate use of its vhf allocations—and certainly since the advent of Class B licensees on 2m this band is enjoying an occupancy greater than ever before. But listening to his words brought home to us the need to persuade on to the very highs and the ultra highs (especially) many who now use the lower frequency bands, and perhaps have not even considered the attractions of vhf and its potential for giving them a better service than hf does. It is good to witness how the steady migration from hf to vhf has noticeably accelerated in the last two or three years as Class A licensees sought to escape the so-called rat race on hf. This trend must continue.

What it must *not* do is to bring poor operating habits with it. A comment received from Eric Briggs, G3IJU, of Ruislip, is timely. While applauding the publication of "The Metre Wave Man's Code," he goes on to deplore what he sees as a falling off in operating practices and techniques.

He declares: " The post-War years gave us the ex-Service operators. National Service gave us some partially trained operators. Both groups benefited from some form of training and signals procedural discipline. However, the current crop of emergent licensees seem to have no knowledge at all of national or international practices. Listening on 2m here in the London area soon produces evidence of this lack of knowledge. On 80m it is atrocious. As an ex-professional operator for 21 years, with some knowledge of world wide standards, I am appalled at the degeneration of the standard of operating encountered in the United Kingdom."

Strong words, with which many will concur. They bring us more or less to the point where we came in. More people on vhf, but better operating. This is the requirement. How is it to be satisfied?

Brussels and After

The International Amateur Radio Union is amateur radio's United Nations. Contrary to what is professed from time to time by the unthinking, it is not just a talking shop: it is designed for action. And when its regionally organized constituent societies meet, recommendations made and subsequently ratified at national level can have far reaching effects on the practice of amateur radio.

Several of the recommendations put forward at the Brussels Conference in May by Committee "B," which was the VHF Committee, have now moved on for discussion by the RSGB Council. These recommendations—and the best vhf brains in Europe were behind them—were aimed to enhance both the pleasure and the efficiency with which the Amateur Service conducts itself on the metre wavelengths. More about them, here, in due course.

Constantly borne in on the RSGB delegation during their week in Brussels was the respect which our Continental friends hold for us in these islands. There's no doubt that UK influence is considerable. In turn, RSGB policy may be said in a colloquial phrase to be " to go along with Europe."

One particular respect in which this give-and-take spirit was very evident was in connection with position fixing systems. When the RSGB delegation presented the Georef concept it was sympathetically received and fairly debated. But what became obvious to all, including the RSGB delegation, was that there is at this time no case for Georef (though one Continental delegate remarked that there might have been ten years earlier). In consequence, the RSGB affirms its intention to support the QRA Locator system and to make available to members three maps based on it. For further details see QTC, page 475.

A highlight of the proceedings at Brussels was the presentation by G3FZL of his talk on the suppression of ssb spurii, made famous from last November's IEE meeting and

* Houghton-on-the-Hill, Leicester LE7 9JJ. Send reports for the August issue by 14 July, and for the September issue by 11 August.

at Whitton. It was one of several technical dissertations in which the Conference took a lively interest.

Upon his return Geoff Stone, chairing the June meeting of the Society's VHF Committee, described to the members the "very good spirit of co-operation" which was so manifest throughout all the proceedings at Brussels, and added: "So far as vhf was concerned, Committee 'B' was a really live and constructive body . . . not just one or two of its members but everybody."

The International E-M-E Tests

When in the normal course of events communication on the 23cm band is measured in dozens of miles, usually from hilltop to hilltop under portable contest conditions, it seems to us that Earth-Moon-Earth working on 1296 MHz is just about the ultimate in amateur radio communication—out of this world literally as well as figuratively. Yet the state of the art in an E-M-E context is now such that success can almost be guaranteed, given the right parameters at each end, and these include a favourable position of the moon itself.

These thoughts are prompted by what happened during the international Moonbounce Tests promoted by WB6IOM on 24 May. The Californian's 23cm signals were once again heard at good strength at Chelmsford, where with G3LTF having to be away at the time his E-M-E receiving equipment was operated by G3ORL and G3VPK. They held WB6IOM for 40 minutes from 2000GMT at peaks of 12½dB above noise in 100 Hz bandwidth.

At the Californian end WB6IOM heard W5LGW in Texas, who was using 100 watts into a ten foot dish. An unidentified signal on 1296·000 was thought to be W4QIF. The Texan is on 1296·036 MHz each weekend.

Further to facilitate operation from inside the shack, G3LTF now controls the big dish via a large gearbox and a selsyn, and finds that tracking the moon is much more readily accomplished. His system yields about 8dB of solar noise from the quiet Sun. For the guidance of other intending E-M-E experimenters he suggests that if a system were built to produce 4dB of solar noise, it should be capable of receiving WB6IOM at about 6dB over noise.

Ionization over Frankfurt

Precisely as forecast, the 4m band opened up in late May and early June for long range contacts by sporadic-*E* propagation. What was much less expected was that 2m did so as well.

It was at breakfast time on Saturday, 24 May, that G3IPV out on the seaboard of the Norfolk bulge noted that the weak French-speaking stations which he always hears working among themselves were much stronger than usual. Could sporadic-*E* be developing? he wondered. Four hours later he had the answer: there was HG5AIR calling CQ on am. A quick call on A1 at 11.45 GMT brought him straight back, and reports of RST599 were exchanged. Within days a confirmatory card came with the news that this was the Hungarian station's first G station to be worked. HG5AIR is the callsign of the Malev Radio Club (Hungarian Airlines).

Shortly afterwards another east coast station, G8AXC of Scarborough, heard the Hungarian "at a crashing S9," optimistically gave him a call with the 5 watt transmitter and to his surprise raised him to receive a RS57 report. A well known exponent of 70cm, G8AXC persuaded the Hungarian to attempt a contact on the next band up. Results were negative—but then "spor on 70" is rare indeed.

This particular opening was not confined to east coast stations: at Birkenhead G3SKT heard the Hungarian at great strength. There are also reports that OZ and SM stations heard Italian and Spanish amateurs on 2m on that same 24 May over much the same period of 1200–1300 GMT. From the evidence, G3LTF estimates that the sporadic-E concentration that produced this opening was centred over Frankfurt.

As G3IPV remarks: "I wonder if we are missing many frequent sporadic-E openings to the south, all the year round." The only way to find out is to have a sufficient number of stations on the 2m band all the time to catch any anomalous propagation conditions that show themselves—and since most of us have jobs of work to do in places other than 2m this is a wishful thought. It's the old old story about being in the right place at the right time.

* * *

It was on the same 24 May date that the many operators lying in wait on 4m for the expected lift were well rewarded by contacts with the Gibraltar-men. On 2 June the new ZB2VHF beacon on 70·311 MHz was heard pounding in at many locations from the South Coast well up into the centre of England.

* * *

From Storrington in Sussex BRS15744 reports intense sporadic-*E* activity on 1, 2, 3 and 7-8 June. He does a daily check for sporadic-*E* manifestations with nearby G3JHM, and early morning landline calls enable notes to be compared—and notes (of the other sort) put over the telephone to one another with the comment: "Can you hear this one?"

To show the comprehensiveness of Ron Ham's band checking, here is a brief word picture of the scene in his radio room. He writes: "The drill here is to start with the S36

BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG	Craigowl Hill, Dundee	145.950 MHz	A1	S
GB3CTC	Redruth, Cornwall	144.13 MHz	A1	NE
GB3GW	Swansea	144.250 MHz	A1	ENE
GB3GM	Thurso	144.995 MHz	A1	N/S
GB3GM	Thurso	70.305 MHz	A1	N/S
GB3GEC	W. London	434.000 MHz	F1	N/W
G3SUT	Sutton Coldfield	433.8 MHz	A1	N/SE
GB3SX	Crowborough,Sussex*	28.185 MHz	A1	E/Omni
GB3VHF	Wrotham, Kent	144.500 MHz	F1	North-West

* Not operational

GB3VHF

The Society's vhf beacon transmitter frequency at Wrotham, Kent, measured by the BBC Frequency Checking Station (nominal frequency 144.50 MHz):

Date	Time		Error
27 May	1015 GMT	—300 Hz	low
3 June	1000 GMT	—350 Hz	low
12 June	0840 GMT	—530 Hz	low
18 June	1350 GMT	—380 Hz	low

ZB2VHF is now operational on 50·092, 70·311 and 145·1298 MHz. Reports to G3JHM.

receiver and tune from 30 to 80 MHz on a fixed beam heading to the north-east, and record and log all stations heard. If there is activity a check is made with the 4m converter into AR88LF to look for GB3GM and ZB2VHF. Then a new home-built converter is used to feed the 640 in order to listen for ZB2VHF on 50 MHz. This operation is done three times a day.

" Imagine the following situation: Time 1230Z, solar telescope running and noise coming from the AR88D, with 4m gear running and signals coming from the AR88LF. On 2m signals from GB3GW and the 680X, while the 50 MHz converter is providing signals from the 640, not to mention the S36 thumping out Continental fm signals. All this racket sounds like the monkey house at the Zoo instead of a scientific watch."

The Advent of AMSAT

Back in January, George Jacobs, W3ASK, addressed a meeting of the Communications Satellite Corporation Radio Club on the subject of Project Oscar, in the course of his talk suggesting the formation of an East Coast based group in the US to build new communications satellites for amateur use. He pointed out that the capability to design, build and test satellites now exists in the Washington, DC, area among amateurs employed by the numerous US Government and industrial laboratories located in and near the American capital.

The suggestion was taken seriously, and led to the formation of AMSAT, the Radio Amateur Satellite Corporation. One month after its incorporation in March AMSAT membership stood at nearly fifty.

Talks were initiated at an early stage with officials of Project Oscar. They welcomed the formation of AMSAT and offered whatever assistance they might provide in its activities.

AMSAT functions through the co-ordinated activities of Member Clubs (recognized groups, clubs or organizations) which are willing to undertake specific task responsibilities.

One of its first major projects is expected to be the launching of the Australis Oscar-A, a 30 lb satellite constructed by a group of Australian amateurs and forwarded to Project Oscar for assistance in locating a suitable launch. As it happened, a launch did not materialize on the US west coast and AMSAT volunteered its assistance in initiating discussions with the space agencies in the Washington area. It is believed that as a result of these discussions a launch for the Australis satellite may be obtained within a reasonable time.

The satellite contains beacons on 29·45 and 144·05 MHz. It is not a transponder type unit which can be used for relay purposes, as Oscars 3 and 4 were, and we are told, as future AMSAT satellites will be.

Financing of AMSAT comes from membership subscriptions, which are five dollars annually for individuals—and that means any UK amateurs who would wish to join—and ten dollars per annum for member clubs.

Over here in the UK the AMSAT co-ordinator is Bill Browning, G2AOX, 47 Brampton Grove, London NW4, who did such good work as the Oscar co-ordinator. He tells " Four Metres and Down " that he will issue AMSAT news letters as and when any specific information becomes available.

To British amateurs who wish to join up with AMSAT he can supply an application form which may be sent to the States direct with the five dollars subscription. Information will then come direct to them from Washington.

The address of AMSAT is PO Box 27, Washington, DC, 20044.

Ten Weeks to Field Day

The metre wave year's second major event (Convention is the other) is now only a matter of weeks away: VHF National Field Day comes on 6/7 September, and a refresher-briefing on the rules published here in April will no doubt be a must with all Groups and Clubs intending to participate.

Field Day gives the VHF Contests Committee its biggest job of the year. The task of getting the results out quickly is much assisted if the paper work that will flood into its members' homes after the event is legible, accurate and on the correct forms.

Says " Jakey " Gould, G3JKY, a member of the VHF Contests Committee: " In past years we have had all sorts of cover and summary sheets sent in, or even none at all. As the logs are divided into bands and passed out to members of the Committee, while another member concentrates on the overall results, it is essential that each entry should be accompanied by the Form 427 cover sheet for each band. In addition to this, a VHF National Field Day Summary Sheet must be sent, even by single station entries. If the latter is omitted the entry may not appear in the overall results table."

If you don't already have log sheets, Form 427 cover sheets and summary sheet, write to HQ now, or to G3JKY himself at 60 Merlin Grove, Beckenham, Kent, enclosing a large SAE in each case. That will make one less job to think about in the last weeks before the event.

On the technical front a fair amount of work should be in progress among Groups and Clubs with the object of reducing inter-band QRM of the kind likely to occur from several stations operating on one site (see Rule 6). There's no doubt some ingenious solutions to this one will be worked out—and the *time* to work them out is not during the dummy run a few weeks ahead of 6/7 September but *many weeks* in advance. If you can't get on the intended site because the corn isn't cut try a nearby bit of pasture.

Let " Four Metres and Down " know how this mutual interference problem is cracked, so that the detail may be passed on to others for use next time.

* * *

Coming back to contest logs in general, most of us have met at some time or another the disappointed member who was *sure* he had sent his contest entry in but is mystified why it didn't appear in the final table.

One explanation: he sent his log to the wrong adjudicator. Lots do. Lots more send them direct to Headquarters, which is quite wrong. It has even been known for logs sent to the wrong address to turn up eventually at the right one not only after the closing date but actually after the adjudicator had completed his report on the contest in question.

Verb sap: re-read contest rules before *and after* the event.

Eight more for the Shack Wall

Another eight applications for the RSGB " Four Metres and Down " certificate were ratified at the June meeting of the VHF Committee. For the 4m band Certificates Nos 63 and 64 go to G3WQP and G3OXD/A. On 2m G3ILO gets

Certificate No 124, G3RQI No 125 and G3OXD/P No 126. And for 70cm prowess G8ADC collects No 50 with No 51 going to him for operation as G8ADC/P. To G8ATL goes Certificate No 52.

In the May list of holders a small but to Keith Fisher of Chelmsford vital misprint occurred. His call-sign was given as G3WSM; as everybody knows who has heard the cw coming out of Essex way it's G3WSN.

Vision on

Steadily the number of " Stroke T " licensees increases. Steadily the number of video links on 70cm develops, and this to the extent that the exchange of caption test cards is now regarded as an almost nightly routine. Here is the G6ACU/T " logo " as received at G8ARM some miles across South London . . . .

. . . and here is how a Birmingham station is received 35 miles to the east on a makeshift converter fed into the domestic television receiver. At G6MXW/T 90 watts peak white are radiated; nearer in, the signal is a saturation one that provides a picture comparable in quality to BBC1. Several other operators in Greater Birmingham are similarly active.

To decide if it is worth attempting video reception assess a station's sound signal first. If it is S9 plus on audio there is every chance that it will be excellent on video.

The number of " Stroke T " licensees who can put out 625 line video is also steadily increasing, and with them of course the need for plenty of bandwidth in the 70cm allocation to accommodate signals which are appreciably wider than those on 405 lines. In mid-Scotland another 625 line operator has appeared to join GM6ADR/T, whose activities were recorded here in April. He is Colin German, GM6ADU/T, of Balerno in Midlothian, also known as GM3VBB (in which capacity in a very different context he will be operating 80m cw from Sule Skerry Lighthouse, 30 miles west of the Orkneys, during the course of next month). As GM6ADU/T he is now operational on 436·05 MHz, 625 lines negative modulation, with a peak power output of 20 watts.

Any TV screen photographs taken of amateur stations operating on 625 lines would be especially appreciated for " Four Metres and Down " to help record the activity on this higher definition standard.

Apollo Frequencies

Having seen earlier comments on this page about which frequencies were used for what during Apollo space shots, Sid Webster, G3FUW, of Hinckley passes along the following information, which he says he spotted in the American magazine *CQ*:

Freq	*Mode*	*Information transmitted*
2287·5 MHz (secondary)	PM	Voice, tracking, ranging and data
2272·5 MHz	FM	Television and data
2106·4 MHz (primary)	PM	Voice, tracking, ranging and data
246·8 MHz	AM	Voice and data
259·7 MHz	AM	Voice, data, Apollo-to-moon
243·0 MHz	AM	Recovery beacon

It is understood that the 2·2 GHz transmitters radiate 2·8 or 11·2 watts.

" Bravo Alpha " Hit 707

To operate from eight different counties in 7½ days and make 707 contacts on " Two " in the process, not to mention covering many hundreds of miles of road (and track!), and this with a crew of two, is a feat of endurance by any man's reckoning. It is the kind of expedition superbly organized in the typical G3BA/G3BHT manner that gives the protagonists a deal of pleasure to mount and the 2m fraternity equal pleasure to work.

The first evening's operation from a mountain top near Appleby in the rain produced 87 contacts. Next day out of the mud and westwards to Kirkcudbright and the sunshine, with another 70 contacts in the log. The third day GM3BA/P " from the Mull of Galloway " and a fine seaview site at 250 feet asl gave pleasure to 91; and 91 was the tally from the county of Lanark next day, quite a long haul across GM. The team did even better in Dumfries: 110 stations worked.

In Selkirk and Roxburgh thousand-foot sites were used but conditions went sour. The scores were 58 and 82 respectively, which still represents intensive operating.

Finally back to Cumberland to put another rarish county within reach of aspirants to the " Four Metres and Down " award, and from here 118 contacts were completed.

Best DX was provided by south coasters G6XM, G3FAN, G3BHW and G3DAH; G3XC was heard from Cornwall at 550 kms.

On the earlier Irish trip operation was 85 per cent cw, 5 per cent am and 10 per cent ssb. This time especially to help the Class B phone-only men the proportions were 40, 40 and 20 per cent respectively. Output power was 40 watts on cw and sideband, and 12 watts on am, and the 10-element Skybeam sat at 24 feet. The sideband source was a KW2000A appropriately modified, and used also as the 80m administrative talklink.

The station power source for GM3BA/P-GM3BHT/P-G3BA/P-G3BHT/P was a " Minigen " petrol driven alternator " one and a quarter kilowatts and utter luxury!" to quote Tom Douglas, whose concluding words in his expedition-report to " Four Metres and Down " are: " Winner of the haggis: G3RMB, whose operating, patience and *two* watts pep of ssb netted a QSO in five counties."

Other Expeditionaries

Almost as well known as the G3BA-G3BHT radioactive itinerants is " Four Johnny Johnny," whose job takes him all over Britain and puts his callsign on the 2m air in many unexpected places far from the G4JJ home site at Barnsley. He has been " Stroke M " in every county in England, plus quite a few in GW and GM.

" I am breaking the habit of a lifetime and mixing radio with holidays this year," he says. He will be heard as ON8KJ/M in Belgium, G4JJ/LX/M or " Stroke P " in Luxembourg, and G4JJ/DL/M (or again " Stroke P ") in Germany. There's just a chance he may get to HB, too. Operational frequencies will be 144·078 and 145·56 MHz, and he will tune 2m from 146 down to give the northern UK stations a good chance to work him.

Not wishing to be tied down to any one place or time, " Johnny Johnny " will not fix schedules. Dates to look for him: 21 July to 9 August.

* * *

More dates to book: 28 July to 7 August, when the Hillingdon VHF Contest Group will operate 4m and 2m from the Isle of Man—and perhaps 70cm if equipment can be got together in time. Full details may be had from G3WCB (QTHR) or Peter Marcham, A4414, 14 Lyncroft Avenue, Pinner, Middlesex, the secretary-man for the expedition.

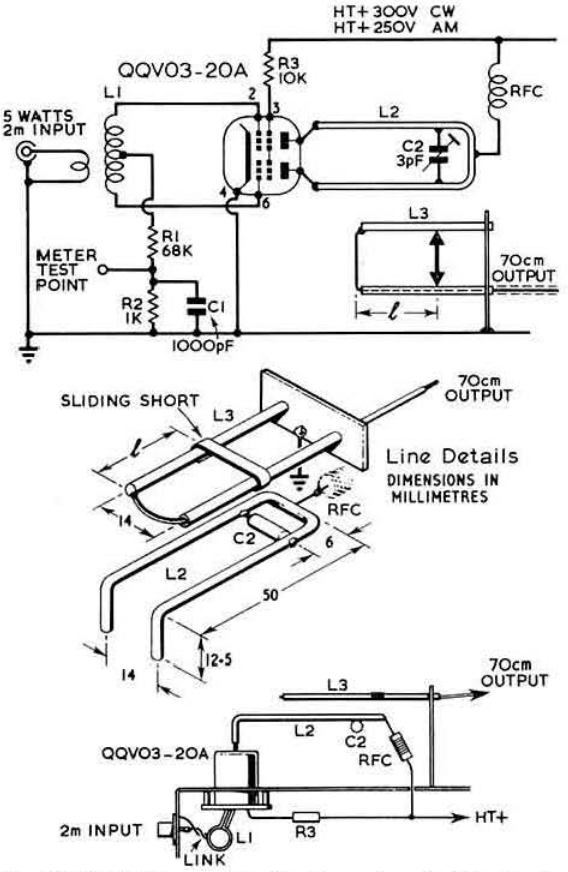
Tech Corner

From G8ARV-G6SBD/T (David Taylor of Dudley):

With the hope of encouraging more activity on the 70cm band here are details of a 70cm tripler (it forms part of the main transmitter at G8ARV). Complete with output balun as shown in the diagram, it makes a self-contained 432 MHz transmitter ready to go.

Drive from a 2m transmitter is coupled via a one-turn link on to the grid tuned circuit L1 which resonates with the valve capacity at 145 MHz. Grid current bias is provided by a 68 kΩ resistor R1; the current can be monitored across R2. It should approximate to 2·5 mA.

The anode circuit consists of a quarter wave tuned line and output balun (see *Radio Communication Handbook*, page 7.6). The line is tuned with a Mullard 3pF trimmer tapped



The G8ARV tripler amplifier for 70cm, described by him in the accompanying note. In the circuit diagram L1 has 4 turns of 16 swg at 10 mm inside diameter, and a one-turn link. The anode choke RFC has 23cm of wire close wound on a 6 mm former.

about 6mm from the shorted end of the line. Both line and balun are made from $\frac{3}{16}$ in brass tube, whose ends are hammered to an oval shape and hence a force fit on the anode lines (take care!).

To set up, apply 2m drive and resonate the grid circuit by adjusting the turns spacing for maximum grid current. Optimum matching to the drive is achieved by varying the coupling of the link to the grid circuit.

Some form of output indicator is now required, and with this in use the output circuit can be resonated. The length of the balun, L3 on the diagram, and its position relative to the quarter wave line, are adjusted for maximum output, thus effecting a match.

Of course this tripler is only a simple starter, but should be easy to build and to get working to encourage some of these new " 2m only " Class B licensees to get going on the " grand band," as I heard 70cm called recently.

From GM3TLA (David Pearson, Aberdeen):

I have built FET converters for 2m and 4m using i.f.s. of 4–6 and 28–30 MHz in both cases. The design has some features in common with the G3HBW design, but in particu-

lar I have used TIS88A for the cascode and mixer. The following points are especially relevant from my experience:

All circuits returned a noise factor of 1dB measured with a home made diode noise generator. I doubt if it is possible to set them up for optimum noise performance without such a unit.

Cross modulation is much reduced compared with transistor circuits, but I have not had enough experience taking these converters out portable to decide just how good they are. In the cascode circuit used the inductor between the two FETs is omitted. When it was replaced the noise level was considerably higher, possibly due to positive feedback. This coil was in the field of the others: like G3HBW, I had not used any rf screening.

It was observed that the 4m converters were subject to parasitic oscillation in the cascode, which altered the bias on the mixer FET, which was how I detected it. The trouble was cured by putting a ferrite bead over the drain lead of the second FET, as near to the device as possible.

When an i.f. of 28–30 MHz was used capacitive coupling of the local oscillator into the mixer did not give enough drive. Link coupling was found to be far more satisfactory.

When using the directly coupled cascode care must be taken in the selection of FETs, for the spread of characteristics is such that the second FET may not be able to pass all the current the first one offers it, if the first is biased to pass several milliamps. Gain will then be reduced. The remedy is the obvious one of interchanging the devices.

From G3PMJ (Stewart Revell, Manchester):

We in the NW VHF Group like the new magazine *VHF Communications*, which is obtainable from G3JHM, and some of us are making a 4m version of the DL6SW converter. In place of the TIS34s we are using the new type TIS88 which is the 2N5245. This FET replaces the TIS88 and costs only 8s 10d from Texas Instruments. The TIS34s are 13s 9d, postage extra. For 4m a crystal at 28 MHz is required. This when doubled in the second TIS45 provides 56 MHz to give an if of 14–14·7 MHz.

Just for the record, a 2m version is also being made!

Here and There

" May I echo the request of Bill Scarr for more information on gear used for 13cm? I might add that as a non-professional just retired from banking I find ' Tech Corner ' of the greatest help."—BRS3015, George Carter of Pulborough.

* * *

Could aurora affect signals as low down as 21 MHz? GM3NHQ of Dundee noted that on the afternoon of 14 May both G3JYP and G6YL exhibited auroral sounds on their normally impeccable T9 notes. A quick check on 4m showed G3RIK with an auroral sound to his signal. No other signals were audible on either band at the time. (ED: *Aurora certainly can affect 14 MHz and lower*).

* * *

" Super-DX corner ": SV1AB beams north-west daily from 1500 to 1600 GMT and calls CQ at the beginning of each ten minute period within this hour. Frequency 145·41 MHz on single sideband.

* * *

Still on super-DX, Charles Preston, K4LJH, would like it known that he seeks transatlantic crossband contacts 10m to 6m. Any UK stations equipped with 50 MHz converters are invited to get in touch with him on 10m phone or cw first, and then to listen for him on " Six." For skeds write him at Ivandale Road, Hamilton, Virginia.

* * *

" Strictly a metre-wave man and regular reader of ' Four Metres and Down,' and at the same time a very new G8, I would be grateful if someone could supply me with a crystal for 12,010-12,020 kHz for local Zone 2. I can offer a 12,090 crystal in exchange."—G8CPB (ex A5477), J. J. Kozminski, 1 Campbell Road, Bournemouth.

* * *

Old timer and vhf pioneer Leon Ward, now GW5NF, is enjoying retirement near Tregaron in mid-Cardigan. He may be found on 144·48 on schedule with GW3LJP daily at 7 pm. He will have a cw-end crystal soon. He says: " After a spell on hf came back to vhf for a rest from the noise. Even during the week it is tough. Tell the gang to have a look west more often." His new QTH is Ynys-y-bont, Swydd-ffynnon, Ystradmeurig, Cardiganshire.

* * *

" Re the piece ' Men of Brass,' I find 2m cw a dead loss unless either by sked or an opening to the Continent. The G3s seem to have ceased using cw now there are more phone stations to work."—G3VSZ. (More on this subject next month.)

* * *

" The last 70cm contest was on a Bank Holiday. The third one is on 10 August, the same day as the Woburn Rally. Last year the second 70cm coincided with the Gilwell Rally. Can anything be done to avoid these clashes?"—G8AWO.

* * *

" Operating Stroke P from Slieve Gallion, Co. Derry, in the May portable contest, I formed the opinion that not many stations were tuning the top few kHz where I was (145·984) despite statements that they were tuning 146 down . . . many northern stations were heard with their beams 90 degrees off GI "—GI8AYZ.

* * *

" For those interested in ssb every Monday at 2300 hours clock time this is EI/GD/GI time. . . . The other Monday EI6AS, GIGXP and GD3FOC were all on and worked by Midlands stations "—G3BA.

On top of the take-off. Three members of the Cornish Group on recce just before one of the recent RSGB 2m portable contests. From left to right they are G2BHW, G3WKF and G3LBP.

Wolverhampton Meeting

Reporting the Midlands VHF/UHF Convention

It was an inspired move by the Midlands VHF/UHF Convention's organizing committee (G6FK, G6UI, G8AEV, G3THW and BRS30717) to secure the Dunstall Suite on Wolverhampton Racecourse for the gathering of Saturday 14 June. This brand new building with its Festival Hall style architecture offers on the first floor up a fine meeting hall that gives on to a broad balcony looking on to the greenery of the racecourse with its tree lined boundary. In such a setting on the hottest summer day for years it didn't seem to matter much that the vhf bands were wide open: there would be time to attend to them when you got home.

Something like 120 members assembled just before half past two to hear the welcoming address by G3DAH, conductor of *Short Wave Magazine's* " VHF Bands " feature and chairman-for-the-day. He introduced G3NNG, billed to lecture on " A New Approach to VHF/UHF Receiver Design." Supported by G2HIF, who had accompanied him to the Midlands from that radioactive place down in Berkshire, G3NNG gave what can only be described as a marathon discourse for 90 minutes about a device comparable in size to a small portable typewriter which in fact was a receiver, complete with HRO tuning mechanism on the front, which provided a high order of performance on 2m, 70cm and 23cm, each band selectable in a matter of seconds.

Afterwards, there was time to inspect the receiver in detail, as well as a number of other home constructed items which members had brought along, before dinner was called at 7.30 pm. Ninety seven were present.

In his after-dinner address G3DAH paid special tribute to G3BA and G3BHT, both of whom were present, on the success of their latest DX-pedition to Scotland. He also touched on the value of the various vhf/uhf groups which were springing up in many parts of the country, often without permanent meeting places, written constitutions or even subscription rates, but able to invite leading practitioners of vhf to lecture to them. He recommended such groups as a " form for Club secretaries to consider." On a serious note, G3DAH reiterated the " use or lose " theme of the Whitton Convention dinner speeches and while welcoming the great increase in activity on 2m which the Class B licensees had fostered, urged much greater use of the 70cm band—and indeed of any metre wave allocation which we had at our disposal. J.H

The Month on the Air

continued from page 481

Band Reports

As is usual at this time of the year there has been a falling off in the number of reporters to this section, but quantity has been replaced by quality! Conditions seem to have been very much as last month with higher static levels, and with some intense short ship on the HF bands at times. Eighty metres still produces remarkable DX signals for those who have the energy to stay up until the small hours, and even ten metres still produces the odd DX opening. One particularly interesting station reported on forty metres was " BY1KPC " on am who was heard at 23.00 one evening working a DL. The operator gave his name as Lin and said that the station was the amateur radio station of Radio Peking—using a 12-element beam pointing to Europe! More information is awaited with interest.

Very many thanks to the following, who provided the logs from which this section was compiled: G2BOZ, G2BW, GM2HCZ, G2HKU, G3AAE, GW3AX, G3LNS, G3TZU, G3UYM, G3WNT, G3YHB, G8VG, BRS26870, BRS30694, BRS31172, A5390, A5812, A6023, A6098 and A6254.

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

3·5 MHz 01.00 CR6AI, KV4FZ, *VP2LZ*. **20.00** *CR6IK, VK2EO, ZS3AW*. **21.00** VK2AVA, ZS5QU, 5A1TK, 5Z4's KL, LS. **22.00** CR7FM, HV3SJ, LG5LG, PY's 1CAD, 7GV, TA1SK, VP8's FL, *JT*, KO, 9M2's DQ, RH, 9X5PB. **23.00** CR6IV, HB0FM, G3ESP/LX, *VK5NO*. **24.00** CR4BV, PZ1DF, TU2BC.

7 MHz 01.00 ET3USA, TF3TP. **21.00** VK2AVA, *VS9MB*, ZS1JA, 5Z4KL. **22.00** CN8AW, PY's, 5A2TR, *9H1BL*, **23.00** *CX8CZ*, HB0AFM, ZP3AB, 9M2's DQ, RH, 9Y4KR. **24.00** EA6BG, F9UC/FC, *VP2LZ*.

14 MHz 02.00 VU2DK. **04.00** *HU1P*. **07.00** FO8BY, W1HGL/MM (U.S.S. *Vanguard* in S. Atlantic on Apollo 10 mission), TV7BI. **08.00** *FB8ZX, KS6CX*, KW6GJ, TG8IA, *YJ8JM*, YS1AG, *VK0MI*. **10.00** *EI0SI*. **11.00** LI2B. **16.00** CR8AI, 5X5FS, *9M2VI*. **17.00** JX4YM, 9M6HM. **18.00** ET3ZU, F0LJ/M (G3FXG), *HH9DL*, 4S7YL, 9K2AM. **19.00** AP2AD, CR6GA, VU2ASW, 9V1OI. **20.00** JX1OM. **21,00** DU9EO, KR6JV, 8R1P. **22.00** FG7XT, PY0RE (Trindade Is.), TN8BK. **23.00** PJ7CJ, **24.00** VP5AB.

21 MHz 06.00 *OA4ED*. **09.00** *TJ1AJ*, 9X5AV. **11.00** HB0GJ, *VU2VZ, YA2AR*. **12.00** KX6GS, VK9RY, VP2LZ, *4U7ITU*. **13.00** KC6JC, VS6AA. **14.00** IT0ARI (Exhibition station), *TA2E*, XW8CS, VP8KO. **15.00** KG6ALY, YB0AAC. **16.00** AP2MR, 9M6HM. **17.00** *CT3AS, DX1AAV*, EL9C, FR7ZL/T (Tromelin Is.), HR1KAS, VK9XI, *VS5PH, YB1AK, W3AMU/YB6*, 9V1OG. **18.00** FL8DJ, *JT1AK, KH6COB*, VP2AA, *VQ9/A/A, VQ9/A/D*, YB1JM, 5R8's AS, AX, 7P8AB. **19.00** KH6GKV, VP8KL, VS9MB, ZD8JW, 5H3JL, 9M2DQ. **20.00** EA9AQ, HI3AGS, 5Z4KM. **21.00** CE0AE, *FK8BN*, 9Y4MM. **22.00** HP1LB, *JT1AK*, ZD8Z, W7HST/8R1, *9Y4DS*. **23.00** OA4US.

28 MHz 08.00 *VK2EO*. **09.00** HV3SJ, *TJ1AJ*, VK9XI, *ZD5X*. **10.00** VK9RY, *VR2DK*. **11.00** KR6TAB, VS6's AA, AD, *VU2GGB, XW8BP*. **12.00** *SV0WE*, 4S7DA. **13.00** FG7XT, MP4TCZ, *SU1IM*, VQ8CG, 9N1MM. **14.00** CR8AI, *UA9XI*, 9X5AA. **15.00** VP8KO, ZP5CN. **16.00** *CR6GO*, TN8BK, *UA0BX*, VP8's KF, KR. **17.00** PJ2VD, VQ9EP, ZD9BM, 5H3MA, 5R8AX. **18.00** *CE8AA*, KV4AD, *VQ9/A*, ZS3HX. **19.00** ZP5's CN, GJ.

Many thanks are expressed to all correspondents and especially to the following for permission to reproduce items from their publications: The **Ex-G Radio Club Bulletin** (*W3HQO*), the **DX'ers Magazine** (*W4BPD*), the **Florida DX Report** (*K4GRD*), **CQ DX** (*ARI*), **NARS Newsletter** (*5N2ABG*), **Long Skip** (*VE3HJ*), **QUAX** (*SM4DXL*), **On the Air** (*ON4AD*), the **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0TO*), and **DX News Sheet** (*Geoff Watts*).

Please send all correspondence **to reach G3FKM** no later than **15 July** for August issue, **5 August** for September issue, and **2 September** for October issue. **Please note that the closing dates for September and October are exceptionally early.**

SOCIETY AFFAIRS AND NEWS SUPPLEMENT

A Brief Report of the Council Meeting held at Society Headquarters on 17 May, 1969

President: Mr J. W. Swinnerton (President, in the Chair); Messrs B. Armstrong, N. Caws, J. Etherington, J. C. Graham, E. G. Ingram, G. R. Jessop, L. E. Newnham, J. Petty, R. F. Stevens, G. Twist, G. M. C. Stone, E. W. Yeomanson, (Members of Council), A. E. Dowdeswell (General Manager), and J. Adey (Editorial Staff).

Apologies for absence were received from Messrs R. J. Hughes, A. F. Hunter, H. E. McNally, D. M. Thomas and F. C. Ward.

Membership and Affiliation

Council approved the election of 126 Corporate members, 32 Associate members and granted Corporate membership to six Associate Members.

Council agreed to waive the subscriptions of five members on the grounds of blindness or other disabilities.

Council approved the affiliation of:
St LAWRENCES AMATEUR RADIO CLUB
St Lawrences Hospital, Bodmin, Cornwall
Secretary: W. F. Swain, BRS31270

John Clarricoats, G6CL

In response to a request from Mr A. O. Milne, Council agreed to approach the GPO with a view to having the callsign of the late John Clarricoats reserved for the Society.

Mr Caws reported that an account had been opened for the G6CL memorial fund and some contributions had already been received (see page 272, April issue).

Recommendations of Committees

Council approved the following Committee recommendations:

HF Contests Committee

To co-opt Mr G. T. Peck as a corresponding member of the HF Contests Committee with special responsibility for D/F Events.

To make awards as published in *Radio Communication*.

Mobile Committee

To ensure that the Mobile Committee is kept fully informed of all Mobile Rallies, the General Manager will pass to the Committee all information as received.

VHF Contests Committee

To award Certificates of Merit to the leaders of the 432 MHz Cumulative Contest 1969.
Winner: J. Warrington, G8AKE.
Runner-up: J. Foster, G2JF.

IARU Region 1 Conference, Brussels

Mr Caws, as leader of the Society's delegation, reported briefly on the main features of the Conference. A full report will appear in *Radio Communication* (see page 456).

VHF/UHF Convention, Edinburgh

Mr Stone reported receiving an invitation to attend this Conference in his capacity of VHF Manager and this was approved by Council.

Area Representative

Council approved the nomination of Mr H. G. Newland, G5ND, as AR for the Blackpool Area.

Call Book

Mr Stevens reported on the compilation of the *RSGB Amateur Radio Call Book* and hoped that eventually it might be published in an expanded form.

Council approved a proposal to approach Mr J. W. Mathews, G6LL, to be compiler of the 1971 edition *RSGB Amateur Radio Call Book*.

Minutes of Meetings of Committees

The following Committee Minutes were approved by Council.

Mobile Committee (28/2/69); HF Contests Committee (10/4/69); VHF Contests Committee (29/4/69).

Council was in session for 5 hours

H. A. M. Whyte, VE3BWY, ex G6WY, and Mrs. Whyte being shown a copy of the *Radio Communication Handbook* by our receptionist Krystyna Idczak. Ham was an RSGB Council Member back in 1956 and moved to Canada shortly afterwards

Special Event Stations

Finchley

The Southgate Radio Club will be operating from the Finchley Carnival on 10, 11 and 12 July from Victoria Park, London, N3. Activity will be on all main bands and further details can be obtained from G3MBL or G3TXA.

Isle of Wight

The Isle of Wight Radio Society is putting on a special station, GB3IIF, at the Isle of Wight Industries Fair at Ryde Airport from 8 July to 17 July. They will operate from a marquee fitted with three separate stations and a local manufacturer is supplying three hydraulic aerial masts. A similar show in 1967 was a great success. Operation will be from 15 to 160 metres using the three main modes and there will probably be some VHF operation also. A special QSL card will be available.

Crawley

GB3RGD will be the call of a special station operating at the Gala Day of the Redifon Company on 13 July. The equipment will comprise a KW2000A transceiver, a KW600 linear and various multi-band dipole aerials. The station will be on all bands with SSB. The operators will be G3MGL, G3KEA and G3YAB and the station will be situated at the Redifon Sports and Social Club at Crawley.

Harlow

Harlow and District Amateur Radio Society is running exhibition stations, static displays and probably an Amateur TV station at the Harlow Town Show on 30 and 31 August. Further details from Brian King, 36 Upper Park, Little Parndon, Harlow, Essex.

Rochester

The Secondary Modern School at the Hundred of Hoo, Hoo St. Weburgh, Kent, will be holding its Annual Fete on 5 July. A special station operated by the Medway Amateur Receiving and Transmitting Society will be active on all the hf bands using am and ssb under the call G2FJA, from 1200 to 1800.

High Wycombe

GB3WRA will be operated by a group of local amateurs from the Annual Wycombe Show on the Rye, High Wycombe, Bucks, on Saturday, 6 September. Operation will be on all bands from 160 to 4 metres using am, cw and ssb. Visiting amateurs are very welcome. Further information can be obtained from G3FSN, 70 Hughenden Ave, High Wycombe, Bucks.

Stoke Mandeville Games

The International Stoke Mandeville Games for the Paralysed are being held at Stoke Mandeville Hospital, Aylesbury, Bucks, from 27 July to 2 August, 1969 in the new sports stadium, built especially for the disabled. There will be a Special Event Amateur Radio Station for the occasion and the call sign will be GB3SMG. Operators will be G3OTB, G3TER, G3WHO and G3XIF. They intend to use all bands from 160–10m and hope to be on the air at least from 0900–1800 BST.

Southend

G6NU will be running his "Uncles Southend Do" on Sunday, 17 August at 12 noon for the first meeting time and 3.15 pm for the second meeting time. These will be at the land end of Southend pier and the social events will take place at the Liberal Hall, off the High Street. Wives and friends will be very welcome.

Obituaries

Norman Thompson, W8YHO
Russell Barron, VE2AFB

It is with much regret that we must report the deaths of two more well-known members of the Ex-G Club, following the recent passing of Bob Pearce, K5QWZ.

Norman Thompson, of Akron, Ohio, died on Sunday, 18 May. Norman emigrated from Sunderland and was Honorary Secretary of the Ex-G Club for many years up to 1969. The hard work he put into the club with W3HQO was largely responsible for getting the club into a going concern and he will be sadly missed by all its members, and by all who have known him as the cheery voice from Akron. He is survived by his wife Elaine and two sons, to whom we convey our sincere regrets.

Russell Barron, VE2AFB, ex G8RN, passed away in Montreal General Hospital on 8 April. He was a long standing member of the Ex-G Club having been born in Southampton. He is survived by his wife Juliet, to whom we convey sincere regrets. F.F.

Arthur Denys Narraway, G2APW

The death occurred on Tuesday, 27 May, of Arthur Denys Narraway, G2APW, as the result of a heart attack.

He was 67 years old and had been keenly interested in Amateur Radio for the past 50 years. His "artificial aerial" permit was issued around 1936 and the full radiating licence was granted in 1946. Since then he had remained active until a month ago.

A schoolmaster by profession and also a very accomplished church organist, Denys will be sadly missed by his many friends on top band and eighty.

Our sympathy goes to his widow, son and daughter in their great loss. O.H.O.

R. E. Rogers, BRS29599

It is with deep regret that we record the passing of R. E. Rogers, BRS 29599, who died suddenly on 27 May, 1969.

He was only recently successful in passing his RAE and he had applied for a G8 call for which he was programming a constructional future. He was a man of perfection and he will be sadly missed.

To his wife Margaret and son Paul we extend our deepest sympathies. D.N.T.W.

John W. Sole, G3LIG

It is with deep regret that we record the sudden death of J. W. (Jack) Sole, G3LIG, who passed away on 20 May, 1969.

A pre-war territorial, he served in India during the war, having been able to join the RAF as a radio operator because of his skill as a regimental signaller. His interest in radio continued after the war for him to become a well known enthusiastic DX operator, especially on 15 metre CW.

Jack was a superb gardener and his knowledge of the wild plants and animals of East Kent was outstanding. He was for many years the village postman.

At his funeral on 24 May, the RSGB, EKRS and local amateurs were represented by G3FUN, G3MDO, G3WAW and G3MLO. To his wife Phillis, daughter and son-in-law, we express our deepest sympathies. He will be greatly missed. D.N.T.W./D.J.W.

C. S. Norman, G3FCY

It is with deep sorrow that we have to record the passing on 4 April, 1969, of C. S. Norman, G3FCY, at the early age of 53. Charlie was a true amateur in all respects. Always helpful to newcomers and a friend to all who knew him. His death after a short illness was indeed a shock to many amateurs in East Yorkshire especially those active on 144 MHz. Charlie was the treasurer of the Hull and District Amateur Radio Society for a number of years and will leave a space which will be hard to fill. Our heartfelt sympathy is extended to his widow Vera and his son and daughter Gordon and Jean. D.N.B.

YOUR OPINION

2 m MOSFET Converter

From: C. J. Horrobin, G3TZW, Stoke on Trent.

In reference to the article on the MOSFET 2 metre converter (June 1969). I would just like to add a warning to prospective constructors. Using a similar converter mixer circuit I have to date managed to destroy five out of five 40600 series dual gate MOSFETS. I would agree with G3HBW that these devices are not, perhaps, as susceptible to body static as feared. However I will advance the presumption that G3HBW was not using an ac iron nor has he used the converter with a direct connection to mains operated equipment. In spite of earth connections I have found both deadly.

A 10 volt zener between the supply lines appears to prevent the devices going completely dead, but gate leakage increases, in a specific case about 10,000 times. This causes a deterioration of the device's otherwise excellent characteristics.

As I would presume that static on the coax outer would produce a similar destructive effect I am at the moment holding nine of these devices in the hope that a solution is available.

The Author, Arnold Mynett, G3HBW replies :

In response to G3TZW's comments about the fragility of MOSFET's, I can only say that I find his experiences very surprising and mysterious and can only suppose that his set-up is suffering from some sort of intermittent earth-connection.

I do indeed invariably plug my converters directly into mains-operated receivers of various types, including an old broadcast set and I also use several directly mains-fed soldering irons without mishap and with no precautions other than the earthing of the bit and of the receiver and converter chassis. Converter DC power is of course switched off during soldering.

I have had two MOSFET failures so far but both were caused by gross overloads; in one case gate$_1$ was inadvertently shorted to chassis (+ve) with a screwdriver during probing operations and, in the other 25 volts RMS of RF were fed directly to gate$_1$ through a faulty diode T/R switch. Either of these faults would have blown up a junction-gate FET or even a bipolar, let alone a MOSFET! In both cases, as remarked on by G3TZW, the gate$_2$ to source insulation resistance dropped to a few tens of thousands of ohms. This situation is easily checked in practice by measuring the gate$_2$ to source DC voltage which seems to fall to about one half of its normal value, with the component values as shown in my circuits.

G3HBW

Distasteful VHF Contest Practice

From: GM3TFY, GM3SRV, GM3RXZ, GM3OWU, GM6SR, GM3OWI, GM4NC, GM3UM, GM3RVL, GM3LAV, GM3PSP, GM3VTH, GM8BJF

It has become common practice in recent years for English operators to cross the border into Scotland in order to operate schedules on VHF from " rare " Scottish counties. Such expeditions are usually heralded by much pre-publicity to enable a full operating programme to be filled. These stations generally operate for several days or more, and arrange the end of their expedition to coincide with a VHF portable contest. Indeed, most even have the audacity to emphasize their intention to operate during a contest.

We, the undersigned resident Scottish VHF operators, consider that it is contrary to the spirit of a contest for portable stations to advertise their presence in an area, either in print or by arranging to operate schedules during the days prior to a contest.

RAEN

From: H. J. Phillips, GC3PRA, for Jersey Amateur Radio Society, Jersey, C.I.

I read, together with my fellow club members the farcical paragraph by G3PAZ regarding the growth of RAENET, and a mixture of amusement and anger has prompted me to pass comment on the opening lines concerning enquiry from GC land etc. I feel I must place the full facts before readers, and these briefly are as follows:

Early last December, the chief of Jersey Civil Defence approached me, having heard of the valuable work done by Amateurs during the east-coast floods (before official RAENET times) and also during the recent Italian flooding, to see if we could supplement the communication system in times of disaster etc. Knowing little of the organization of the UK RAENET, I wrote on 20 December to the Hon. Sec., Mr Bassett, explaining what was wanted and asking for any assistance he could give us to start a Group in Jersey. Hearing nothing from him, I sent a copy of the letter, and a further letter to the then Registrations Sec., G2ABC to ask if he could help. Again, no reply and our Society Chairman GC3XOJ personally telephoned RSGB HQ to try to get some information on why we had not had acknowledgement of my enquiries. The only real satisfaction he got was that this kind of treatment was not altogether unusual, and they were already investigating a similar complaint, but promised to look into it. This was the beginning of April and by the middle of May we have not had one single word from any RAENET official.

Ignorance, using the word as " lack of knowledge," of our request and enquiries can be ruled out as proved by the comment of G3PAZ. Failure to acknowledge can therefore force us to use the word in its other sense, together with obvious " Don't want to know you " attitude.

We have, therefore, placed our services at the disposal of our local Controller of Civil Defence and we can provide quite adequate co-operation within the terms of our licences and have now no need for affiliation to the RAENET (Dis) organization.

I feel that other clubs referred to by G3PAZ should at least be prepared for the kind of treatment JARS has received (or is it, not received?) and make preparations to " go it alone " if necessary —hence my opening statement of RAENET patting themselves on the back.

This letter may not be published in your columns at all, since it is not flattering to RAENET—indeed it is not meant to be, so with this in mind I am also submitting a shortened form of report to the *Short Wave Magazine* so at least most of the Ham Fraternity will be aware of the state of things.

RAEN Committee member S. W. Law, G3PAZ replies—

We in RAEN ask for brickbats—and here we have a beauty! GC3PRA has a point and we apologise for his discomfiture (unfounded) and our apparent lack of courtesy (unwitting). Were RAEN an industrial or a commercial organization the position would be execrable; we are, however, just volunteers trying to do a useful job for our fellow-men at our own expense, sometimes at the expense of our daily work. Our members fall sick, move house, are called away on business, have domestic crises and so on; and, unlike commercial houses, have no filing clerk nor secretary to keep the ball rolling. Something went wrong—it will be rectified and we welcome such an energetic reaction from a prospective body who obviously mean business. There is room on the RAEN Committee yet for men of spirit! None of us lasts for ever. Meanwhile the brickbats serve to build a stronger edifice.

CONTEST NEWS

Low Power 3·5 MHz Contest

This year's contest, held on Sunday, 30 March, attracted 14 entrants—exactly the same number as the 1968 event. It is of interest to note that only five of last year's entrants appear in the results table above, although another five or so participated.

The leading station was G3JVJ, operated by Alan Wybrow, from Solihull, and subject to Council approval he will receive the " 1930 Committee Cup " and a commemorative plaque. Alan used a TT11 pa drawing 6·5mA from a 70V supply, an 888A receiver and an inverted-vee dipole at 40ft. Second place is taken by Philip Bagshaw, G3NEO, who ran 0·5W to a 6C4 pa driving a dipole at 30 ft. G3IGU, in third place, had a transistorized transmitter using BFY51s, and a 133 ft aerial. G3DOP deserves a special mention as 28 of his contacts were made with the aid of an all FET transmitter running 176 mW to a 137 ft wire. G3NEO and G3IGU will both receive Certificates of Merit in due course.

Comments from competitors: " Next year how about 06·00-17.00 ?" —G3IAR. " How about a multiplier for distance?"—G3WJS. " Amazed at what can be done with QRP,"—G3WRR. " Still tough going from down here!"—G3GDW. " Really hard going!"—GM2HCZ

Quite a number of entrants commented that they would have preferred an earlier start and an earlier finish. The Committee have noted these remarks, and will consider them when the Rules for next year's contest are reviewed.

Check logs from G3YBJ and G5LB are acknowledged with grateful thanks.

Posn	Call-sign	Score	QTH	Power(W)	QSOs
1	G3JVJ	4900	Solihull	0·45	50
2	G3NEO	4100	nr Sheffield	0·5	41
3	G3IGU	3500	Doncaster	0·48	36
4	G3DOP	3400	Gloucester	0·18 & ·5	35
5	GW3WVG	3330	Pontypool	0·4 & 3	35
6	G3IAR	3200	Sevenoaks	0·5	34
7	G3WJS	3050	Halstead, Ex	0·46 & ·96	33
8	G3WTJ/A	2600	Ayton, Ys	0·2 & 2	29
9	G3TR	2500	Gatwick	0·42	25
10	G3WRR/A	2300	Tadworth, Sy	0·49	23
11	G3NYA	1500	Birmingham	0·5	15
12	G3GDW	1250	Newton Abbot	0·5	13
13	G3JKY/P	100	Farleigh, Sy	0·8	2
14	GM2HCZ	75	Dumfries	0·5	15

Grafton Top-Band Contest

Here are the results of this Contest held between 15-29 March 1969:

OPEN SECTION

		AM	CW	SSB	Total
1	G3IGW	61	70	—	131
2	G3VLX	—	31	56	87
3	G3BWQ	—	26	39	65
late	G3TSL	—	63	89	152
late	G3XAQ	—	51	77	128

MEMBERS SECTION

1	G3AFC	—	—	52	52
2	G2CJN	25	—	48	48
3	G3KRH	40	—	—	40
late	G3VUE/A	21	42	89	131

Members Listener Section

1 R. A. Pusey
2 T. W. Coleman BRS27678
3 W. A. Jackson BRS29846

Many thanks for the 27 logs received, together with check logs from GW3SRG, G3GJL, OK2PAE, OL2AIO, OL6AIN, OK2BEC, OL6AMB.

First 432 MHz Cumulative Activity Contest, 1969

The total number of logs received for this event was almost three times the number for the 1968 series. Two thirds of them were from G8 + 3 operators and a special word of thanks is due to those entrants with only a handful of contacts who nevertheless took the trouble to send in their results. Twelve counties were represented, with Derby and Hertfordshire leading the field with four entries each.

Yet again, John Warrington, G8AKE, of Melton Mowbray emerges as leader, with a hundred scoring contacts out of a total of 135. Runner-up is Jim Foster, G2JF, of Wye, near Ashford, Kent. G2JF made 12 Continental QSOs and it is interesting to note that his nearest neighbour in the contest, G8AJC, made 20, most of them on 8 March. His only G contact on that evening was G3LQR, also across the water but in a different direction.

There were an unusually high number of errors in the logs and several entrants have lost points for omitting to give " Location information as sent." Several operators claimed points for all six sessions, while one ambitous chap used the 1968 multiplier system and claimed over 2000 points! G8AVX may be amused to know that one of his contacts logged him as " 6 km East North West of Birmingham." The adjudicator is still puzzling over that one!

G5UM was away from home for part of the time and was only able to take part in three sessions while G8AWO moved from Welwyn Garden City to Hatfield part way through and only made the required four appearances by burning the midnight oil to put the rig back together.

Several alterations to the rules were suggested, including: " Fewer sessions " (G3COJ). " Eliminate requirement for four sessions " (G8AWO). " Radials at 50 km intervals " (G3XEB). " Permit entry of single operator portable stations limited to 25 watts and aerials not to exceed 15 ft above ground " (G8AFA).

G8AOD comments that poor conditions were worsened by a seized-up aerial rotor while G8AYY expresses surprise at the number of clocks that stop at 2059! On the subject of timing, it is not considered to be in the spirit of any contest to pre-arrange a DX contact or to establish contact before the contest begins.

G6OX, G8AFA, G8AVG and G8BHL are thanked for their check logs which are always welcome. Subject to Council approval, Certificates of Merit will be awarded to the winner and runner-up.

			Scoring	County	Input	
Call-sign	Pos	Score	QSOs	Code	Watts	Aerial
G8AKE	1	428	100	LR	150	4 × 14 ele
G2JF	2	388	66	KT	45	14 ele
G8ATK	3	205	73	SY	25	14 ele
G3COJ	4	194	98	BS	150	14 ele
G2RD	5	192	97	SY	28	6 × 6
G8AJC	6	182	26	KT	70	2 × 18 el
G3XEB	7	177	82	HF	26	18 ele parabeam
G8BGQ	8	169	89	HF	30	18 ele parabeam
G8AWO	9	159	74	HF	150	parabeam
G8BGX	10	149	66	DY	34	18 ele parabeam
G8AIE	11	143	85	HF	18	parabeam
G8AKT	12	134	44	BD	24	24 ele
G8AYN	13	133	77	SY	25	18 ele parabeam
G8ARM	14	129	68	LD	14	2 ×18 ele parabeam
G8AOD	15	120	60	SX	12	10 el e
G8AVX	16	98	41	WK	60	18 ele
G8ANZ	17	97	45	ST	21	18 ele parabeam
G5UM	†	97	47	LR	12	14 ele
G8APZ	18	80	61	MX	9	18 ele parabeam
G8AYY	19	72	39	WK	25	8/8 + 8/8 slots
G8AVC	20	58	25	DY	19	18 ele parabeam
G2WS	21	48	35	ST	72	11 ele
G8BGW	22	44	23	DY	10	18 ele parabeam
G8BAV	23	42	30	DY	30	parabeam
G8AQZ	24	32	25	ST	28	18 ele parabeam
G8BKR	25	17	16	GR	8-25	8/8

† Not eligible, Rule 10(*b*)

A late entry was received from G8AUE.

May 1969 144 MHz Contest

This contest was held on Sunday 4 May in normal contest conditions; average to poor. Despite this an extremely high entry was received, showing almost a 50 per cent increase over last year's large entry! The winner, almost inevitably, was GW3NUE/P with a large lead over the second place GW3ITZ/P. Third was GW3BA/P. Congratulations to these three stations who were all in the first four in last year's contest. It is perhaps significant that the first three stations were all in Wales at an elevation of over 1300 ft asl. The large entry seems to be due, in part, to the very simple scoring system which received unanimous approval from entrants. Also activity was very high both from fixed and portable stations which made the contest much more enjoyable. Even stations near the bottom of the table worked 30-40 stations. The Contests Committee is encouraged by the participation of stations in the more remote areas since it is felt that the present scoring system gives at least an even chance to these stations. Entries were received from GM and GI and at least two EI stations and one GC were worked.

The best DX was worked by GM3OHC/P, this being G6NB at 430 km, G8AKQ/P was a close second, working PA0CML at 425 km; G3NJN/P occurs often in the "Best QSO" column. From entrants' comments is would appear that a lot more stations could work good DX if only they would use the most efficient mode of communication—CW! The high-sited stations do not need to use CW to win, but the more handicapped stations could reduce the gap considerably in this way.

Several complaints were received of stations radiating poor signals. It would appear that many entrants do not check their gear before embarking on their day out and are then loath to close down when others complain of interference. Rule 11 has been formulated to prevent this and it has been and will be used on "persistent offenders."

Generally log-keeping was good but there were a large number of nondescript pieces of paper masquerading as cover sheets.

Comments received included:

"Why do so many ops announce 'Beaming North, or North-West' and then 'Tuning from low to high'? "—G2CUZ/P.

"... it was annoying to QSO with G3GZJ ... at 750 km distance just after the contest had finished."—GM3OHC/P

"Guess who didn't check his RX before going out!"—G8AFA/P

"Two Racal RA-17's were used as i.f.'s giving a total of 10 ft of bandspread."—GW3ITZ/P

"Would like more publicity to SSB every hour on the hour."—

"Why don't people say where they are when calling CQ?"—G3UHK/P

VHF/UHF Listeners' Championship — Progress Report

Pos.	Entrant	1st 144MHz	2nd 144MHz	1st 70MHz	3rd 144MHz	2nd 70MHz	4th 144MHz
1	T. Cooper BRS 28005			132	406	123	256
2	C. Baker A5032	115			367		244
3	R. Thomas BRS15822		117			70	
4	G. Haslip A6119					52	
5	J. Brewer A6421					46	

The results for the first six contests for the year show BRS28005, who won the Hanson Trophy in 1968, in the lead with 917 points. The score at the end of the year is the sum of the points scored on the two best logs for 432 MHz and above plus the score from any other four logs. There are still five VHF and three UHF contests to come in 1969, not to mention VHF NFD which for the purposes of the Listeners' Championship counts as one VHF contest and one UHF contest. It is therefore possible for a listener beginning at this comparatively late stage to obtain a high position in the final results.

August 1969 432 MHz Open Contest

1. **Date and time:** 1000 to 1600 GMT on 10 August.
2. All **entries** and check logs must be sent to the Adjudicator at: VHF Contests Committee, c/o G3LAS, 7 Barclay Close, Hertford Heath, Hertford. In addition the following **General Rules** as published in the January issue of *Radio Communication* will apply: 3a, 4a, 5a, 6a, 7a, 8a, 9a, 10a and 11-28.

Position	Call-sign	Score	QSO's	Co. Code	Best QSO	Km	Power (watts)
1	GW3NUE	853	165	BR	G8AZA/P	305	50
2	GW3ITZ	628	113	DB	G3BDQ	360	25
3	GW3BA	569	116	MG	G3DAH	325	25
4	G3PWJ	513	108	SD	F2YT/P	414	50
5	G3OBD	480	94	WE	EI7AF/P	395	25
6	G3OGY	478	97	LE	G2JF	350	17
7	GW3NWR	453	88	FT	G2JF	360	45
8	G8AKQ	416	72	YS	PA0CML	425	10
9	GM3OHC	405	56	LK	G6NB	430	60–am 100–ssb, cw
10	GW8BHY	371	78	RN	G3DAH	312	50
11	G8AWN	360	64	YS	PA0VD	385	20
12	G8BQX	359	77	SX	F3LM	375	25 (output)
13	G8BXT	341	87	SD	G3BDQ	325	12
14	G3PXP	330	95	LR	FICW/P	280	25
15	G8AJC	310	51	KT	DL2ZN	360	25
16	GW8ACG	282	78	FT	GM3OHC/P	240	20
17	G8AGY	281	70	BE	F9NJ	325	25
18	G3NJN	280	53	LE	G3OBD/P	360	20
19	GW3VXC	279	75	MH	G3DAH	293	4·5
20	G8AGU	273	48	DN	G8BBB	336	40
21	G8CDL	270	75	BS	F9NJ	315	11
22	G6XM	246	66	HE	G8AWN/P	343	22
23	G5HZ	233	65	OX	G3NJN/P	350	12
24	G3SDS	230	58	DT	G8AKQ/P	390	25
25	G2BHW	227	35	CL	G8APV/P	375	10
26	G8BEN	225	71	RD	G3NJN/P	230	30
27	G3SFG	223	63	BD	G3NJN/P	303	16
28	G3WCB	218	59	OX	G3NJN/P	288	30
29	G3NAQ	206	76	SD	G3XZW/P	196	15
30	G8ADP	201	57	ST	F1CW/P	292	20
31	G8AAY	187	53	DT	G8BBB	235	24
32	G3FJE	182	51	BD	G3NJN/P	290	10
33	G3THX	181	37	LN	PA0CML	303	5
34	G3BPM	176	38	BE	G8AKQ/P	320	20
35	G3SLJ	174	34	NK	F3NG	310	25
36	G3WSN	173	86	EX	F3LP	225	15
37	G3JQA	170	56	LE	G3DAH	360	30
38	G3JFY	162	44	HE	G8AWN/P	315	10
39	G8CEQ	160	34	DN	GC3YIZ	178	26
40	G8BVP	170	54	GR	G3KHU/P	202	18
41	G3WQP	155	45	LE	G3XZW/P	305	12
42	G3WUW	150	46	CE	GW3ITZ/P	280	25
43	G3ONP	147	53	SD	G3JIJ/P	172	1·5
44	G3UHK	144	44	OX	GW3NWR/P	216	10
45	G8AWO	142	44	HF	F2YT/P	335	18
=45	GW8BXJ	142	31	CV	G8AKQ/P	206	30
47	G3WIR	137	74	BS	F9NJ	275	24
48	G8BXD	135	56	ST	G2JF	268	6
49	G8AZA	133	30	YS	PA0VD	380	20
50	G8CIX	132	62	SY	F9NJ	245	10
51	G8BIB	131	74	KT	F2XN/P	130	8
52	G3OTK	130	50	ST	G3NJF/P	290	4
53	G8ACJ	129	50	SY	G8AWN/P	306	18
54	G8AVG	120	38	WE	G3OGY/P	220	15
55	G3FD	119	46	HF	GW3NUE/P	202	18
56	G8AUN	116	35	NK	GW3NUE/P	307	40
57	GM3OWU	115	29	LK	G8ARQ	253	15
58	G8AQO	112	46	BD	G8BXT/P	170	15
59	G2CUZ	108	30	LE	GM3OWU/P	270	15
60	G3UES	105	55	HF	GW3NWR/P	250	10
61	G8AFA	104	41	WE	G3KHU/P	145	20
62	G3NEO	100	13	YS	EI5BH/P	355	50
63	G8CAI	93	32	BS	G3XZW/P	190	10
64	G3THW	78	33	SD	G3THX/P	143	7
65	G3HXN	74	40	GR	G3MRA	110	20
66	G3KIP	71	29	SX	F2YT/P	250	7·5
=66	G3CGQ	71	28	BD	G3XZW/P	115	20
68	G3WFM	66	41	HF	G3BDQ	95	10
69	GM3WEE	62	26	BW	G3KRG	123	8
70	G3SID	54	33	SY	G8AFA/P	109	5
71	GI8AYZ	49	11	LY	G8ARQ/P	320	35
72	G8CIT	33	10	CD	GM3OHC/P	127	0·15
73	G3OHW	30	20	BD	G3PXP/P	112	10

Grateful thanks are due to the following for their check logs: G3GZJ, G8BKR, G2WS, G3XFW, G8CKZ/A, G2DHV and G2BQ.

G3NJF/P, G3WTP/P and G3MAX/P disqualified Rule 18(i) (late entries).

G8AYB/P and G8APV/P disqualified Rule 2.

BERU 1969

The Thirty-second BERU Contest, held on 8-9 March with new rules for scoring, produced a record number of contacts for the winner and a very close fight for second place. In the Low Power Section the first three contestants had big margins over their nearest rivals. As in 1968 the leaders made full use of good conditions on 14 and 21 MHz, while 7 and 28 MHz provided a number of welcome contacts but nobody had a good word for 3·5 MHz.

The Senior Rose Bowl was won by A. R. W. Cake, 9H1BL, with a score of 6336 points from 819 contacts of which 120 gave him bonus points. The next four competitors, on claimed scores, were covered by 65 points and finally J. Ravenscroft, VE2NV, emerged as runner-up with 6171 points, having collected 167 bonuses from a total of 540 contacts. Third place, together with the Colonel Thomas Rose Bowl for the leading British Isles contestant, went to D. L. Courtier-Dutton, G3FPQ, who scored 6142 points from 348 contacts of which 223 earned him a bonus.

Last year VE2NV was placed fourth and G3FPQ was the leading G station in seventh place overall.

Low Power Section

Andre Saunders, 5Z4KL, repeated his 1968 triumph in winning the Junior Rose Bowl but by a smaller margin than last year. He scored 4312 points from 435 contacts (109 bonus) while Frank Johnstone, G3IDC, was runner-up with 3536 points gained from only 173 contacts (139 bonus). In third place was Capt. G. A. Hamilton, 5H3LV, with a score of 3098 points from 264 contacts (113 bonus).

This is a repeat performance from the winner and runner-up but one wonders how many more points 5H3LV might have gathered if the power supplies in Dar es Salaam were more reliable. He was without power for 20½ hours during the 48 hours of the contest!

Receiving Section

This section has again been dominated by Eric Howell, BRS24775, who by repeating his successes of 1967 and 1968 retains the Receiving Rose Bowl for a third year. He amassed a total of 5430 points from 315 "contacts" with 192 qualifying for the bonus. Second this year was R. W. Thomas, BRS15822, followed by E. H. Sherlock, BRS6604. Eric Trebilcock, BCRS195, of Victoria, Australia, sent in his usual log but could only be on for 15 hours due to the Contest clashing with holiday preparations. This was his 28th BERU receiving Contest.

Equipment

A brief description of equipment used by the leading stations is as follows:

9H1BL had a Viceroy Tx with 888A + PR30X as Rx with inverted Vees for the two LF bands, dipoles for the two HF bands with a ZL Special beamed on G-land for 28 MHz.

VE2NV used a 32S3 + linear with 75S3 and Drake 2B. A TH4 looked after the HF bands with a GP and dipole on 7 MHz and a vertical and 2 elements phased to complete the picture.

G3FPQ had a home-made receiver to back up a 100 watt transmitter with two element quads on 28, 21 and 14 MHz, two element beam on 7 MHz and phased quarter-wave verticals on 3·5 MHz.

VE1TG used the same as last year, a KWS-1 and 75A4 with separate beams, arrays and verticals for each band.

The Low Power Section leaders all used home-made transmitters and commercial receivers. 5Z4KL used a SX28 with 2 element 3-band quad and single quad for 7 MHz, G3IDC a Racal RA17 with Vee beams and 5H3LV had a Trio 9R59D with tri-band quad, a ground plane and 7 MHz dipole.

The Receiving Section leader used a Drake 2B with 33 feet long vertical and a fixed W8JK beam for 28 MHz while the runner-up had a JR500SE and a HRO with preselector.

Comments on Rules

All comments bar one were in favour of the change in the scoring and apart from a few suggestions such as changes in the duration of the Contest, making a multi-operator section, splitting the G's into separate areas and introducing higher bonus awards on the two LF bands all other comments were of a very general nature. However, all will be carefully considered by the Contests Committee when they come to prepare the rules for 1970.

Comments from the Committee

This year the High Power Section produced 13 fewer entries than last year while the nine entries received for the Low Power Section were six down on 1968 but four more than in 1967. In this Section one does not have to get a fantastic number of contacts to get a reasonable score so how about a few more having a shot at stopping 5Z4KL's hat-trick. The Contests Committee looks on the Receiving Section as being static with seven, six and seven entries for the last three years but would like to see a few more logs.

Once again, the standard of logs submitted was very high but, as always, there were a few that left a lot to be desired. If you are NOT typing your entry please *print* the call-sign clearly with the numerals (if preceded by one or more letters) under each other. Should the call-sign start with a numeral please keep the *second* numeral in line with those mentioned above. When typing entries please use *CAPITAL* letters—they are a lot easier to read than lower case. Very many thanks for the check logs of prefixes for bonus points and, in many cases, of all contacts, listed under prefixes. They were a very great help.

The perpetual problem of points being claimed for duplicate contacts was as bad as ever. One log had claimed points for 20 duplicates and another had 13 and there were dozens of others.

This year the Contests Committee spent nearly 100 man-hours checking the Contest and they send their thanks to all the contestants whose logs made the job easier.

Activity

An analysis of the leading logs in the three sections did not reveal as many active stations as reported last year. A total of just under 1200 was found. However, it was very noticeable that there was the usual big turn out of two letter G's also the G2 + 3 letters and G3 + 3 letters with the first letter in the first third of the alphabet As 9H1BL remarked he had visions of bespectacled Edwardian gentlemen struggling up to the attic on gout-ridden legs to dust the cobwebs off the TPTG!

In a letter sent with his log VK2NS commented that he first came on the air in 1914 (with spark), was in the first BERU in 1931 and wondered how many others competed this time that were in the original contest. He also said that this year would have to be his last effort but the Committee will be very disappointed if they do not receive an entry next year. In fact, he won in 1931.

However, the Committee feel that 5Z4KL sums it all up by saying "Now that it is all over once again, I can look back and wonder what it is that makes all the hundreds of hams in the four corners of the world sit at a key for forty-eight hours."

Comments

"Long may the BERU contest flourish—why not twice a year" (G3HGJ). "Please don't ever allow inter-G working" (G3GES). "I think that commercialism has taken most of the pleasure out of contest work these days" (G2DC). "Suggest certificate for highest scoring home-built station" (G2HAO). "Getting too old (56 years old and 41 years a ham)" (VK2RA). "Came from retirement—VP8FL lent me station and VP8KF a bug-key" (VP8HJ). "Had not worked Singapore before (started 37 years ago) and then got five in less than one hour" (VE7HQ). "High light was QSO with VK7CH—previous one (of many) 2 September 1928" (G2NH). "Low spot—VU on 28 who took up 15 minutes of a G's time getting details and then sank without trace" (G8GK). "Less interference this year—only had to explain it to one W" (VE1TG). "Overheard VQ8 to W—If you want to join the Commonwealth you should apply to the Queen not me" (G3LFM/A). "Think new scoring hard on G's but good for everyone else" (VE3AU). "For once my 'one weekend off in three' coincided with BERU" (VE3BMB). "ZL's particularly scarce" (G3KSH). "Activity from VK and ZL appeared to be very low" (ZD5X). "Along with many other VK's and ZL's I suffer from not having access to any up-to-date rules" (VK2GW). "I have followed rules and scoring as per *RSGB Bulletin* October 1963" (ZL1AMO).

Check Logs

Three of the senders of check logs have asked if their logs are ever used by the Committee. They can rest assured that they are used and really appreciated and on occasions in the past (and also in other contests) the check logs have been the deciding factor in determining the winner.

This year the Contests Committee wish to thank the following for their check logs—G3GLX, G3HCL, G3IOR, G3SSO (a multi-operator entry with a score of 5940), G5FA, VE3DV, VE7AC, VK2OW, VK3KS, VK3XB, VU2VZ and ZE3JJ. The entry from ZL4BO, claiming 5135 points, posted 31 March and received 13 June, was unfortunately too late for inclusion in the tabulated results.

BERU 1969.

RESULTS

HIGH POWER SECTION

Position	Call-sign	Points	Position	Call-sign	Points	Position	Call-sign	Points	Position	Call-sign	Points
1	9H1BL	6336	25	G6RC	3740	49	G3KHA	2775	73	G2HAO	1553
2	VE2NV	6171	26	VK2BPN	3665	50	VK2NS	2721	74	MP4BBA	1545
3	G3FPQ	6142	27	G3KMA	3608	51	VE7HQ	2585	75	ZL2CD	1483
4	VE1TG	6080	28	GW3NJW	3596	52	9V1PF	2583	76	G2ZR	1470
5	9J2MX	6078	29	G3GEW	3538	53	VE3BS/VP9	2530	77	G3GMK	1445
6	G5WP	6053	30	VE3BJK	3535	54	G3PVL	2400	78	G2IO	1369
7	G5RI	5739	31	ZL1HV	3485	55	VE1EK	2395	79	G3JVJ	1360
8	G3FXB	5565	32	5Z4KO	3431	56	G2NH	2225		G3VPS	1360
9	VE2WA	5510	33	VS6FX	3370		G3VDL	2225	81	G3WSL	1193
10	VO1AW	5053	34	VP9BK	3368	58	G2HLU	2210	82	G2BLA	1185
11	VE2AYY	4900	35	G2DU	3276	59	G3JKY	2165	83	G3HGJ	1133
12	VE3AU	4415	36	G2QT	3236	60	G3EBH	2128	84	G3OCA	1090
13	VK2RA	4376	37	VE2LY	3103	61	G3KPU	2085	85	G3WP	960
14	VE3BWY	4355	38	VE4MF	3101	62	G3LFM/A	2080	86	G3UAA	937
15	G3GFG	4275	39	VE2AYU	3066	63	G3VW	2070	87	G3GSZ	925
16	5Z4SS	4258	40	VE1IM	3058	64	G3APN	2068	88	G3KSH	850
17	G3GGS	4240	41	9V1LK	3026	65	G5HZ	1916	89	G3RJB	765
18	VK3MR	4046	42	G3SJE	3013	66	G6XL	1888	90	VE1AE	670
19	G2DC	3947	43	G5VU	2975	67	G2FRI	1885	91	G8QZ	550
20	G6CJ	3911	44	VK2GW	2970	68	G8KU	1750	92	VK2AND	435
21	9V1PB	3888	45	VS6AA	2945	69	VP8HJ	1729	93	VE5PM	390
22	VK3AXK	3883	46	G3LPS	2940	70	G2AJB	1683	94	GM2HCZ	378
23	VE3BMB	3845	47	VE2BV	2930	71	G3TR	1621			
24	VP7DX	3826	48	ZD5X	2915	72	G3TZU	1575			

HOW THE LEADERS MADE THEIR SCORES

Call-sign	9H1BL	VE2NV	VE1TG	G3FPQ	G5WP	G5RI	5Z4KL	5H3LV	G3IDC	G3TXZ	BRS 24775
Points	6336	6171	6080	6142	6053	5739	4312	3098	3536	2186	5430
28 MHz Prefixes	13	19	16	24	24	20	13	10	16	18	15
Bonus Contacts	24	33	31	51	40	37	18	22	30	30	30
Total Contacts	246	66	70	63	48	51	108	105	31	34	47
21 MHz Prefixes	15	18	19	30	31	29	22	16	24	23	28
Bonus Contacts	31	35	35	60	62	60	45	32	45	42	54
Total Contacts	206	139	144	100	98	105	158	98	61	63	93
14 MHz Prefixes	24	35	28	32	36	32	22	16	25	7	30
Bonus Contacts	45	62	52	62	78	60	43	31	44	12	57
Total Contacts	230	202	218	104	116	115	166	53	60	12	98
7 MHz Prefixes	6	16	18	21	17	18	3	6	7	—	20
Bonus Contacts	14	30	32	34	32	34	3	8	13	—	32
Total Contacts	96	89	128	53	50	38	3	8	14	—	48
3.5 MHz Prefixes	3	8	6	10	10	6	—	—	6	—	10
Bonus Contacts	6	17	14	16	18	14	—	—	7	—	19
Total Contacts	41	44	45	28	19	21	—	—	7	—	29
Totals Prefixes	61	96	87	127	118	105	60	48	78	58	103
Bonus Contacts	120	167	164	223	230	205	109	113	139	84	192
Total Contacts	819	540	605	348	331	330	435	264	173	109	315

LOW POWER SECTION

Position	Call-sign	Points
1	5Z4KL	4312
2	G3IDC	3536
3	5H3LV	3098
4	G3TXZ	2186
5	ZL1AMO	2170
6	VK3ZC	1681
7	G3GNS	1635
8	VK3RJ	1510
9	9H1Q	395

RECEIVING SECTION

Position	Call-sign	Points
1	BRS24775	5430
2	BRS15822	3765
3	BRS6604	3360
4	BRS2292	2745
5	BCRS195	1670
6	ORS26813/9V1	1105
7	BRS30694	1075

High Wycombe D/F Qualifying Event

Date: 3rd August, 1969.
Map: OS Sheet 159 (Chilterns).
Assembly: 1300 BST for start at 1320 BST.
Location: At top of Pink Hill, near Trig Point and Power Crossing NGR 822 014. Approximately one mile north of Lacey Green.

This event is being organised by C. A. Vernon of "Durleston," White Pit Lane, Flackwell Heath, High Wycombe, Bucks. (Tel. Bourne End 21005), and intending competitors are asked to notify him of the numbers requiring tea not later than 28 July.

Grimsby D/F Qualifying Event

The first qualifying event staged in North East England took place on 18 May when fourteen competing teams assembled at a disused airfield on the outskirts of Grimsby. A brief but heavy snow storm and continuous heavy static made conditions at the start difficult, but rather faint signals from both stations could be heard.

Many competitors, mislead by the signal strength, travelled a considerable distance before taking their second bearing, and were then surprised to find that both stations were inaudible, unmistakably indicating that they could only be a relatively short distance from the start. Transmitter " B " was, in fact, in thick undergrowth about a mile from the airfield but could only be approached along a deeply rutted farm track partially underwater. Difficulties of competitors increased at close range owing to the use of a 750 ft barbed wire fence as an aerial.

Transmitter " A ", while not well concealed, presented a different problem as it was situated close to the sea wall, a short distance above high water. The bearing from the start went almost entirely through the built-up areas of Grimsby and Cleethorpes, then into the estuary of the River Humber, access to the transmitter being made difficult by the presence of a main railway line and Grimsby docks. Very careful map reading was neeessary to locate what was thought to be the only practicable access route along the sea wall from a level crossing.

Owing to a technical hitch transmitter " A " was inoperative for a short period after the second fixed transmission, and most competitors concentrated first on transmitter " B ", Messrs. North, Mollart and Hawkins all arriving simultaneously at 14·33 before hot footing it in the direction of transmitter " A ". Although the organizers had envisaged that station " A " could only be approached along the sea wall, E. Mollart found an abandoned scrap yard in Grimsby docks which enabled him to reach the coast and cross the railway. He then set off at a brisk trot towards the transmitter still nearly a mile away, but was very dismayed when the much younger M. Hawkins passed him in Olympic style beating him to the hidden station by over a minute.

Some 40 exhausted but cheerful contestants sat down to tea in the Red Cross Headquarters at Cleethorpes and were there well looked after by Mrs Reynolds and her helpers. The Vice-Chairman of the Grimsby Amateur Radio Society, Mr B. Robson, thanked all those who took part in the organization and particularly the crews of the two hidden stations led by G3NJF and G3HTI who suffered much discomfort from the heavy storms and the North Easterly gale blowing on the coast. Mr G. T. Peck, representing the RSGB and replying for the contestants, said how pleased the competitors were to support the first qualifying event ever held in the North East and thanked the Grimsby Amateur Radio Society for the excellence of the organization and particularly for the ingenuity displayed in the placing of the two transmitters to provide a contest of considerable difficulty and interest.

Results of Grimsby DF Qualifying Event 18 May 1969

Name	Time of Arrival Station " A "	Station " B "
1 M. P. Hawkins, Colchester	1512	1433*
2. E. Mollart, High Wycombe	1513	1433
3. B. Mahoney, Rugby	1530	1451
4. T. C. Gage, Oxford	1531	1444
5. W. J. North, High Wycombe	1535	1433
6. J. R. Vickers, Stratford-on-Avon	1558	1458
7. O. L. Harding, Lincoln	1629	1510
8. G. T. Peck, High Wycombe	1633	1516
9. R. P. Smith, Manchester	—	1516
10. D. E. Newman, Rugby	—	1532
11. J. Quarmby, Grimsby	—	—
12. R. J. Foulger, Grimsby	—	—
13. G. Wood, Grimsby	—	—
14. R. J. Cross, Scunthorpe	—	—

* Previously qualified.

August 1969 70 MHz CW Contest

1. **Date and time:** 2300 GMT on August 16 to 0700 GMT on August 17.
2. All **entries** and check logs must be sent to the Adjudicator at: VHF Contests Committee, c/o G3USB, 32 Harbour Avenue, Comberton, Cambridge. CB3 7DD. In addition the following **General Rules** as published in the January issue of *Radio Communication* will apply: 3a, 4a, 5a, 6a, 7a, 8b, 9b, 10a, 11–25, 27 and 28.

Listeners' 70 MHz Contest

Support for this contest held on 13 April, 1969 was very poor, only four entries being received.

The standard of log-keeping was very good with one exception, and all entrants sent carefully completed cover sheets. These are not called for in the rules, but nevertheless do provide additional useful information.

Pos.	Entrant	Points	QSOs Heard	Best DX	Comments
1.	BRS28005	123	45	GW3NUE/P	Conditions moderate
2.	BRS15822	70	42	GW3NUE/P	Fair, but local storms
3.	A6119	52	18	GW3NUE/P	Location at sea level, must get higher.
4.	A6421	46	33	G3VPS/P	

First and second were two contest regulars, Terry Cooper of Storrington and Ron Thomas of Clapton, E. London.

Listeners are reminded that a 144 MHz contest will be run in conjunction with the Open contest on 5-6 July.

September 1969 144 MHz Fixed Station Contest

1. **Date and time:** 0700 to 1300 GMT on September 21.
2. All **entries** and check logs must be sent to the Adjudicator at: VHF Contests Committee, c/o G3EDD, 39 Angle End, Great Wilbraham, Cambridgeshire. CB1 5JG. In addition the following General Rules published in the January issue of *Radio Communication* will apply: 3b, 4a, 5a, 6a, 7b, 8a, 9a, 10a, 11–18, 20, 23, and 26–28.

Mobile Rally News

Derby

The 12th Annual Rally of the Derby and District Amateur Radio Society will be held on Sunday, 17 August, 1969, at Ryknield School Bedford Street, Derby. Admission and parking will be free together with all the entertainment provided.

Talk-in stations will be active from 10 am on 2, 4 and 160 metres, and it is hoped to have a station on the DX bands as well. There will be numerous field events plus the regular favourites including the Mammoth Prize Draw, radio controlled model aircraft, super junk sale, a silver band and the children's treasure hunt. An RSGB stand will also be there.

Refreshments will be on sale. There will also be a trade show but the number of stands will be limited and they will only be available to firms willing to advertise in the programme. The attendance at this rally is generally over 4000.

Further details on all aspects, including the trade show, can be obtained from the Honorary Organizer, Tom Darn, G3FGY, Sandham Lodge, 1 Sandham Lane, Ripley, Derby DE5 3HE, Telephone Ripley 2972.

Worcester

Worcester and District Amateur Radio Club hold their rally on Sunday, 13 July, at Hill County Secondary School, Upton-on-Severn. The venue is a mile west of the River Severn on the A4104. A new feature of this rally will be a Children's Fancy Dress Competition. There will be a model aircraft display and an RTTY display. Refreshments will be on sale and talk-in stations will be active on 160, 4 and 2 metres. Further details can be obtained from G8ASO or G3TQD, QTHR.

Looking Ahead

13-14 September—IARC Convention, Geneva.
1-4 October—RSGB International Radio Engineering and Communications Exhibition, Royal Horticultural Society's New Hall, Greycoat Street, Westminster, SW1. 10 am to 9 pm.

Contest Diary

5-6 July—Summer 1·8 MHz Contest (May, page 350).
5-6 July—July 144 MHz Open Contest (June, page 421).
5-6 July—Listeners' 144 MHz Contest.
12-13 July—High Power Field Day (March, page 203).
20 July—Salisbury D/F Qualifying Event (June, page 420).
20 July—July 432 MHz Portable Contest (June, page 422).
3 August—High Wycombe D/F Qualifying Event.
4 August—August 144 MHz, SSB, Contest.
10 August—August 432 MHz Open Contest.
17 August—August 70 MHz, CW, Contest.
6-7 September—VHF National Field Day.*
14 September—3·5 MHz Field Day.
21 September—Rugby D/F National Final.
21 September—September 144 MHz Fixed Station Contest.
5 October—October 1296 MHz Open Contest.
11-12 October—28 MHz Telephony Contest (May, page 350).
25-26 October—7 MHz Contest, CW (June, page 421).
25-26 October—October CQ WW DX Contest—Phone.
3 November—November 144 MHz SSB Contest.
8-9 November—7 MHz Contest—Phone (June, page 421).
15-16 November—November 1·8 MHz Contest.
29-30 November—November CQ WW DX Contest—CW.
6-7 December—Tops CW 80m Contest.
7 December—December 70 MHz CW Contest.

* To coincide with an IARU Region 1 Contest.

Mobile Rallies

6 July—South Shields Mobile Rally.
13 July—Worcester and District Amateur Radio Club Mobile Rally at Hill County Secondary School, Upton-upon-Severn, Worcs. The venue, which has plenty of cover, is a mile west of the River Severn on the A4104, and will be signposted. Talk-in station will be: G3GJL 1910 kHz; G2AFD 70·26 MHz and G3NUE on 144·26 MHz.
Our Club Junk Stall will again run a Bring and Buy section. There will be a Children's Fancy Dress Competition, a running display of Amateurs' Teleprinters and a Model Aircraft flying display. Refreshments will be on sale during the day.
27 July—Cornish Radio Amateur Club. Provisional location—The County Scout Headquarters, Malpas, Truro.
27 July—The White Rose Mobile Rally, Allerton High School, Leeds.
10 August—RSGB National Mobile Rally, Woburn Abbey.
17 August—Derby and District Mobile Rally.
24 August—Torbay ARS Mobile Rally.
24 August—Swindon Mobile Rally organized by the Swindon and District Amateur Radio Society.
31 August—Bromsgrove and District ARC Mobile Picnic. Call G3VGG. The venue will be Hartlebury Castle near Kidderminster. Talk-in on 2m and top band. Details from: Hon. Sec, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.
31 August—Preston Amateur Radio Society Mobile Rally at Kimberley Barracks, Deepdale Road, Preston.
28 September—Harlow Mobile Rally, Magdalen Laver Village Hall, near Harlow, east of the A11. Open from 10 am. Talk-in station on 160m and 2m. Further details from: The Hon. Sec, B. G. King, G8CHC, 36 Upper Park, Little Parndon, Harlow, Essex. Tel.: Harlow 20812.
5 October—RSGB Scottish Mobile Rally, Beach Ballroom, Aberdeen. Details GM3AEL.

RADIO AMATEUR EMERGENCY NETWORK

By S. W. LAW, G3PAZ*

IT is a human trait to assume that one's special interests and activities are clear as crystal to the uninitiated. By the letters we receive from time to time, we must take ourselves to task for failing to make it clear that RAEN membership is not a " closed shop " and that there is no involved rigmarole in joining. There is no entrance fee, all work is voluntary, we pay our own way and our skills are freely available to the Police, the British Red Cross Society and the Saint John Ambulance Brigade by the terms of the GPO licence. Any radio amateur or short wave listener of either sex who is over 16 years of age may join RAEN by filling in an application form and sending it to the Hon. Registrations Secretary (address below) who will issue a registration card stamped to date and valid for a year The new member will be put in touch with the nearest Group Controller who has the final decision. Forms are available from any RAEN member or from RSGB Headquarters.

Floods

At the time of writing there is no news of any call-out in connection with the floods in the Severn valley area during the latter part of May. Any activity will be reported in the next issue.

Wales

We apologise for giving some out-of-date information on Wales some time ago. This was due to some data going astray and we are now a little better informed. The Group centred on Cardiff are well organized under their Controller GW3VNO and hold regular meetings at 25 Womanby Street, Cardiff. This is a stone's throw from Cardiff Castle, but watch out if you are visiting by car as the QTH is in a one-way street. Car parking is available in the next street opposite the Angel Hotel. Facilities are available for lectures, films and the testing of equipment and meetings are held on the first Tuesday of each month. At the time of writing there is a membership of 20 of whom two are SWLs. The Honorary Group Secretary is GW8CLB (QTHR). At long last the Group has acquired four B44s (" issue " equipment has been in short supply for some time past) and is, we understand, due for a base station in the future. Our best wishes to this lively Group.

RAEN and the 4m band

As reported elsewhere in last month's issue, the restrictions on the RAEN use of the 70 MHz band are now removed. It is suggested that Groups give considerable thought to the choice of frequencies having due regard to the overall picture of operations in their part of the country. Full liaison with adjacent Groups is a necessity in order to ensure efficient operation under emergency conditions. Try to remember that RAEN is a country-wide organization in which, whilst Group pride is an asset, " Parish Pump Politics " are definitely out.

Real Enthusiasm

We love the story of the keen RAEN type who turned up at the rural residence of our Registrations Secretary and, proffering a shiny half-crown, asked for a new Manual. Not exactly a " happening "? No—until you realize that he had travelled from the E6 district of London by ordinary public transport. Get a map and time-table and work it out! Of course, all *you* have to do is to send a PO for 17·5np including postage to the address below for your copy.

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* 11 Chisholm Road, Croydon, Surrey, CRO 6UQ.

Honorary Registrations Secretary:
Mrs. Jane Balestrini, "Merrivale", Willow Walk, Culverstone, Gravesend, Kent.
Honorary Secretary, RAEN Committee:
Mr. E. R. L. Bassett, 57 Upper St. Helens Road, Hedge End, Southampton, SO3 4LG.

CLUB NEWS

ATTENTION CLUB SECRETARIES !!!

We have been asked by a Regional Representative to bring up some points regarding submission of copy.

Many secretaries are forgetting vital details when they send in their information. Please check your copy carefully. Apparently some secretaries are assuming that the copy that they submit on the first of a month will appear in the magazine of that month. Gentlemen, our printers are pretty good but they can't convert copy into a magazine in three days! Notes submitted by 1 August will be included in the September magazine and so on.

It would be helpful if the senders of notices would indicate their exact positions, ie secretaries, Area Representatives, etc. Finally, please do not expect a programme of your club's events for the next six months to let you out of sending further copy. It is not practical for a regional representative to survey a mass of programmes to glean out what is applicable for a particular month. It is up to you to submit your club's events monthly to the RR (never direct to RSGB HQ). Of course, it is a courtesy to let him have your long-term programme as well, as a confirmation. Your co-operation will be greatly appreciated.

Region 1 RR B. O'Brien, G2AMV.

Merseyside Luncheon Club—Meets on the first Monday in every month HMS Landfall, 12.30 for 12.45 meal. If you wish to attend please advise G3VQT or G2AMV beforehand.

Ainsdale (ARC)—9 and 23 July, 6 August, 8 pm, " Morris Dancers," Scarisbrick.

Allerton (Liverpool) (SARS—NW Region)—First and third Thursdays each month, 8 pm, Liverpool County Scout Headquarters, Richmond Street, Liverpool.

Blackburn (ELARC)—3 July (Open Night), 7 August (" Your Questions Answered "). 7.30 pm Edinburgh House, Shearbank Road, Blackburn. Further details from G4JS.

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

Bury (B & RRS)—The meeting on 8 July is of interest to all potential or established VHF fans as G2JT is to give a talk on VHF aerials. Members are advised to bring along their aluminium tubing and hacksaws. It is also proposed to have a brief post-mortem on National Field Day, 8 pm, George Hotel (Private Room) Market Street, Bury. Club Secretary, G3VVQ, 411 Holcombe Road, Greenmount, Bury.

Cheshire (Mid-Cheshire ARC)—Club nights every Wednesday, 7 pm, to 9.30 pm. Instruction nights every Thursday, 7 pm to 9 pm. The latter includes theoretical work for the RAE exam, practical construction and morse practice. Further details from G3JWK. Technical Activities Centre, Winsford Verdin Grammar School, Winsford, Cheshire.

Chester (C & DARS)—Tuesdays, 8 pm, YMCA.

Crewe and District—No meetings will be held for the time being as no accommodation is available. However the Area Representative Mr R. Owen of 10 Circle Avenue, Willaston, Nantwich will welcome visitors at his home.

Douglas (D & DARS)—2nd and 4th Wednesday each month 7 pm, 19 Rosemount, Douglas. Further information from W. T. McEvoy at same address. Telephone Douglas 6146.

Eccles (E & DRC)—Tuesdays, 8 pm, Bridgewater School, Worsley, Lancs. Every Thursday Club Top Band net 20.30 hours.

Leyland Hundred (ARG)—The Thursday night net at 20.00 hours GMT on 1·915 MHz.

Liverpool (L & DARS)—Tuesdays 8 pm. Conservative Association Rooms, Church Road, Wavertree. Secretary—H. James, G3MCN, 448 East Prescot Road, Knotty Ash, Liverpool 14.

Liverpool (NLRC)—4 and 18 July, 1 August, 8 pm, Landsbury House, 13 Crosby Road South, Liverpool 22. Secretary R. Simmons G3PNS, 62 Daneville Road, Liverpool L4 2RG.

Macclesfield (M & DRS)—15 and 29 July, 12 August, 8 pm, The George Hotel, Jordangate.

Manchester (M & DARS)—Wednesdays, 7.30 pm, 203 Droylesden Road, Newton Heath, Manchester 10. Hon Secretary, G. Tillson G3TJX, 95 Kelverlow Street, Oldham, Lancs.

Manchester (SMRC)—Fridays, 8 pm, Conservative Association Divisional Office, 449 Palatine Road, Northenden, Manchester 22.

North West VHF Group—Please note new address. Meetings will take place every Monday at 8 pm in the Club Caravan, Greeba, Shady Lane, Manchester 23.

Preston (PARS)—10 and 24 July, 7 August, 7.30 pm (Private Room), " Windsor Castle," St Paul's Square.

Salford (Dial House Radio Society)—Wednesday evenings at Dial House (1st Floor), Chapel Street, Salford 3. All members of the Society are GPO engineers. Anyone interested should contact the Club Secretary at the address given above.

Southport (SRS)—Wednesdays, 8 pm and Sundays, 2.30 pm. The Esplanade. Secretary S. Miller, 72 Station Road, Banks, Southport.

Southport (73 SSB Society)—Thursdays at 8 pm. (All commencing with a talk on part of RAE Syllabus), 73 Avondale Road North, Southport.

Stockport (SRS)—9 and 23 July, 6 August, 8 pm. The Brookfield Hotel, Wellington Road South, Stockport. New members are always welcome. Further details from the secretary who is D. I. Lunn G3LSL, 4 Farnham Avenue, Macclesfield (Tel. 7903).

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

Westmorland—Fridays, 7.30 pm, 24 Park Road, Milnthorpe. Additionally there is an RAE class on Mondays and Thursdays at the same time. Secretary G3UEC, 9 Castle View, Sedgwick, Kendal.

Wirral (WARS)—8 pm, first and third Wednesday each month at former Civil Defence Headquarters, Upton Road, Bidston, Birkenhead. Coming events: 2 July (The Inoue Transceiver by G3KEN), 16 July (Radio Control of Models by Roger Hatton), 6 August (DF Foxhunt contest). On 7 May Alan Jones G3NPJ gave a very instructive talk and demonstration on Crystal Etching. Region 1 Field Day took place on 11 May in the grounds outside the club QTH. On 21 May G3YHQ Dave (" the brolly ") Mercer gave an interesting talk on Frequency Synthesisers and showed how to produce any frequency from a crystal in an oven and phase locked VFO's.

Region 2 RR K. Skethaway, BRS 20185.

Barnsley (B & DARC)—Summer recess until the AGM which is scheduled for 12 September, 7.30 pm, King George Hotel, Peel Street, Barnsley. *G3LRP.*

Hartlepools (HARC)—Meetings every Monday at 7.30 pm, rear of 42 Murray Street, Hartlepool. *G3NWU/G6ACI/T.*

Middlesbrough (TARS)—1st & 3rd Fridays each month, 8 pm, Settlement House, 132 Newport Road, Middlesbrough. *G3JMO.*

Northern Heights—2 July (Bring along your favourite Gadget and Demonstrate), 16 July (Ragchew), 30 July (Citizens Band in the USA), 7.45 pm, Sportsman Inn, Ogden, Near Halifax. *G3MDW.*

Pudsey (PDRC)—Wednesdays, Liberal Club, Hough Lane, Bramley, Leeds 13. The club heard a very interesting lecture on RTTY on 28 May from D. Pratt, G3KEP. 27 July, White Rose Rally,

Scarborough (SARS)—7.30 pm, Thursdays, c/o RAF Association, Fulbeck House, 3 Westover Road, Scarborough.

Scarborough (NRARG)—Meetings fortnightly, Ship Inn, Scarborough, Alternately Tuesdays and Thursdays. General Secretary J. S. Jones, G3VLM, "Highfield," Pickering Road, West Ayton, Scarborough. *G3VLM.*
South Shields (SS & DARC)—4 July (Final arrangements for Mobile Rally), Meetings Fridays, 8 pm, Trinity House Social Centre, Laygate, South Shields. *G3SFL.*
Spen Valley (SVARS)—3 July (AGM), 7.30 pm, The Grammar School, Heckmondwike. Recess until mid-September, New syllabus nearly complete and copies can be had from the Secretary N. Pride, 100 Raikes Lane, Birstall, Near Leeds. Sae please. *G8BSC.*
Teesside—Second Saturday every month, Social Evening, 8 pm, The Crown Hotel, Yarm. *G3JMO.*
York (YARS)—Thursdays, 7.30 pm, British Legion Club, 61 Micklegate, York.

Region 3 RR R. W. Fisher, G3PWJ.
Birmingham (MARS)—Third Tuesday in each month, 7.45 pm, Midland Institute, Margaret Street, Birmingham 3.
(South)—2 July (Demonstration of Vero Board by T. Woodhouse), 6 August (Post NFD Discussion), 8 pm, The Scouts Hut, Pershore Road, Stirchley, B'ham 29. *G8BHE.*
Bromsgrove (B & DRAC)—11 July (Talk on SB101 by G3VHL), 8 pm, Co-op Hall.
Coventry (CARS)—4 July (Oscilloscopes and their uses, by G3RIR), 11 July (Night on the Air), 18 July (No meeting), 25 July (Night on the Air), Scout HQ, 121 St Nicholas Rd, Radford.
Dudley (DARC)—15 July, 8 pm, Central Library, St James's Road. *G3PWJ.*
Hereford (HARS)—First and Third Fridays of the month, Civil Defence HQ, Goal St, Hereford. *G3RJB.*
Leamington Spa (MWARS)—Every Monday 8 pm, 28 Hamilton Terrace, Leamington Spa.
Lichfield (LARS)—The First Monday and Third Tuesday of each month. 8 pm, The Swan Hotel, Bird Street, Lichfield. *G3NAS.*
Redditch (EWARG)—10 July (Talk and film on Industrial gases, illustrating effects of liquid oxygen etc. R. Blackburn G3PYR), 8 pm, Old People's Centre, Park Road, Redditch.
Shrewsbury (SARS)—4 July (Club Station), 10 July (Visit Royal Radar Establishment, Great Malvern), No meetings in the remainder of July and in August, 8 pm, Shrewsbury School Signals Hut. *G3WNI.*
Solihull (SARS)—Third Tuesday each month, 8 pm, The Old Manor House, 126 High Street, Solihull. Visitors always welcome. *G3VXV.*
Stafford (English Electric)—Wednesdays and Fridays, 7.30 pm, Visitors are most welcome, Association Hall, Stychfields, Stafford. *G3RLH.*
Stourbridge (STARS)—15 July (Informal Meeting "Shrubbery Cottage" Heath Lane) HQ, Longlands School, Stourbridge.
Sutton Coldfield (SCRS)—7 July (Talk by G2AGK), 21 July (Projects and Natternite), 8 pm, SCTFC Clubhouse, Coles Lane, Sutton Coldfield. *G8AVH.*
Worcester (W & DARC)—Meetings are held each Wednesday and Saturday evening at 7.45 pm, 13 July (Mobile Rally), 35 Perdiswell Park, Droitwich Road, Worcester. On 21 May as a change from radio a competition for photographs was held. The winning entry was submitted by David Weaver, and second by Brendan Magill G3RMF. *G8ASO.*

Region 4 RR T. Darn, G3FGY.
Nothing received for this region.

Region 5 RR S. J. Granfield, G5BQ.
Bedford (B & DARC)—Club meets on Thursdays at the Dolphin Inn, Broadway, Bedford at 8 pm (Morse Classes at 7.30 pm).
Bishop's Stortford (BS & DARC)—21 July (Junk Sale & Natter Night). Club meets at the British Legion Club, Windhill, Bishop's Stortford, Herts.
Cambridge (C & DARC)—4 July (Transistors—Part 2—Richard Baker G3USB), Fridays, 7.30 pm, Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
Dunstable Downs (DDRC)—4 July (To be arranged), and "In Between evenings for rest of Holiday Season. Meetings on Fridays at Chew's House, Dunstable, Bedfordshire at 8 pm. The Double Dee Club Rag which appears bi-monthly covers all aspects of the Club's activities, with G8ASP, G6AEH/T as editor.
Luton (L & DARS)—Meeting at 8 pm on first Thursday in the month at Club HQ, Putteridge Estate, Luton, Bedfordshire.
March (M & DRAS)—Meetings on Tuesdays at Old Police HQ, March, Isle of Ely.
Peterborough (P & DARS)—Meeting at 7.30 pm on first Friday in the month in the Electronics Section, Peterborough Technical College, Eastfield Road. On other Friday evenings meetings are held at Club HQ in the Old Windmill, behind the Peacock Inn, London Road, Peterborough at 8 pm.
Shefford (S & DARC)—Meetings on Thursdays, 8 pm, Church Hall, High Street, Shefford, Bedfordshire.
Stevenage (S & DARS)—Meetings on first and third Tuesdays, 8 pm, Hawker-Siddeley Dynamics Ltd, Gunnels Wood Road Stevenage, Hertfordshire.

Region 6 RR L. W. Lewis, G8ML.
Cheltenham (RSGB Group)—First Thursday, 8 pm, Great Western Hotel, Clarence Street, Cheltenham.
Gloucester (GRC)—Second and fourth Thursdays, 7.30 pm, Lamb Inn, Market Parade, Gloucester.
South Bucks (VHF Club)—2 July, 5 August, Bassetsbury Manor, Bassetsbury Lane, High Wycombe, Bucks.

Region 7 RR P. A. Thorogood, G4KD.
The RR reports that at a recent convention £1 18s 9d was donated to RAIBC and also an amateur in Essex organised a penny fair and raised 50/-.
Acton, Brentford & Chiswick (ABCRC)—15 July (Members' problems—discussion), 7.30 pm, Chiswick Trades and Social Club, 66 High Road, Chiswick.
Addiscombe (AARC)—Second and fourth Tuesdays, 7.30 pm, 158 Lower Addiscombe Road, (Toc H Hall).
Ashford, Echelford (ARS)—7 July, 31 July (Colour TV by G8ASI and G2FNK). At last meeting, the club heard a talk on the early days and equipment by Leslie Bourne, an old timer who is retired chief Engineer for Hammond Organs. 48 people attended, including 23 RSGB members. St Martins Court, Kingston Crescent, Ashford, Middlesex.
Barking (B & DREC)—Tuesdays and Thursdays, 7.30 pm, Gascoigne Recreation Centre, Gascoigne School, Morley Road, Barking.
Bexleyheath (NKRS)—10 July (Junk Sale), 24 July (Club station and natter night). Last meeting was supported by 36 members (30 RSGB) when RSGB final arrangements for NFD were discussed. 7.30 pm, Congregational Church Hall, Chapel Road, Bexleyheath.
Cheshunt (CDRC)—4 July (Lecture and field day arrangements, 13 July (VHF Field Day), 7.30 pm, Methodist Church Hall, opposite Theobalds Grove Station, Cheshunt.
Chingford (RSGB Group)—Fridays. Tel 01-524 0308.
Chingford (SRC)—Fridays, 8 pm, Friday Hill House, Simmons Lane, Chingford, E4.
Civil Service (CSRS)—15 July, 6.30 pm, Civil Service Recreation Centre, Monck Street, Westminster.
Croydon (SRCC)—15 July, 7.30 pm, Swan and Sugarloaf, South Croydon.
Crystal Palace (CP & DRC)—19 July, 8 pm, G2MI talked about his W/VE visit at last meeting and was very well received. Attendance was 24. G2VB hopes to be helping with the station at the annual traction engine rally. Emmanuel Church Hall, Barry Road, SE22.
Dorking (DR & DRS)—8 & 22 July (2 and 4 metre discussion with joint meeting of Guildford RS at Cock, Headley), Star and Garter, Dorking.
Ealing (E & DARS)—Tuesdays, 7.30 pm, Northfields Community Centre, Northcroft Road, W13.
East London—Wanstead House, The Green, E11.
Edgware & Hendon (E & DARS)—8 and 22 July, 8 pm, St George's School, Flower Lane, Mill Hill, NW7.
Farnham, Bucks (Burnham Beeches RC)—fortnightly, 14, 28 July, Farnham Common Village Hall, Victoria Rd.
Gravesend (GRS)—Third Wednesday, 8 pm, Community Centre, Cedar Ave, Kings Farm Estate.
Guildford (G & DRS)—11 July (High Power FD discussion arrangements), 25 July (70 MHz portable discussion by G3PGT). Events planned for 22 July with Dorking ARS on 2 and 4 metres at the "Cock," Headingley. Guildford Engineering Society, Stoke Park.
Hampton Court (TVARTS)—First Wednesday, 7.30 pm, Three Pigeons, Portsmouth Rd, Surbiton.
Harlow (DRS)—Mark Hall Barn, First Avenue.
Harrow (RSH)—Fridays, 8 pm, Roxeth Manor School, Eastcote Lane, Harrow.
Havering (H & DARC)—Fortnightly, 9 and 23 July, 8 pm, British Legion House, Western Road, Romford.
Hemel Hempstead (HH & DARS)—First and third Fridays, Rucklers Lane Hall, Kings Langley.
Holloway (GRS)—Mondays (RAE), 7 pm, Wednesdays (Morse), 7.30 pm, Fridays, Monten School, Hornsey Road.
Ilford—Thursdays, 8 pm, 50 Mortlake Road (off Ilford Lane), Ilford.
Kingston (K & DARS)—Second Wednesday, 8 pm, Penguin Lounge, 37 Brighton Road, Surbiton.

Winner of a D/F Competition recently held at a Mobile Picnic organised by Cardiff RSGB Group was D. Nasey, GW3ATM

Arthur Robinson, G3MDW (seated), Secretary of the Northern Heights ARS, presenting a Honorary Membership plaque to Stew Perry, WIBB

Leyton & Walthamstow—Tuesdays, 7.30 pm, Leyton Senior Institute, Essex Road, E10.
London (UHF Group)—First Thursday, 7.30 pm, Whitehall Hotel, Bloomsbury Square, Holborn, WC1.
Loughton—Fortnightly, Fridays, 11 and 25 July, Loughton Hall, (near Debden Station).
Maidenhead (N & DARC)—Third Tuesday, 7.30 pm, Victoria Hall, Cox Green, Maidenhead.
New Cross—Wednesdays and Fridays. 8 pm, Recent activities included a 1·8 MHz field day, participation in South London Scouts camp. A team from Clifton ARS took part in the 144 MHz df event organised by the South East VHF Group. 225 New Cross Road, SE14.
Paddington (P & DARS)—Thursdays, 7.30 pm, Beauchamp Lodge, 2 Warwick Crescent, W2.
Purley (P & DRS)—First and third Fridays, 8 pm, Railwaymans Hall, Side Entrance, 58 Whytecliffe Road, Purley.
Reigate (RATS)—First Wednesday, 7.45 pm. A welcome to the number of visitors from Cray Valley RS to the last meeting when films entitled " Mixed Bag " were shown which covered the society's ten years. Slides included contests, members shacks, Scottish expedition, NFD, and were enjoyed by all. George and Dragon, Cromwell Road, Redhill.
Romford (R & DRS)—Tuesdays, 8.15 pm, RAFTA House, 18 Carlton Road.
Scouts (ARS)—17 July, 7.30 pm, Baden Powell House, Queensgate, South Kensington, SW7.
Sidcup (CVRS)—17 July, (Natter Night), 7 August (Investigation of Radio Interference " by Bill Thompson, G3MQT). 32 members and visitors heard a talk on " Veroboard " by a representative. All Saints Church Hall, Bercta Road, New Eltham.
Slough (SDR Group)—First Wednesday, 7.30 pm, United Services Club, Wellington Street.
Southgate (SRC)—Second Thursday, 7.30 pm, Civil Defence Hut, Bowes Rd, N11.
St Albans (Verulam ARC)—16 July (G2QB Remembers). At last meeting at Cavalier Hall, G5AJH John Fortune from Ambassador College gave a wonderful talk on weather satellites with demonstrations of cloud cover pictures. Europe was seen unrolling from the machine. Town Hall, St Peter's St.
Sutton and Cheam (SCRS)—Third Tuesday, 8 pm, The Harrow Inn, High St, Cheam.
Welwyn (Mid Herts ARS)—10 July (Lecture), 8 pm, Welwyn Civic Centre, Welwyn.
Wembley (GECARS)—Thursdays, 7 pm. Sports Club, St Augustin Avenue, North Wembley. This Club is open to non GEC employees by invitation, Telephone ARN 1262 for details.
Wimbledon (W & DRS)—Second and last Fridays, 8 pm, St John Hall, 124 Kingston Road, South Wimbledon, SW19.

Region 8 RR D.N.T. Williams, G3MDO
Canterbury (EKRS)—Details of future meetings from D.N.T. Williams, G3MDO.
Eastbourne (SARS)—Meetings held at the Victoria Hotel, Latimer Road, Eastbourne.
Maidstone (M YMCA ARS)—Meetings held every Tuesday and Friday at 8 pm, " Y " Sports Centre, Melrose Close, Loose, Maidstone.
Mid-Sussex (Mid-SARS)—3 July (" The SSB Filter Techniques " by Alan Jones, G3SGA), 17 July (" Cause and Effect " by Ron Ham, BRS15744), 31 July (Club Shack Night on the Air), Marle Place Further Education Centre, Leylands Road, Burgess Hill.
Tunbridge Wells (WKARS)—11 July (Mobile Operation), 25 July (" Printed Circuits and how to make them " by Bob Southern, G3RST).
Worthing (W & DARC)—Meetings held every Tuesday, 8 pm, at Rose Wilmot Youth Centre, Littlehampton Road, Worthing.

Region 9 RR J. Thorn, G3PQE
Bristol (BARC)—Every Monday and Thursday, 7.30 pm, Club HQ (G3TAD), University Settlement, 41 Ducie Road, Barton Hill, Bristol 5. *G3WLZ.*
(RSGB)—28 July (" The RSGB and the Radio Amateur " by J. Swinnerton, G2YS, President of the RSGB) 7.30 pm, Becket Hall, St. Thomas Street, Bristol 1. The Home Constructed Equipment competition is being held on 18 August. If you have not completed your latest piece of construction, there is still time to finish it to enter on the night. Keep our Swindle table going each meeting, Longleat has come and gone for the twelfth time and as usual met many of our scattered friends which gave us all great pleasure. *G3ULJ.*
Burnham-on-Sea (BOSARS)—Meet Second Tuesday in each month, 8 pm, Crown Hotel. *G3GIW.*
Cornish (CARC)—July Meeting (Illustrated talk on the " Wreck of the Association " a potted talk, and " QRO TX's " by G3VWK),

Members of the Verulam Amateur Radio Club's NFD Sub-committee hard at work planning their 1969 entry at the QTH of G3LXP. Left to right: D. Underdown, G3MBK; R. Wells, G8BNR; H. Young, G3YHY; BRS. C. R. Tilling; BRS. E. Quick; G. Bird, G2AIA; D. Purchese, G3LXP; G. Eddowes, G3NOH

RSGB President, John Swinnerton, G2YS proposing the toast to the Sutton & Cheam Radio Society at its 21st Annual Dinner

27 July Mobile Rally at Truro. Meet SW Electricity Board, Pool, Camborne. *G3NKE.*

(VHF Group)—Third Thursday in each month, 7.30 pm, The Peoples Palace, Pydor Street, Truro. *G3XC.*

(Falmouth Group)—Meet alternative Tuesdays, Laburnham Drive Mission Hall. *G3OJN.*

(Newquay Group)—Meet alternative Wednesdays, Treviglas School. *G3THT.*

Exeter (EARS)—First Tuesday in each month, 7.30 pm, St Sidwells Methodist School Hall, Sidwell Street, Exeter. *G3HMY.*

Plymouth (PRC)—15 July (Open night), 5 August ("SSB" by Ron Daw, G3OIQ). Virginia House, Bretonside, Plymouth. Chairman is now M. Hibbitt G3ULN, and Secretary J. H. Peters, G3YDU. QUA is being compiled by Ron Hooper, G3SCW.

Saltash (S & DARC)—11 July (Demonstration of Portable Generators), 7.30 pm, Burraton Toc H Hall, Warraton Road, Saltash, 25 July (Foxhunt, 160 metres, Meet 7.30 pm, at Club). A trip was made to Goonhilly Radio Station on 25 June, the 2 metre project continues, a few more converters have appeared. *G3XWA.*

South Dorset (SDARC)—4 July (Special outdoor meeting at Hardy's Memorial, stations on 4m, 2m, 70cms, and HF Bands, Visitors are most welcome, 7.30 pm. Information given in June issue was incorrect for the new Secretary. It is now M. S. Box. G3RZG.

Taunton (TARS)—Every Friday 7.30 pm, SEVO HQ, The Mount, Taunton Barracks. *G3DTB.*

Torbay (TARS)—Every Tuesday and Friday evening, Club nights, Last Saturday in month, Tape Lecture, and Business meeting, Club HQ G3NJA, Bath Lane, Rear of 94 Belgrave Road, Torquay. Holiday visitors very welcome. 24 August, Torbay Mobile Rally to be held at the Newton Abbott Recreation Ground, Marsh Road, Newton Abbott (next door to Gas Holders). *G3NQD*

Wells (WARS)—Meet Mondays, EMIE Social Club, Chamberlain Street, Wells. *G3MQQ.*

Weston Super-Mare (WSMARS)—First Friday, Westhaven School, Ellesmere Road, Uphill, WSM. *G3GNS.*

Yeovil (YARS)—Wednesdays, 7.30 pm, Park Lodge, The Park, Yeovil. G8AFA was elected President and is giving lectures every third meeting, the Club entered the 432 MHz contest and preparations are in hand to enter the UHF contest, a number of visits are being arranged. *G3NOF.*

Region 10 RR C. H. Parsons, GW8NP.

Blackwood (ARC)—Fridays, 7.30 pm, Blanche Cottage, off High Street, Blackwood, Mon. *G6BK.*

Barry College of Further Education (ARS)—Meetings held at College of Further Education, Colcot Road, Barry, Glam. Details of July events available from GW3VPB.

The seventieth anniversary of Marconi's transmission over water between Lavernock and Flatholm Island was celebrated by this Society on May 11th by operating stations at Lavernock and the Island. This was an imaginative and highly organised event. The call-sign GB2FI was used for the Flatholm station, and special QSL cards were used. It is unfortunate that details were not available for publicity before the occasion, but great interest was shown and hundreds of stations were worked. It is planned to repeat the event next year.

Cardiff (RSGB) Group—July 14 (Discussion on arrangements for VHF Field Day), 7.30 pm, TA Centre, Park Street, Cardiff. *GW3VNO.*

East Glamorgan Raynet Group—First Tuesday in each month, 7.30 pm, Cardiff Emergency Services Headquarters, Womanby Street, Cardiff. *GW3VNO.*

Hoover (ARC)—Mondays, 7.30 pm, Hoover Social Club, Hoover Factory, Merthyr. Club station available at each meeting and all interested amateurs are invited. Further information from the Secretary, Mr. F. B. Tribe.

Port Talbot (ARC)—Meets at Trefelin Club & Institute, Port Talbot. Further details from GW3RVG.

Pontypool (ARC)—Tuesdays, 7 pm, Educational Settlement, Rockhill Road, Pontypool, Mon. *GW3JBH.*

Pembroke (ARC)—Last Friday of each month, 7.30 pm, at the Defensible Barracks, Pembroke Dock. *GW3LXI.*

Rhondda (ARS)—Meetings at Pengelli Hotel, Treorchy, Rhondda, Glam. Details from GW3PHH.

Sully and District Short Wave Club—Tuesdays, 7 pm, Annexe Sully Bowls and Social Club, 59 South Road, Sully, Glam. *GW3SLA.*

This Club will be operating a station at the Fete on Sully Playing Fields on 12 July, the call-sign GB2SI having been applied for.

Swansea Telephone Area (ARS)—Meets at Swansea Telephone Sports & Social Club, where RAE examination courses, morse practice and constructional projects are catered for. Details from the Secretary, M. D. E. Connor, 54 Talley Road, Penlan, Swansea, Glam.

University College, Cardiff (ARS)—Details of future activities of this society are available from the Secretary, Students' Union, Dumfries Place, Cardiff. It is strongly suggested that all students contemplating entry to the College next session get in touch with the Secretary as soon as possible.

Region 11 RR M. Williams, GW3LCQ.

Nothing received for this region.

Region 12 RR A. W. Smith, GM3AEL.

Aberdeen (AARS)—Fridays, 7.45 pm, 6 Blenheim Lane, Aberdeen. *GM3HGA, Aberdeen 33838.*

Lhanbryde (MFARS)—Mondays, 7.30 pm, St. Andrews School, Lhanbryde by Elgin. *GM3UKG. Clochan, Buckie 225.*

Dundee (RSGB Group)—Thursdays, 8 pm, 3 Magdalen Place (off Roseangle), Dundee. *GM3KYI.*

Region 14 RR N. G. Cox, GM3MUY.
Ayrshire (Ardeer Recreation Club ARC)—8, 10, 15, 17, 21, 24, 28, 31 July, 7.30 pm, Ardeer Recreation Club, Amateur Radio Section, Stevenston, Ayrshire, details J. F. McCreight, GM3DJS, 10 Auchenharvie Road, Saltcoats, Ayrshire.
Ayrshire (AARG)—6, 20 July, 7.30 pm, ATC HQ, Kilmarnock.
Glasgow University (GURC)—July meetings refer C. Weston, GM3VAP, 46 Manchester Drive, Glasgow W2, Tel 339 2074.
Greenock (G & DARC)—4, 11, 18, 25 July, 7.30 pm, James Watt Library, High Street, Greenock.
Mid Lanark (RSGB Group)—18 July, 7.30 pm, YMCA, Brandon Street, Mothwell.

Region 15 RR J. Thompson, GI3ILV.
Ballymena (BRC)—Tuesdays, 8 pm, morse and theory classes in progress, Club Rooms, 46A Bridge St, Ballymena. *GI3XDX.*
Belfast (B & D RSGB Group)—Wednesdays, War Memorial Building, Waring St, Belfast. *GI2DZG.*

Region 16 RR W. J. Green, G3FBA.
Chelmsford (CARS)—1st Tuesday in each month 7.30 pm, Marconi College, Arbour Lane, Chelmsford. *G3OZF.*
Colchester (CARC)—D. F. Hunts, Details from G3VAG or G3OZF.
Gt Yarmouth (GYRC)—Last Friday in each month, 7.30 pm, at 98 South Market Road, Gt Yarmouth. *G3HPR.*
Ipswich (IRC)—30 July, (Semi conductor Electronics, D. Williams) 7.30 pm, Red Cross HQ., Gippeswyk Hall, Gippeswyk Avenue, Ipswich. *G3UJR.*
Norwich (NARC)—Mondays, 7.30 pm, The Clubroom, Brickmakers Arms, Sprowston Road, Norwich. *G3PTB.*
Southend (SDRS)—11 July, (Visit to Southend Telephone Exchange (Prov. Arrgt.), 25 July (Talk and Demonstration, Teleprinters, G3NPF). Normal meetings 8 pm, Staff Canteen, Ekco Electronics, *G8BSB.*

Region 17 R. R. C. Sharpe, G2HIF
Chippenham (C & DARC)—8 July (mini D/F Hunt starting at 7.15 pm), 15 July (Social at George and Dragon, Rowde, 8 pm. Ladies will be welcome). *G3UTO.*
NW Berks (AERE, Harwell, ARC)—Third Tuesday in the month, 7.30 pm, Social Club, AERE, Harwell. *G2HIF.*
Reading (R & DARC)—Meetings fortnightly, Tuesdays, at the Victory PH, Tilehurst.

Forthcoming meetings will be devoted to NFD, the RAEN and a film show. The topics of Amateur interest which have been covered in recent weeks have included a review of the Heathkit HW100, the RAE and a talk by G5HZ on the reminiscences of an old Timer. New members will be particularly welcome. *G3TEB.*
Salisbury (S & DARC)—Tuesdays, 8 pm, Sawmills, Pembroke Park, Wilton, Salisbury, Wilts. *G3HCL.*
Southampton (SURC)—Tuesdays, 8 pm, Radio Clubroom, Students' Union, Old Union Building, University of Southampton. New members are welcome, especially students who will be coming to the University next October. *G3VRW.*

RSGB Film Library

Film No 11. **Radio News of 1968.** 16mm sound, 29 minutes. Hire: 25s. per day; additional days at half-rate.
"*We enjoyed the film immensely. Congratulations on a fine production.*" Lothians Radio Society.
"*FB Film. Many thanks.*" Fareham & District Radio Society. " Radio News of 1968 " is available to all Members, Affiliated Societies and Groups. Circulars have been sent to all Societies. Further copies of Film Library circulars can be obtained from the Librarian—sae please. Contact R. A. Cathles, G3NDF, 4 Dawnay Road ,Great Bookham, Leatherhead, Surrey.

THE RSGB SHOW

INTERNATIONAL RADIO ENGINEERING & COMMUNICATIONS EXHIBITION

Where: Royal Horticultural Society's New Hall, Greycoat Street, Westminster, London, SW1.
When: 1 to 4 October 1969—10 am to 9 pm.

This year's exhibition will be opened on 1 October by Colonel D. McMillan, CB, OBE, BSc(Eng), CEng, FIEE, Chairman of Cable & Wireless Ltd. The special exhibit on the stage of the hall will be provided by Cable & Wireless.

All the usual Exhibition attractions will be present and correct, but in particular we should like to draw Members' attention to the display of Home Constructed Equipment. The Society invites items for display, subject to the following conditions:

i All items submitted for exhibition will be subject to acceptance by the Exhibition Committee.
ii Entries will be accepted (*a*) as items which have been the subject of published articles in the RSGB BULLETIN or *Radio Communication* during the period January 1967 to date. It should be made clear that only the member writing the original article will be allowed to enter; (*b*) from members who are prepared, if required, to write a constructional article for publication in *Radio Communication* featuring their entry, this article to be paid for at the normal rates.
iii Entrants will be required to certify that their entries were constructed entirely by themselves from commonly available materials and components.
iv RSGB members only will be eligible.
v The Horace Freeman Trophy will be awarded for the most original piece of equipment on show.
vi Additional prizes may be awarded at the discretion of the judging Committee.
vii Members wishing to exhibit should write to the organizer::

M. ELLIOT, G3VWS, 23 Filbert Crescent, Gossops Green, Crawley, Sussex.

MEMBERS' ADS

These advertisements are free to members and limited to 32 words, discounting the name, address and telephone number. Ads must be typed or printed on the form, or on a post card similarly laid out. They should be accompanied by a *recent* Radio Communication wrapper. No trade advertisements can be accepted in this section, although these and others requiring immediate inclusion should be sent to our classified advertisements department. Inclusion is *NOT* guaranteed and unused advertisements are *NOT* held over to the following issue.

Entry period for August .. 9 July to 15 July
Entry period for Sept. .. 5 Aug. to 11 Aug.

Entry period for Oct. .. 1 Sept. to 5 Sept.
Entry period for Nov. .. 6 Oct. to 10 Oct.

4m mobile transmitter, transistor mod, transistor psu, QQVO3/10 pa, positive earth. All one cab, very compact, £8. Cossor 1035 double beam scope £15. J. Adey, 18 Mount Park Crescent, Ealing, London, W5. Tel 01-997 5429 or Office 01-837 8683.

Several lengths of dural 2 in dia pole, up 25 ft, around £4 10s for 25 ft. Buyer must collect. Also five remote control units, each with psu and af amp in 16 in rack, mint, cabs £2 each. Mrs H. Rouse, 7 Priorswood, Compton, Nr Guildford, Surrey, Tel 0486 34 408.

ET4336 tx, vfo/co with mic amp £15. Rack psu outputs 300 V pos, 300 V neg, 100 mA £2. 12 V vibrator supply 25/-, G73 wavemeter 100 KHz-25 MHz 70/-. Audio osc 50 Hz-15 KHz BSR L050B 50/-. Buyer collects. W. Chew, GW2HIN, QTHR. Tel Pontypool 2759.

AR77E, hb, £17 10s. 4 tr tape rcdr stereo £12 10s. Both gd cond, buyer tests, collects. R. Field, 1 Haines St, Battersea, London, SW8.

Cases (2) 19 × 10½ × 10½ in black crackle, hinged lids 30/- each. 6 ft GPO rack £1, Carriage extra. R. Parkes, G3REP, 94 Canterbury Walk, Warden Hill, Cheltenham, Glos.

Minimitter MR44 rx needs attn £10. LG300 tx new 813, 2 spare 813, circuit, £20. LM Frequency meter, charts, mains psu, spare valves £20. Pair field telephones type F, 150 yds wire 70/-. B. Stone, G3JFC, 39 Purrett Rd, Plumstead, London, SE18. Tel 01-854 6646.

Eagle RX80, 4 bands 550 kHz–30 MHz, bs hambands, s meter £20. Codar Q-mult and Codar preselector both self powered versions £5 each. 2 Creed 3X teleprinters £3 each, all carriage extra. T. Gardner, G3XUA, 303 Wollaton Rd, Wollaton Park, Nottingham.

KW2000 with ac psu and Q mult, fully updated by KW £135 ono. T. Kirk, G3OMK, QTHR. Tel Loughborough 61778.

TW2 with mains psu £22. RA-1, matching spkr, xtal cal £28. OS-1 3 in scope £15. RF 1U sig gen £10. Buyer collects. L. Logan, G8AZX, QTHR, Tel 01-969 1882.

Mosley V-4-6 vertical with 80m loading coil £8. RCA trans 2000–1500–0–1500–2000 V at 500 mA £2. Sae for list of values, capacitors, trans etc. T. Griffiths, G3NPZ, 7 Somaford Grove, East Barnet, Herts. Tel 01-440 6219.

Rep's R30 tape rcdr, gd cnd £35 ono. Carriage extra or by arrangement. D. Bemister, G3OBX, 69 Woodfield Dr, Gidea Park, Romford, Essex.

Viceroy mk IV extra filter, manual, mint £95 callers only. Bliley 100 kHz xtal for BC221, Viceroy new meter, offers. HRO S meter 35/- New 813 25/- TZ40 15/- Z match coils 12/-. C. Stead, G2UZ, 2 Cliff Road Gdns, Leeds LS6 2EY.

American Spitfire linear, 1 kW pep input, 10–80m, drive requirements 70–100 W pep. Dimensions suitable car dash mounting, weight 13 lbs, snip at £35 ono. J. Heys, G3BDQ, 418 The Ridge, St Leonards-on-Sea. Tel Hastings 51033.

KW2000A, 20 mths old with 201 mic, immac cnd plus psu, best offer over £160. Consider 2m Communicator as part exch. C. Phillips, GW3XCR, 40 Castle Drive, Neath, Glams. Tel Neath 4998.

Brand new Kokusai MF455 mech filter, trans and carrier xtal £8. Pye Ranger transistor psu (350 V) and modulator, perfect wkg order with case £9. UM1 mod tran 30/-. W. Clayton, G8ARG, 7 The Bancroft, Etwall, Derbyshire.

Equipment of late G3FRT. HRO, psu, coils gc, bs inc 21 MHz, manual, mods, official National noise limiter, s meter, works any rf gain and net £20 ono. Write, phone appointment to hear wkg. Buyer collects. Mrs M. Evans, 90 Gleggside, West Kirby, Wirrall, Cheshire. Tel 051-625 8108.

Clearing shack. KW2000A with ac psu and mic £185. Dc psu £25 813 linear in KW500 case £30 AR88D £30 BC221 with mains psu and charts £18 Heathkit gdo £8. Sae list. Richardson, 50 Hayes St, Bromley, BR2 7LD. Tel 01-462 5004.

CR100 £10 exc, but slight fault, probably new valve needed, little used. Buyer collects. C. White, 19 Castalia Square, Isle of Dogs, London, E14.

£25 Lambda Investment Company redeemable debenture stock. Hough, Halton and Soal, 34 Fisher St, Carlisle, for executors of Miss Kate Bell, deceased. Tel Carlisle 24379.

Heathkit Two-er, HW30, with xtal and autotran for 240 V mains, as new perfect wkg order, £25. C. Johnson, G8BWO, 48 Gospeloak Rd, Tipton, Staffs. Tel 021-556 1875.

20m Mark heliwhip and fibreglass single hole mount, new £5 5s. Pair G8KW traps and T piece £2. Pair Eddystone raising blocks 12/6. Sanwa multi-meter £2 10s. Mrs D. Barry, G3XLY, 15 Fairlawn Ct, Acton Lane, London, W4.

Heath HD10 keyer, requires attn. HM11U swr meter, Olson cabinet 14 in × 6 in × 8 in. Xtals 46·10 MHz 5/- 7800 kHz 5/- 33·2 MHz, 7500, 40 MHz 10/-. S. Gall, G3UCM, QTHR. Tel 71-55342.

Minimitter mobile whips 160m £3 10s, 80, 40m £3 10s. Taylor 45C valvetester £15. New Dow relays, various. Swr meter, irons, chokes, trimmers. Wanted Eddystone 750, 12AT7, 6BA8, 6BS8 valves. R. Reynolds, G3IDW, Plot 31, 6 Church Way, Stratton St Margaret, Swindon, Wilts.

Moving coil meters, flush mounting, 3·25 in dia, 0–200 mA, 0–500 mA, 11/6 each. Valve check meter for Eddystone 358X rx 12/6. National type N dial 4 in with vernier offers. Sae with enquiries please. H. Beadle, 12 Cartmel Rd, Keighley, Yorks.

Tested ex-equipment Mullard OC44 transistors, long leads, 10/- per doz, £3 10s per 100. R. Norris, G8CJC, 19 Bluebridge Ave, Brookmans Park, Hatfield, Herts.

Lafayette HA500, Codar PR30X, Joystick and matching unit, speaker tran, earphones £40, ono. Buyer insp and coll or exch for tape rcdr. Grundig or Philips. G. Chandler, 53 Barkis Way, Bonamy Est, London, SE16. Tel 01-237 9369.

QRT sale. 1968 KW2000A, Q mult, Shure 201, spare 6146's, lpf, £170. Hy-gain 18AVQ 10–80 m vert £15. Hammarlund HK1B keyer with paddle £12 10s. Books galore, valves, FL8's etc, sae for list. J. Batham, 10 Churchfield Rd, Houghton Regis, Dunstable, Beds. Tel Dunstable 65114.

Fichord 1A transistor tape rcdr complete with battery charger and two sets batteries as new, perfect order, not ex-BBC with Grampian mic £15, would sell separately. 240 V to 120 V, 1 KW tran £5. D. Wilson, G8APS, 177 Dower Rd, Four Oaks, Sutton Coldfield, Warks. Tel 021-308 3044.

Homemade 10 W tx, 160–80m, am, cw, 6L6 pa, incl atu, fully screened, £11. Rx PCR2, mw, lw plus sw 6–18 MHz, unmod, ac psu, int spkr. £5. Heathkit RA1 rx, factory built, A1 cnd, £31. G. Barber, G3WQT, QTHR. Tel Soton 69476.

Collector's items, early valves. S625 (2) with bases, PM4, PM524, PM3, DEP610, DEL610, DEH610, Ostar Ganz mains voltage series, horn ls, BBC hb 1929, offers, include post. G. Jones, GW2HMO, 24 Walters Rd, Llanelli. Tel Llanelli 3712.

Four 6SH5 valves, exch for four 6JS6 or sell. Offers Newland, 161 Penrose Ave., Marton, Blackpool.

Homemade 15m 3 el yagi with 60 ft coax, prefer buyer collect. Will exch for 455 kHz Kokusai filter 2·1 kHz wide with carrier xtals. P. Smith, G3WPB, 76 Southfield Rd, Hinckley. Leics.

Minimitter MC8 converter with hb £8. 19 set mk III with hb £3. Carriage extra. Wanted conversion details or circuit for 62N rx. All letters answered. D. Thomas, 134 Clyndu St, Morriston, Swansea, Glam.

R107 fair cnd, new front end covering 160–80m amateur bands only with extra output stage. Spare valves and manual £5 10s ono, will deliver Birmingham area. J. Viney, 1254 Yardley Wood Rd, Shirley, Solihull, Warks. Tel 021-474 4636.

Various atu's ex govt 15/-, 60/- Mint JR500SE rx £55. Linear components 813's, bases, tran and other parts £10. Reporter 4m ac/dc £8. 2m, 4m, 10m tx's, including mod £6 each. E. Haycock, G3VKC, "Two Four," The Comyns, Bushey Heath, Herts. Tel 01-950 3387.

HE50 rx £12 ono. Wanted morse key, GPO or similar. W. Winton, 55 Bradgate, Dr, Wigston Fields, Leics.

Trans. RCA 945-0-945 V 400 mA 75/- Woden 650-0-650 250 mA 50/- DTM16 matching choke 20H 250 mA 40/- Parmeko 500-0-500 V 165 mA 35/- Matching 16H 250 mA choke 30/- C. Olley, G3AIZ, 157 Wanstead Park Rd, Ilford, Essex.

AR22 rotator £12 TA 32Jr £12 Mosely A320 3 ele 20m monobander (American) £10 Lattice mast triangulated 15 in × 50 ft long in four sections, galvanised, very strong £18. G3CUN, QTHR. Tel 021-783 3628.

Radio TV Servicing 1959/65. (160m tx), 70 cm exciter, 625 line interlaced pocket sized sync gen all sale, exch. Wanted 70 cm converter or why, pocket sized equipment only. J. Kasser, G8BTB, 21 Kings Close, London, NW4. Tel 01-203 2822.

Cossor 330 scope £10 or exch SSB filter, preferably mech. Dozens xtals 2-8 MHz 3/- each plus pp. N. Wilshire, 56 Chilvers Bank, Baldock, Herts. Tel Baldock 3039 (evenings).

HW32 14 MHz Heathkit tcvr ssb, Shure ptt mic, small neat psu, spkr unit, lpf, total cost over £100. All in as new cnd £70, prefer buyer insp. M. Batt, 106 Westover Rd, Westbury-on-Trym, Bristol. Tel Bristol 623321.

RSGB Bulletins April 1944–Dec 1968 complete £3 10s. Buyer collects. R. Lloyd, 52 Lees Terrace, Bradley, Bilston, Staffs.

Nuvistor converters, i.f. 4-5 MHz, 144 MHz less 35 MHz xtal, 70 MHz complete £5 each. Wanted 9 MHz filter. J. Colebrook, G3BJD, Green Gable, Springfield Rd, Bigrigg, Egremont, Cumberland.

Bantex, 4m mobile ¼ wave whip, mint, never used £4. Various xfmrs many as new, also numerous xtals, sae list. 50W 4m tx, QQVO6/40 pa, mod & psu, one cab, £20. D. A. Evans, G3OUF, c/o 18 Mount Park Crescent, Ealing, London, W5. Tel 01-997 5429 or Office 01-837 8688.

B44 mkII with mains psu £5. TW 2m 6BQ7A converter 27-29 MHz £3. Canadian 52 rx, faulty on 160m £4, all carriage extra. G3TTV 12 Hazel Close, Mildenhall, Suffolk.

FL200B, exc cnd, £95 ono. Ackerley, G3RIR, QTHR. Tel Coventry 465319.

Selling KW2000A and ac/dc psu's £140. Pyramid linear linear, 4 6HF5 £40. Also Multi-Mobile G whip 10-80m £14. Carriage at cost, offers considered. M. Thompson, GD3JIU, 146 Ballabrooie Drive, Douglas, IOM.

Globe Scientific rx 100-150 MHz as advertised, new, £5 10s. Also piano keyboard free to caller. G. Bloomfield, G2NR, 22 Elmwood, Welwyn Garden City. Tel Welwyn Garden 23782.

Complete Codar mobile rig T28, AT5, transistor 12 V psu, control unit, all cables and manuals £30. 160m whip £2. Minimitter Mercury 150 W tx, am, cw, £25. Monitor 56 scope £4. Carriage extra. Keith Younger, G3OIB, College of Agriculture, Bishop Burton, Beverley, E. Yorks. Tel Leconfield 482.

HRO rx rack mounting model, xtal filter, valves, coils 900 kHz–30 MHz, bs 80, 40, 20, 10 with 250 V stab psu having additional outlets for converter, wkg order £15. G Ward, G3TUQ, 19 Portland Rd, East Grinstead, Sussex. Tel East Grinstead 24594.

10 W hi-fi amp with psu, Collaro autochange £9 ono. 50X terrestrial telescope, brass construction £10 ono. Klystron waveguide attenuators and wavemeter not wkg £6 ono. Good strobe £14 ono. Callers Mon-Thur, 6.30–9 pm. J. Oliver, G8ANJ, 45 Selbourne Rd, London, N22.

Collins 75A2 ssb rx, mod to 75A4 specs. Fitted 2·1 kHz and unfitted 6 kHz Collins mech filters, exc agc, 10 in spkr in matching cabinet, ideal for discriminating dxer with handbooks £70. G. Harris, G3XSL, 25 Altcar Rd, Formby, Lancs. Tel Formby 72544.

30 W mod, 6L6's, relay, psu, 19 in panel £4. Four 866A, two 866, four 866Jr lot £2. Misc valves 6BE6, 6AG7, 6Y6, EF86, 12BH7 etc, lot £2. *SWM* 1957–62, *Bulletins* 1953–64 £1. Fry, G3NDI, 60 Bills Lane, Shirley, Solihull, Warks. Tel 021-744 3730.

Kokusai 455-150K filter with carrier xtal and conversion xtal to 2 MHz £8. All new and unused. C. Lipkin, 4 Sandhill Mount, Leeds 17. Tel Leeds 682388.

Creed 655 tape reader (2), vgc, mains £25 each. Hartley 13A d. beam scope with probe and leads £12 10s. Cossor 1039M mkII 2½ in scope new £10. Bendix MN26Y direction finder complete manual £15. B. Cedar, G8BMQ Cedarville, 2A Convent Hill, Upper Norwood, London, SE19. Tel 01-653 8489.

Ferranti valve battery superhet mw/lw coverage but with plenty of space for mods. Supplied with two spare valves and inverter diagram. £5 ono plus pp or buyer collects. E. Jones, 234 Ilchester Cres, Bedminster Down, Bristol 3.

DX100U vgc with mains operated aerial relay switching, psu's etc and connections for rx muting £65, deliver reasonable distance. J. Barlow, G3TCJ, The Pippins, Lake Lane, Liskeard, Cornwall. Tel Liskeard 2073.

Heathkit HX20 tx approx 150 W pep input cw/ssb 10-80m, very compact, £60. Psu HP23E £20. 4-400A (2) new, not tested, offers. G. Foster, GW3POD, 9 MSQ, T & AVR Centre, Llandaff North, Cardiff. Tel Cardiff 26068 (working hours).

Sphinx tx and Delta control unit in gd cnd £50, prefer buyer insp and coll. G3UPZ, 21 St Simons Drive, Cherry Willingham, Lincoln.

B44, tuneable, transistor psu £5. Wanted rx HRO, CR100 or similar, consider anything. D. Griffiths, G3RDQ, 30 Slade Rd, Stokenchurch, Bucks. Tel Radnage 2461.

Panda explorer 150W am/cw 80-10m tx, gd looks and fb wkg order. New valves incl 6146's in final, ready to operate with all leads £30, buyer collect or pp extra. J. Baker, G3YHB, 86 Max Road, Liverpool, Lancs. L14 4BJ. Tel 051-228 1321.

HW17, spare tuner, noise factor 4 dB, spare set valves, spare FET and speech amp transistors, upgraded 17B spec, first class, factory checked, converted relay switching, best offer over kit price. C. Robjohns, Granada, South Furzeham Rd, Brixham, Devon.

Collins 75A1, hb, perfect, fine ssb/am rx, £85, ono, deliver 50 miles. 70 xtals, FT 4340-8350 kHz 3/- each or £3 10s the lot, Dozen new 832 vhf valves 50/- BC454 rx 35/- carriage extra. A. F. Walton, G3XBE, 39 Oakdale Drive, Wrose, Shipley, Yorks. Tel Shipley 57490.

Lafayette HA350 type mech filter, 2·2 kHz at 6 dB with QCC carrier xtal to give usb. 455 kHz, both in new cnd, £10 ono or why. Also vfo driver unit from TA12C tx, offers? C. Horrobin, G3TZW, 50 Fletcher Rd, ST4 4AJ.

Heathkit Mohican rx mk II, exc cnd, £22 ono. Heathkit RF1U sig gen few hours use only, mint cnd, £16 ono. E. Taylor, 4 Brownsea Ave, Corfe Mullen, Dorset. Tel Broadstone 2631.

Geloso G209 rx, gd cnd, will sell for £25 ono or exch with cash for HA350 rx. J. Kelly, G3WHQ, Marshwick, St Mary's Gdns, Hilperton, Nr Trowbridge, Wilts. Tel Trowbridge 4451.

2N706 npn silicon 400 MHz transistors, reduced to 15/- per doz. 1000 piv 200 mA diodes 2/- each. T. Boucher, G3OLB, 598 Long Cross, Lawrence Weston, Bristol, BS11 0TT.

Scope, monitor, int psu tb, cal, etc, vgc, £6. Creed 5060 teleprinter loop, psu, £2 10s. Complete SCR522 2m tcvr £5. 19 set mkIII lf/vhf with c/box etc £5. D. Barrow, 47 Cannon Lane, Stopsley, Luton, Beds. Tel Luton 25595.

Labgear LG50 tx £20. AR88D manual £23 or £40 the pair, buyer collects. Taylor, 48 Garfield Rd, Enfield, Middx.

Free to whoever wants it. Handbook for BC224A. D. Adair, G3BVB, 3 Belmont Close, Shaftesbury, Dorset. Tel Shaftesbury 2427.

DX40 and VF1U working perfectly, very clean cnd, going vhf £18. A. Burge, GI3OTU, 6 Ashley Park, Bangor, Co. Down. N.I.

Heathkit RA-1 £25. Also 10 W 160m am homemade tx (psu required) £6. Deliver 100 miles Stevenage. Bryn Attenborough, G3WKD, 364 Jessop Rd, Stevenage, Herts.

KW Vanguard mk II, 160-10m, exc cnd, delivered 50 miles. D. Grant, G3UWL, 49 Lisle Grove, Howdon, Wallsend, Northumberland.

LG300 tx, companion mod and pp £50. Original Cornishman prototype 3 band, pp and all data £15. 4X150 socket, 3 × 4X150 £7 10s. Other gear exch J. Brown, G3LPB, Marlborough Farm, Falmouth, Cornwall.

Heathkit RA-1 rx, gd cnd with internal xtal cal £35. Matching Q mult £5. Lafayette vfo as new £9, cost £14, very stable, has int'l psu, buffer and OA2, 80m to 10m. P. Brumfitt, G3XMH, Home-Port, Northgate, Beccles, Suffolk. Tel Beccles 2360.

432 MHz converter, 32-34 MHz output, 2 EC88 rf, EC88 mixer cathfol, EF91 if amp, 2 × 12AT7 xtal lineup. Muting relay, needs external 6·3 V and 150 V supplies. £8. G. A. Jeapes, G2XV, 165 Cambridge Rd, Great Shelford, Cambridge.

UM3 40/- Corner spkr, walnut, vgc, Bakers 12 in, cost £22, sell £6. Pair 866A free to any caller, prefer collection all items. W. Hazelden, G3KBE, 65 Bretby Lane, nr Burton-on-Trent.

Pye Mozart am/fm tuner, little used £10 ono. Digital clock (blue) 12 hr dial, hrs/min/sec, 240/50 cps, £8 ono. Tacho generator synchros, 10/- each. Wien Bridge valve audio osc free first request received. 6L6, 807, ECC81/2/3 2/- each. M. Sayer, G3YJC, 8 Canute Drive, Bransgore, Christchurch, Hants.

RSGB Bulletins vols 23 to 29, SWM 5-11, must go. Bibliophiles please enquire with sae before destruction. W. Heywood, G2ALZ, 150 Ruskin Rd, Crewe, Cheshire.

Viceroy mk III, gd cnd, £70. A Fletcher, G3LDA, 40 Chelmsford Ave, Warden Hill, Cheltenham, GL51 5DN.

KW77 rx £75. Heathkit DX60A tx with HG10 vfo £40. Auto transformer available for tx, both exc. Dr. E. Searle, G3VMY, 4 Park Lane, Charvil, nr Reading, Berks, RG10 9TR. Tel Twyford 226 or 5621 after 7.30 pm.

G2DAF type tx, Scarab filter £48. Eddystone 888 £45. 120 W am tx less psu £10. A. White, G2FCI, 5 Glenmore Rd, St Loyes, Exeter, Devon.

Two 3 in image Orthicon tubes. Two scanning yokes for same. 70 cm cavity. Wavemeter TS184A-AP with power unit. Pu regulated 250 V 200 mA, 150 V, 5V 5A, 5V 4A, 5V 3A, 6V 5A ct, another, pu, 250 V 125 mA, 6·3V 4A, 30V 1A offers. E. Lawley, G8ADX, Coppers, Roxwell, nr Chelmsford, Essex. Tel Roxwell 638.

3 ft diameter met balloons 10/- each. Hydrogen filled £1, London, area only. 275 ft reels aluminium wire 10/-, all ideal for erection of balloon supported aerial. R. Stratton, G3XKV, 15 Avenue Rd, Brentford, Mddx. Tel 01-560 8671 (after 6.30 pm).

18 relays PO 3000 coil, 6000 ohm, 6 c/o contacts, new equip in screen cans, any offers. 2 in Vantone transistor intercom masters, new, not working 30/- Br. Markowski, 66 Manor Ave, London, SE4.

Pair Admiralty pattern W325A monitor torque tx's 230 Vac, suitable for remote control of mech apparatus, unused cnd, £8. G3FDS, phone Epping 3128 evenings.

Minimitter 150W tx £25. Wanted TW Topmobile or similar. A. George, G3YAP, 1 Fountain Rd, Birmingham 17. Tel 021-429 3268.

Rx's for sale. Eddystone 770R mk I, 19-165 MHz, exc cnd, £100. Hallicrafters S27, 27-143 MHz, gd cnd, £25. R209, 12 Vdc, gd cnd, £12. S. Jesson, 181 Kings Acre Road, Hereford. Tel evening 3237.

HRO with 14 coils and mains psu £18 ono. Sae for details. Wanted Star SR600 rx in gd cnd. C. Baker, 18 Collingtree, Stopsley, Luton, Beds.

KW Vanguard, clean, fb, 80-10m £37 10s. Wanted 15-20W 2m tx, compact, Swansea area. A. Dempsey, GW2FBG, 125 Dunvant Rd, Killay, Swansea. Tel 25352.

3 rack units comprising HRO-MX, new capacitors, some mods, psu, spkr, Q mult, atu, CRO 1089B, all wkg but need alignment, 9 coils, £20 or offer. Buyer insp and coll, write first please. O. Pearcey, 15 Southway, Carshalton Beeches, Surrey. Tel 01-642 6930.

Cubical Quad, 10-15-20, GM3BQA make, complete, used, with bamboos, spiders, boom, clamps, coax cable, instructions, carriage paid £7 10s. A. Taylor, G3JMO, 8 Heythrop Drive, Middlesborough, Teesside.

Pye Ranger, high band, 12V, unmod, fair cnd. Pair of xtals 9475·000 kHz. Pan display IP-69A/ALA-2 30 MHz (will tune to 25 MHz), 10 MHz wide (variable), vgc, offers with sae to Fuller, G8CEZ, 45 Marleyfield Way, Cheltenham Rd East, Gloucester, GL3 1JW.

4X250 bases, brand new cnd, heavy cadmium plated brass type, £3 10s. each. K. Thompson, G3AMF, QTHR.

36 set, 50W tx, 20-15-20 am, cw, complete with mains psu, harmonic filters, dummy load, key and instruction book £6 free delivery short distances, otherwise buyer collect. E. Wilders, G3TGW, 28 Highbury St, Peterborough.

AR88LF £24. 22 set less cabinet, with phones, mains psu, atu £4. Suit swl. Encyclopedia of Space, unwanted gift, cost £7 gns accept £4 10s. Wanted Nov 1968 Wireless World and Oct 1968 Tape Rcdr magazine Walsh, G8CEF, Sedan, Stock Lane, Ingatestone, Essex. Tel Ingatestone 667.

AR88D, gd cnd, realigned late 65, £40. M. Simpson, G3UUM, 11 Leagh Close, Crockley, Kenilworth.

Valves 4X150A £2. 6AU6, 6AQ5 5751 £3—Double gun crt DHM—11 £10. D. Wright, 76 Tarvit Drive, Cupar, Fife.

Trio JR500SE communications rx, few months old, as new in makers carton, instructions and data sheet, reason for sale, gone completely vhf, £47. Delivery free within reasonable distance. J. Large, 10 Manor Gdns, South Croydon, Surrey. Tel 686 01-1635.

Wavemeter W1191A new £3. Wavemeter Class D mains £4 10s. AR88LF with a meter exc £30. Trio 9R59DE new with manual £27 10s. Codar PR30X preselector with psu £5. Pye cabinet Goodmans spkr new £1 10s. R308 rx 20 MHz–145 MHz manual £20. S. O. Heskeith, 4 Hill Farm Rd, Chesham, Bucks. Tel Chesham 5557.

Offers invited for KW Vanguard, 80-10m, new 6146 pa, any test welcomed, with end feed atu. Rayer, Reddings, Longdon Heath Upton-on-Severn, Worcs.

Hy-Gain 14AVQ vertical, £7, prefer buyer collects. J36 bug-key £3. Spare 21 MHz Hy-Gain traps fit TH4 £1 each. G3FXB 86 Cross Rd, Southwick, Sussex, BN4 4HL.

Juliette portable rx, am, 160, 80m, fm, vhf aircraft, 144-174 MHz, brand new cnd, £40 plus post. Thexton, G3URE, QTHR, Tel Wide-open (Northumberland) 3044.

TZ40 (4), TZ40 ceramic base (1), 832 (2), 832A (2), 1625 (7), 811 (2), RG1-240A (4), RG1-240 (1) 5/- each. DA41 (8), 19G6G (3), 832 ceramic valve holders 3/- each. Pp extra. Taylor model 88A multtest meter with hb, fault in movement £5, pp 5/- J. Lepper, GM3JHL, 42 Inch Cres, Bathgate, West Lothian, Scotland.

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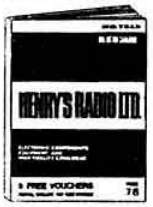

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