40p

The SHORT WAVE Magazine

VOL. XXXVII SEPTEMBER 1979 NUMBER 7

RADIO SHACK for TRIO

TRIO EQUIPMENT

		Inc. VAT £	Carriage £
TS820S	160-10m transceiver 200W PEP (with DG1)	832.00	3.75
TS820	160-10m transceiver 200W PEP	710.00	3.75
DG1	Digital readout to 100Hz	122.50	1.00
SP820	Speaker	39.00	1.50
VFO820	External VFO	123.50	3.75
TG88C	CW filter 8 pole	38.00	0.50
DS1A	12V dc inverter	43.00	1.00
R820	The ultimate matching receiver to the TS820	790.00	3.75
YG455C	CW filter 500 Hz	61.50	0.50
YG455CN	CW filter 250 Hz	69.00	0.50
TS520S	160-10m transceiver	542.00	3.75
SP520	Speaker	18.00	1.25
VFO520S	External VFO	103.00	3.75
YG3395C	8 pole CW filter	40.00	0.50
DG5	Digital display/counter	119.50	1.50
DK520	Conversion for older TS520	10.50	0.75
TS120S	80-10m mobile transceiver 200W PEP	495.00	3.75
TS120V	80-10m mobile transceiver 20W PEP	408.00	3.75
PS20	AC power supply for TS120V	52.00	3.75
MB100	Mobile mounting bracket	17.00	0.75
YK88C	500 Hz CW filter	29.00	0.50
SP120	External speaker	25.50	1.25
VFO120	External VFO	93.00	3.75
AT120	Antenna tuner (100W)	69.00	1.50
PS30	AC PSU for TS120S	98.00	3.75
AT200	1.8-30 MHz antenna tuner	95.00	1.50
SM220	Monitor scope	246.00	3.75
BS5	TS520 scanboard for SM220	49.50	0.50
BS8	TS820 scanboard for SM220	49.50	0.50
TR8300	70cm FM mobile 10W transceiver fitted 4 channels	250.00	3.75
TR3200	70cm FM handy transceiver fitted 3 channels	190.00	3.75
MB1A	Matching mobile mount	9.20	1.00
PB10	Pack of 10 ni-cad batteries	10.35	0.50
PB15	Battery pack (moulded case)	20.25	0.50
	Spare power lead	1.30	0.15
TR7010	2m SSB/CW mobile transceiver 10W output	193.00	3.75
R300	General coverage receiver	189.00	3.75
HS5	Communications headphones, tailored response	23.50	0.75
HS4	Communications headphones, tailored response	10.75	0.75
TL922	HF linear amplifier 160-10m/2 Kw PEP 2 × 3-500Z tubes	797.50	3.75
MC50	De luxe desk microphone dual impedance PTT locking bar	27.50	1.50
MC35S	50K fist microphone	13.30	0.50
MC30S	500 ohm fist microphone	13.30	0.50
LF30A	HF low pass filter 1 kW 90 dB. Stop band rejection	18.90	0.75
BPF2A	2m band pass filter 144-146 MHz 50W rms 100W PEP	25.20	1.00
RD300	High power dummy load	59.50	0.50
TS700S	2m all mode digital readout transceiver. Simply the best	549.00	3.75
SP70	Matching speaker	20.50	1.00
VFO700S	External VFO	92.00	3.75
TS770	2m/70cm all mode dual bander	t.b.a.	
TR7500	2m FM mobile 10W transceiver PLL with all 80 FM channels	240.00	3.75
TR7600	2m synthesised mobile/fixed transceiver 10 Watt	247.25	3.75
TR7625	2m synthesised mobile/fixed transceiver 25 Watts	273.70	3.75
RM76	Microprocessor control unit	74.50	1.00
PS6	AC PSU for TR7500/7600	59.50	3.75
TR2300	2m FM portable transceiver PLL with all 80 FM channels	199.00	3.75
VB2300	10W booster	59.30	1.00
MB2	Mobile mount	18.90	1.00
RA1	Helical rubber antenna	6.90	0.25
VB2200GX	10W PA for TR2200G/GX	46.00	1.00
PS1200	Power unit and charge TR2300/3200/2200GX	29.50	1.00
TS180S	160-10m solid state transceiver	712.00	3.75
TS180S	As above but with digital frequency control	825.00	3.75
VFO180	External VFO	120.75	1.00
SP180	Speaker	42.70	1.00
DF180	Digital frequency control	t.b.a.	
AT180	1.8-30 MHz antenna tuner	t.b.a.	
PS30	AC power unit for TS180S	98.00	3.75

TRIO OSCILLOSCOPES

CS1577	Dual trace 30 MHz with signal delay	552.00	3.75
CS1566	Dual trace 20 MHz	397.00	3.75
CS1560A	Dual trace 15 MHz. 10mV/cm on X and Y	374.00	3.75
CS1562A	Dual trace 10 MHz. Auto run and trigger TB	310.00	3.75
CS1352	Dual trace 15 MHz battery portable	402.50	3.75
B7-7E	Battery pack	34.50	1.75

The above 5 scopes are complete with matching probes

CS1575	Dual trace with auto phase display. 1mV sens	319.50	3.75
CO1303D	Single trace 5 MHz service/student scope	132.00	3.75
		155.00	3.75
DM800	Multi purpose dip meter	59.80	1.00
AG202	Sine/square audio generator. 20 Hz-200 KHz	82.80	3.75
AG203	Sine/square audio generator. 10 Hz-1 MHz	132.00	3.75
SG402	Service shop RF generator. 100 KHz-30 MHz	66.50	3.75

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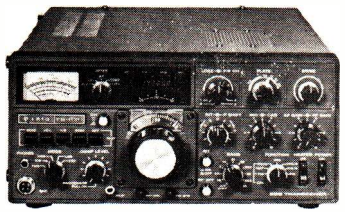
G3MCN



R820 RECEIVER

*** * THE ULTIMATE IN RECEIVERS * ***

Frequency coverage 160-10m plus SW Broadcast Bands. All modes CW-USB-LSB-RTTY. Digital Readout. Noise Blanker. Fully variable I.F. Bandwidth, plus Bandpass tuning, plus rejection notch filter. **£790·00**

TR7500

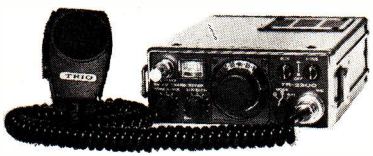
TR7500 2m FM Mobile Transceiver. A sensitive and selective receiver section and advanced synthesiser which gives you operation across the whole 2m band in 25 HKz. We have tried many mobile Transceivers in our 15 years in Amateur Radio and this is the best seller, remember this was designed for the U.K. market. **£240·00**

TRIO TS120 TRANSCEIVER

ALL SOLID STATE HF BAND TRANSCEIVER

Freq. 3·5-30 MHz Amateur Bands and WWV. I.F. Shift System, Noise Blanker, Vox, Single conversion system using PLL circuit. Digital display dial.

TS120V	10 watts PEP	£408·00
TS 120S	200 watts PEP	£495·00



TR2300

TR2300 2m Synthesised Portable Transceiver. We have lost count of the number of this model we have sold over the last 12 months hikers, campers, climbers you can hear them all over the country and reliability which is the essence of TRIO equipment.

JAYBEAM

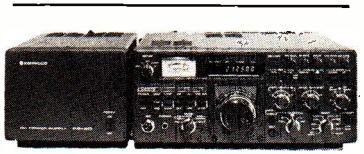
5Y/2M 5 element yagi	£8·86
8y/2M 8 Element yagi	£11·50
10Y/2M 10 element	£25·13
PBM/14/2m. 14 element Parabeam	£35·78
5XY/2m. 5 element crossed yagi	£18·40
8XY/2m. 8 element crossed yagi	£23·00
10XY/2m. 10 element crossed yagi	£30·48
Q4/2m. 4 element Quad	£19·08
Q6/2m. element Quad	£25·30
D5/2m. 5 over S slot fed yagi	£15·86
D8/2m. 8 over 8 slot fed yagi	£21·16
UGP/2m. ground plane	£7·96
MBM48/70cms. Multibeam	£25·06
MBM88/70cms. Multibeam	£33·35
TAS ¼" 2m. Whip mobile	£14·37
C5/m. Colinear	£35·65
C8/70cm. Colinear	£45·42
D15/1296 23cm. Antenna	£26·90

Carriage £3·00 on Antennas.

TRIO

R820 Receiver	£790·00
TS820 Transceiver	£710·00
Digital readout for TS820	£122·67
VFO820	£123·70
DSIA 12v. DC Inverter	£42·93
SP820 Speaker	£38·83
SM220 Monitorscope	£246·00
TL922 Linear Amplifier	£797·50
TS520S Transceiver	£541·78
VFO520S	£103·25
SP520 Speaker	£17·90
DG5 Digital readout for TS520S	£119·60
TS120V 80–10m. Mobile Transceiver	£408·00
PS–20 AC power supply for TS120V	£52·14
MB100 Mobile mounting bracket	£17·00
TS700S 2m. All mode digital transceiver	£548·98
SP70 Speaker	£20·45
TR7010 2m. SSB/CW Mobile 10 watt	£193·20
TR7400A 2m. 30 watt Mobile Transceiver	£343·47
TR7500 2m. FM Transceiver	£240·22
PS6 Power supply	£59·29
TR2300 2m. Portable Transceiver	£199·00
PB15 Battery Pack	£20·25
TR8300 70cm. FM Mobile Transceiver	£250·00
TR3200 70cm. Portable Transceiver	£190·00
R300 General coverage Receiver	£189·00
HS5 Headphones	£23·52
HS4 Headphones	£10·73
MCS0 Desk Microphones	£27·60
MC30S Hand microphone 50K	£13·29

Crystals and accessories in stock



YAESU FRG-7 RECEIVER. Mains and battery operated receiver 0·5 to 30 MHz. Solid state. Advance circuitry offers excellent performance for the DX listener at a moderate price. **Price £215·00**

Yaesu FRG7000 Receiver	£376·00
Yaesu SP101B Speaker	£20·00

The Mk. 2 Multituner was designed by us to many requests who found our Mk. I the finest they had ever used but required a wider frequency range. This covers 550 kHz to 30 MHz. The circuitry gives 50 switchable, tunable positions to match any antenna over S metres in length to practically all communication receivers. Our "Multituners" are designed and manufactured by ourselves and have been exported to over 50 Countries. Many operators use them for QRP Transmitting also. See the February edition 1977 of the "Short Wave Magazine" or send SAE for details.

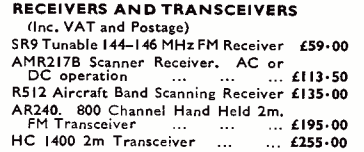
£26·00 inc. VAT and postage

NEW ANTENNA MODELS

H.S. HFS Vertical 10–80m.	£41·40
HF R. Ground Plane Kit	£23·00
GDX 2 Discone Antenna 50-460 MHz	£36·80

BANTEX

Bantex Magnetic Base Mount	£10.40
¼" glass fibre Whip	£8.44
¼" stainless steel Whip	£9.40
UHF stainless steel Whip	£8.63
Standard base mount	£2.70



TS180S

TS180s. HF Transceiver. An all solid state Transceiver with Digital Frequency Control. A rig that has the facilities that DXer, Contest operator or any Amateur would desire for maximum flexibility on the 160 through 10 metre bands. Up to 200 watt PEP input. No tune Final amplifier. **£712·00**
With digital readout. **£825·00**

RECEIVERS AND TRANSCEIVERS

(Inc. VAT and Postage)

SR9 Tunable 144–146 MHz FM Receiver	£59·00
AMR217B Scanner Receiver. AC or DC operation	£113·50
R512 Aircraft Band Scanning Receiver	£135·00
AR240. 800 Channel Hand Held 2m. FM Transceiver	£195·00
HC 1400 2m Transceiver	£255·00
Regency Digital Flight Scan Synthesised Aircraft Band Receiver	£230.00
F.D.K. TM563 Scanning 2m Receiver	£109.00

SECONDHAND EQUIPMENT

Due to delay in publishing secondhand lists please send SAE for our up to date lists. We have a very quick turn over in secondhand equipment, especially in receivers. If you require a specific model please let us know and we will inform you as soon as we have one available. Our secondhand equipment carries a three month guarantee. We would be pleased to sell your equipment on a commission basis, which saves you time and money advertising.

ACCESS and BARCLAYCARD facilities.
Instant HP service

Part exchanges always welcome. Spot cash paid for good clean equipment. If you have equipment surplus to your requirement we would be pleased to sell this on commission for you.

Shop Hours : 9.30 to 5.30 Monday to Friday
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ALL OUR PRICES INCLUDE VAT

ROTATORS

AR30	£47·16
AR40	£54·73
CD44	£109·25
AR22	£49·46
KR400	£98·13
DR7500	£108·10

CABLE

UR43	21p metre
UR67	65p
300 ohm Ribbon	11p metre
75 ohm low loss	20p

SRX–30
Solid state Receiver 550 kHz–30 MHz £175·00

TEK
5D Multi Band Trapped Dipole 80–40–20–15–10 metres. 50 ohm feed. 23 metres in length. This is complete, not a kit. High quality Traps and wire. 2kW PEP rating PRICE (inc. VAT) £50·00

Accessories

2 way Antenna Switch 50 ohm-200 watt	£5.25
3 way Antenna switch SWL push button type	£4.60
3 way Antenna Switch 2 kW PEP 0-500 MHz	£9.50
4 way Antenna Switch 50 ohm 200 watt PEP	£10.50
6 way Antenna Switch 2 kW PEP 0-30 MHz	£17.50
Single Meter SWR Wall type	£10.87
Single Meter SWR Desk type	£11.00
Twin Meter SWR Desk type	£13.55
Hansen FS-301 Through Line Wattmeter	£40.10
DL20 20 watt 50 ohm Dummy Load	£6.30
DL50 50 watt 50 ohm Dummy Load	£7.50
DL120 100 watt 50 ohm Dummy Load	£12.50
DL-1000 1 kW Dummy Load 50 ohm	£31.00
Morse Keys Lightweight	£3.25
Nye King Morse Keys	£10.15
HyMound HK708	£10.50
Katsumi EK150 Electronic Keyer	£79.00
Katsumi MK1024 Electronic Keyer, with memory	£135.00
DX-008 Programmable Frequency Counter	£116.25
Antenna Gutter Mounts	£3.55
HP3A High Pass Filter	£3.25
Twin Keying Paddle. Chrome plated with heavy base. Precision Unit	£26.50

Full Range of Microwave Modules Converters, Transverters, Linears, etc.

Hy Gain

12AVQ 3 band Vertical	£43.12
14AVT/WB 4 band Vertical	£60.37
18AVT WB 5 band Vertical	£87.40

ASP and Diawa 144MHz anfd 70 cms Antennas in stock.

Mini Products

C4X 3 band Vertical	£48.00
HQ1 Mini Beam	£96.00

ARAC 102 receiver, 28–30 MHz. 144–146 MHz. AM–SSB–FM–CW Price £105·00

S.T.E. Prices include VAT and postage

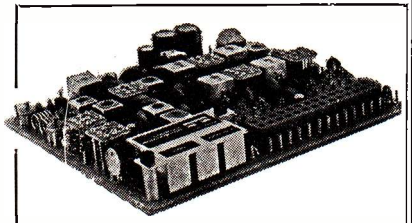
Arac 170 10m. and 70 cm. Receiver	£129·00
AA1 Audio Module for AR10	£4·10
AD4 FM Discriminator	£5·00
AL8 Linear Amplifier	£27·60
AG10 Tone Generator	£4·50
ATAL 2m. AM-FM Tx	£129·00

G-WHIP

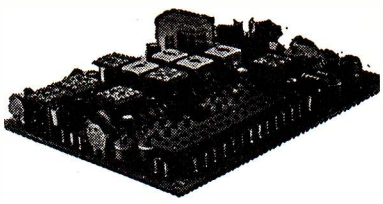
Tribander Helical 10–15–20m.	£23·00
LF Coils for Tribander	£6·55
LF Telescopic Whip Section	£2·99
Basemount standard type	£4·20
Multimobile 78, 10–15–20m.	£26·45
MM Coils	£6·55
MM Telescopic whip section	£2·59
Flexiwhip basic 10 metre section	£16·10
Basemount standard	£4·20
Ball type Basemount	£5·75
Coils for Flexiwhip	£6·55
Base thread adaptor USA/G Whip	68p
Extendarod 40"	£10·93

Drake

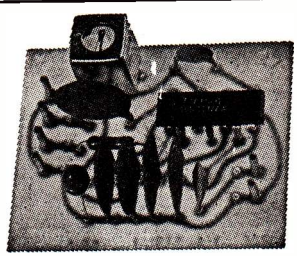
SSR-1 Solid State General Coverage Receiver	£179.00
TV3300 Low Pass Filter	£18.40
TR7 Transceiver and AC psu	£1021.00
MN7 ATU/RF Wattmeter	£126.50
R4C Amateur Band Receiver	£506.00



AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50–75 ohm. AM-FM modes. Sensitivity 0·2uV AF output 3 watts. 12v. DC operation. Price £50.00



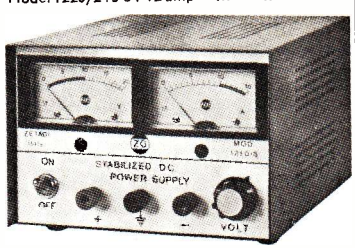
AT23. 12 Channel PM Transmitter. 3 watts. 144–146 MHz. Frequency deviation 3–10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV. Price £50·00



455 kHz FM Discriminator Amplifier. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 200-300mV frequency deviation + or — 3 kHz. Price £5.00

Solid State Stabilised Power Supplies
Maximum ratings quoted. Prices include postage.

Model 122 12·6V 2·5A	£15.55
Model 125 10-15V 2·5A Meter	£28.00
Model 153S 4-20V 3 amp Dual Meter	£29.35
Model 156S 4-15V 5 amp Twin Meter	£35.00
Model 1210S 4-20V 10 amp Twin Meter	£85.00
Model 1210S 4-20V 10 amp Twin Meter	£85.00
Model 1210SV 4-20V 10 amp Digital Readout	£110.00
Model 153SV 4-20V 3 amp Digital Readout	£38.00
Model 1220/113·5V 20 amp	£90.00
Model 1220/213·5V 12 amp	£80.00



Mod. 1210 S

TECHNICAL ASSOCIATES

Rx Band Pass Filter. 9 I.C's. 1 watt output* 8 switched positions of filters* High pass 2·5 kHz–2–00 kHz–1·5 kHz–200 Hz–110 Hz–80 Hz* Ideal for increased selectivity with FRG7, SXR30, ETC ... **Price £30·45**

Printed Circuit Module. Including rotary switch ... ... **Price £17·65**

RX Peak and Notch Filter. Goes between RX and speaker* All I.C's* By-pass switch* Notch width control for optimum width of notch ... ... **Price £30·45**

Printed Circuit Module. Including all pots and switch ... ... **Price £17·65**

Pre-Selector. Coverage 1·6 MHz to 31 MHz* Three switched bands* Type 1 with antenna changeover relay for Transceiver op **Price £30·45**

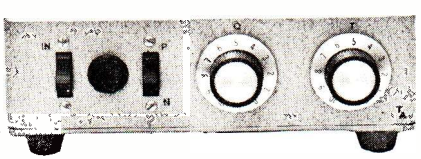
Type 2 for SWL without relay **Price £27·25**

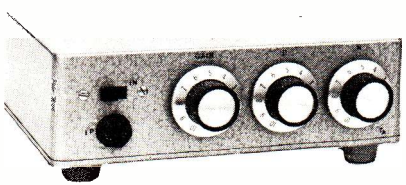
Crystal Calibrator. Seven ranges down to 1 kHz. Selected from front panel. Complete with antenna. ... ... **Price £22·80**

VHF Tunable Pre-amp ... Price £23·00

Some Models in New Type Cabinets

These prices include VAT and postage.





STEPHENS-JAMES LTD.

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CONTENTS

Editor: **PAUL ESSERY, G3KFE/G3SWM**

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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

ACTION!

WRAC '79 is nearly here.
Half used air space could be snapped up
by others, so —
use the bands whenever you can!

G3KFE.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

WE come to our task this time with a somewhat heavy heart. After eleven years of faithful service, Hugh Cassidy and his wife have decided to call it a day on the *West Coast DX Bulletin*. Quite apart from the news — and they were always pretty smart with that! — the characters he created all added to the pleasure of reading it. It seems hard to realise that Red-Eyed Louie the Old Timer, the QRP-ers Palos Verdes Sundancers, and Slim (Slim the Pirate), all are now just a memory and a chuckle. It gave us a pretty good idea of The Boss wrestling weekly with his worn press which rebelled at being asked to print, at the end, some 30,000 sheets of paper a week, while the staff reckoned on two or three fourteen-hour days each week, and never a day with less than four hours. (*WCDXB*) will not be an easy document to replace.

Conditions

When one has oneself not been able to get on the bands, one must rely on spies for information. Essentially, it does seem as though the summer conditions have been more marked than usual, so that when in previous sunspot cycles Ten has been open at least North-South with an occasional lift to the States, this time there has been nothing comparable, and Ten has been mainly the home of first-hop and short-skip. This has resulted in 21 MHz being the best, while on 14 MHz there have been Ws on right around the clock.

Politics

WARC '79 is now with us; whether you like RSGB or not, you have to hand it to them for the work they put in on behalf of amateur radio (one can only hope the Russians and the Americans have done as much). Changes are all but certain, and the writer for one would be the first to moan if his pet bit of band went west; but it must be realised that whatever bit we lose, it's bound to be someone's favourite, and so we must all just keep a stiff upper lip — the chaps on the spot will be doing their best, and they will have to do some horse-trading for sure as the arguments ebb and flow. All we can do is pray for their best judgement.

That letter from G8PG in a recent issue of *Short Wave Magazine* about a CW-only Novice licence seems to have stirred up a few arguments in both directions, but at least it has gone to an RSGB committee for consideration. They have enough on their plate until the dust of WARC '79 settles, but maybe in January next year we may see something emerge; we like the idea if only because we feel that it would make it a lot easier for the newcomer to learn his Morse *properly*, with all the QRM, which would provide the stimulus of wanting to extract the other guy's name and details out of the mush — it makes learning Morse so much easier if there is the incentive, and we find that the majority who have learned this way seem to get the taste for it.

Not surprisingly, we are a bit down on details this time, but nonetheless there are a few items to be mentioned. Before he closed down, Hugh Cassidy was able to head the front page of his final *WCDXB* with a paragraph regarding BY. It seems that in August, JA6HOZ will be in Peking to conduct some instruction classes at a unit of the Peking Youth Club, with some CW efficiency not being overlooked; they are taking with them an Icom 701 and an SWL receiver, it is hoped. Who knows? All these China noises seem to portend something, and maybe by the time this is read, there will be a pile-up on a BY. It certainly looks more likely now than ever before.

8Z4 plans are understood to be brewing-up, with the aim for mid-September appearance, and the 9K2DJ/8Z4 signal is noted on the Arabian Knights net on occasion. Kerguelen has FB8XV there, and reports seem to indicate him as showing fairly regularly, particularly on 14 MHz CW.

Quite an interesting one during August was Kasaksia Island; Father Marquette camped there in 1675 and it was the capital of the state of Illinois — but in 1805 it became an island when the river changed course. (There has to be a moral to that story!)

Those who know of KH6IJ, and his station, will be pleased to hear that he is now much better and has resumed his column in the Honolulu newspaper.

The third of the South African "homelands" is due to become independent on September 13, under the name of Venda; like the other two, there will be some operation on the day of independence, but the question of status for DXCC purposes is a difficult one, and we don't see any indicators until after DXAC have had time to consider the word from WARC . . . Life is complicated!

'CDXN' deadlines for the next three months—

(October issue—September 6th)
November issue—October 4th
December issue—November 1st
January issue—December 6th

Please be sure to note these dates.

Now, to take a look at the reports, and first we must look at the G-QRP club offering put together from members' reports by G4BUE. First, the Activity Week-end back in June showed at least 22 members of the G-QRP club participating, despite poor DX conditions, with a lot of non-member stations showing up (which should result in a few extra members). There is another Activity Week-end set for October 6-7. As to the CQ WW CW WPX contest, the QRP section did attract some QRP activity, club members scoring 418 QSOs and 208 prefixes for 159000 points (SM0GMG), 418 QSOs and 204 prefixes (G4BUE), and PA3ABA who made some 242 QSOs and 143 prefixes for a score of 57000. Another known score is that of N2AA who claimed 435000 from 567 QSOs and 301 prefixes. For G4BUE himself, the Steyning shack found contest contacts at 5 watts on 21 MHz with, for example UD6DFY, UW0AF, HD1A, ED8TY, CK7WJ, 4Z4NUT, TF3JB, HS1ABD, KP4ESP, CG6LU, JAs, and all W call areas save W6 and W7.

28 MHz was nothing like so productive, with only JA1PIG/PZ. 14 MHz was a different tale of course, with EA8QE, UA0SGN, ZW40D, K0AX/DU2, TF3JB, CG6LU, LU8DQ, UH8EAA, and plenty of Ws. Outside the contest there were some QSO's of note: 28 MHz, VP2VJ with 1 watt and 5N0DOG at 5 watts; on 21 MHz VP5PX, YV5GHL, FP8PL, KP2A, ZK1DR, VU2GO, plus QSOs with N4BP and N4TO using only *five milliwatts input*! Turning to the G-QRP club itself, G4BUE notes that it is now up into the 600 members region, and so they are going to "do something" about the method of printing their *Newsletter* to reflect this. We could add that there is no doubt whatever that the G-QRP club is far and away the most important in world terms, which is notable when one appreciates the considerably increased spread of countries which can be found on QRP. Chris certainly seems to have gone over the top for QRP — his SB-220 PA hasn't seen any use save as a last resort when the big rig was needed to give the full licenced power to get a CW QSO with 3B6CD on 21 MHz.

Now we have to look at the Isle of Sheppey, where G2HKU has his hideaway. This time of the year always produces some interesting wildlife in his garden — another wasps nest in the overhang of the roof, baby hedgehogs under the shed, and young thrushes in the hedge (one of which flew straight out and sat on Ted's head!). On 21 MHz, QRP with the HW-8 yielded K0BL, while the main rig CW found PT2EV and KG4R (in Virginia!). Going down in frequency to 14 MHz, QRP CW found W1GAY, while the big machine found CW with ZP5AL, UK9AAQ, AE4X, OH2UBF/OH0, FG0DDV/FS, PY1MAG, UW0MF/UBJ — whatever that suffix may mean. Maybe one of our "Box 88" readers would be kind enough to tell us. SSB showed ZL1VN, ZL3RS, ZL3FV, ZL3SE. Eighty had to be looked at with the HW-8, and thus G2HKU logged QSOs with PA2AWU/P, G4FSP, and G3TKO. Just a single 160 metre SSB contact is mentioned, the usual PA0PN, but CW found GT3PFZ/A, UT5AB, OK3LL, UR2GKW, UP2BE, OL9CJB, UB5VEB, UR2FU, OH2BNP, UA1DZ, OH1VR, DLOFJ/P, UK1AAA, OH2BO, UK2PCR, and UR2RPB.

G3NOF (Yeovil) only noted one opening on Ten and didn't have any QSO's. Turning to 21 MHz, conditions have been very good in the main, with occasional bouts of changeability. Around 0600Z there have been W6/7 on some days, with KH6 and Pacific on others, and again in the evening around 1700-2000. VK/ZL stations long path also on occasions; JAs on short path have been available between 0700 and noon zulu time; the Africans have been heard between 1700 and 2000, and of course the Ws have been about around the clock almost. SSB QSOs were made with AP2KS, C31SR, C5AAS, C5ABK, C6ANI, CN8CW, FG0DDB/FS, FM7AV, FO0RS, FP8GG, FY7AN, F0CH/FC, GT4GKF/A, GU4EON, H44CF, HC1EE, HS1ABD, J3ABP, J3ABQ, J6LGL, J6LIR, JAs, K7SFN, KoWIQ/DU2, KB7EB (Utah), KH6CF, KH6JEB, KH6JPY, KH6BOG, KH6LW/KH7, KH6WF/KH8, KL7H, KP2A, KZ5RO, OE2WSL/YK, OE2UML/YK, OJ0MA, S79MC, SV9KI, TG4NX, TI2EY, UA0QDH in Zone 19, UD6DER, VE1AST/1 (Sable Is.), WP4AAV, WD6CDU/KH6, all W call areas, VP2SW, VP5PX, VU2IF, XT2AV, ZB2BU, ZD7HH, XF4MDX, 3B6CD, 3D6BW, ZD8AI, ZE4JS, ZK1DR, ZS3LO, 5H3FW, 5N0AKD, 5N0DOG, 5N0SID, 5Z4PR, 6W8DY, 9Q5MA, and 9X5PP. We now turn to 14 MHz, and here Don obviously didn't find it as good, with the Ws for 24 hours a day, morning signals from W6, W7, VE7, with VK/ZLs peaking around 0700z. Don didn't listen much during the daytime, but the Central and South Americans were very good in the late evenings. SSB QSOs were made with C31SQ, F6DCQ/HB0, F0CV/FC, FG0DDV/FS, FP0PV, HI8GAL, HM1HR, HR1BL, HS1ABD, K4BKK/PJ7, K71CW (Nevada), M1C, M1D, OJ0MA OY5J, P29JS, TI2EWL, VP2VBK, VP5PX, UA9CBD, UA9HBH, UA9JAX, UK7LAH, UK8IAA, VK0PK (MacQuarie Is.), VP9CP, all W call areas, W1LJ/OH0, XE1UF, YI1BGD, 6Y5RA/P, VKs, ZLs, and GT3PFZ/A. Most unusually Don mentions a foray on 7 MHz, with the idea of collecting some of the GT stations, among them GT3AHD/A, GT3PFZ/A, GT4CTD/A, GT4CVZ/A, GT4IHB, and GT5UG. Another item from Don concerns the local club contest in the matter of countries worked in 1979, on which G3NOF has some 182C worked on SSB.

Snippets

G2HKU mentions that a couple of prosecutions have taken place on Sheppey against illegal CB transceiver users, which resulted in each case in fines and costs to over £100, and confiscation of the gear.

There is another side to this particular argument in that some persecution of G3XSE by the authorities has occurred, they having entered a works car park in order to find the G3XSE van (it's aerials are there daily for all to see), and on more than one occasion requested him to turn out the van's contents. As it happens, he is /M at all times, and at the time there was ten-metre and VHF gear plumbed into the vehicle. Now, the point about this was that there was a man from the Home Office and another from Customs & Excise harassing a properly licensed amateur going about his daily business. The G3XSE stall is seen at many /M rallies, and his bookings go through an accountant; but the Home Office and the Customs & Excise people were, we suspect, working on the basis of a phoney and malicious tip-off. If such was the case, has anything been done by them to deal with the phoney tip-off? Has anyone apologised to G3XSE's employer for wasting the working time of one of their employees? Has anyone thought to apologise to G3XSE for the totally unjustified searches and harassment? At the time of writing, not a word of apology to anyone. The moral of this story is clearly that you must have at least a photostat of your licence with you whenever you are out /M if you wish to avoid harassment. Furthermore, be very sure your mobile rig is clearly marked as to its frequency ranges.

We have a quite delightful picture here, sadly in colour so we can't use it, of VE3KBP relaxing at his shack with some of the gear and a copy of *Short Wave Magazine*. Ron hails from Bradford (which he left in 1957), and now lives in Napanee. If any of the older Bradford gang recall him, the address is: Ron Hewett, 198 Camden Road, Napanee, Ontario K7R 1E3. We notice VE3KBP is a member of the Ex-G Club, so maybe he can find out

why we never hear of the group these days.

The National Wireless Museum at Arreton Manor, on the Isle of Wight is now also licensed as GB3WM, and came on the air at 1300z on July 25, with G3EEL in the driver's seat, being one of the authorised ops. One expects the station will see more operation from G3KPO, the Secretary-Curator. Naturally, G2NJ was on the other end of this contact. Still on the subject of Nick and his activities, he has found on Eighty that around 1830z has been favourite for the inter-G working he prefers; apart from the G3EEL/A contacts while the latter was with G3KPO, G2CAS was noted out /P on July 27th some 10 miles north of Ripon, while among the QRP lads we note G2CP in Scarborough and GD3FXN, both of whom had one watt only.

Anyone looking for VK9Y, Cocos-Keeling should keep an open ear to the receiver between September 7 and 9, when, it is understood a couple of VQ9s are going to give with the pile-ups.

G3HCT sent us a copy of the Rules for the RSGB's new 21 MHz CW Contest — a shortie, from 0700z to 1900z on October 21, 1979. In general terms, the standard rules for the RSGB's HF contests apply. There are four sections, all single-operator: British Isles, RSGB members, British Isles RSGB members running QRP (less than five watts *output*), overseas amateurs anywhere in the world, and overseas amateurs using QRP, again less than five watts output. No QSOs between stations within the British Isles allowable. U.K. stations to score 3 points per QSO, with a multiplier of one for every country worked (RSGB list) save that VE, VK, W, ZL and ZS call areas each count as a country. Overseas entries score three points for each QSO with a station in the British Isles, the multiplier being the number of G prefixes worked — there are 42 of them, if we disregard GB which doesn't count (rotters, we could have come up as GB3SWM and had ourselves a ball!). Logs, to John Bazley, G3HCT, Brooklands, Ullenhall, Solihull, West Midlands B95 5NW, are to arrive from stations within the British Isles no more than 30 days after the contest; overseas entries to arrive at the same address by December 31, 1979. The usual declaration and cover sheet will be required. There is also, an SWL section, broadly to the same rules.

Don't forget the TOPS CW contest 1979, at the CW end of Eighty between 1800z December 1 and 1800z December 2; (USA Novices are allowable between 3.7 and 3.75 MHz). All the details are to be obtained from Peter Lumb, G3IRM, 14 Linton Gardens, Bury St. Edmunds, Suffolk IP33 2DZ. We would think he would certainly want an *s.a.e.* for a reply, or an IRC. Results will be posted to all entrants, and again we would think it would be a courtesy to add an IRC with the log.

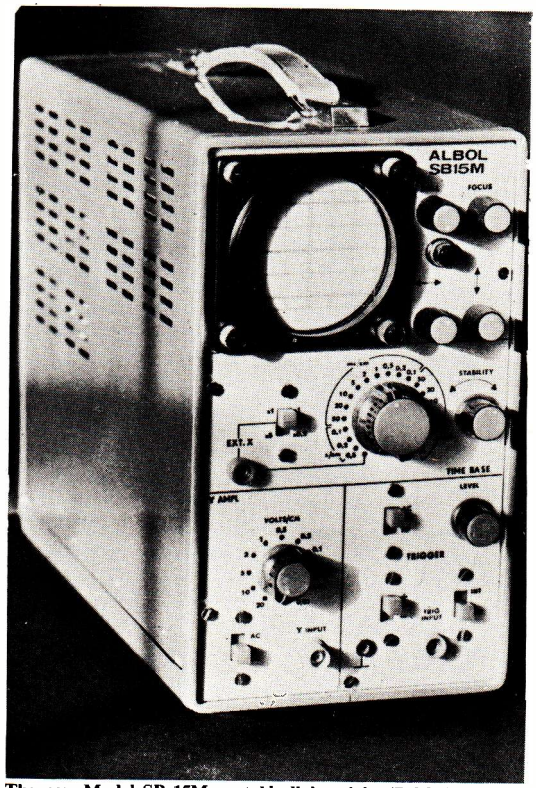
M.C.C.

Remember November 17-18, on Top Band, usual time. A club contest for clubs of any or no affiliation. And those who are going to tell us there's a clash, please don't 'cos there isn't a week-end free in the year. Indeed next year maybe we'll try a midweek evening effort for a change.

Finally, we have a note from G2BJY (Walsall) who runs 100% home-brew gear and is currently on 21/28 MHz CW. On Ten, there were some EUs, GM3SWK in Stornoway, LU8DQ, LU9FAN, PY2GVV, and PY2DG; Fifteen was a bit more forthcoming with J7DD, JA1CKE, JA4KGA, JA5FDG, JF3JTC, LZ2KEF with 500 milliwatts, OH0DX, PY7TA, PY2AWD, SV1LZ, TI2LA, UA0ACJ, UA0IAW, UK6VAF, UK8LAA, VO2CW and YT3M.

Finale

Short and sharp, like the proverbial donkey's gallop; all your news, please, by the date in the box, to "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.



The new Model SB-15M portable lightweight (7.6 kg) oscilloscope from Albol Electronic and Mechanical Products Ltd., who claim that it breaks all records for cost/effectiveness for a professional/amateur instrument. Price is £150 plus VAT, and full details may be obtained from the manufacturers at 3 Crown Buildings, Crown Street, London SE5 0JR.

ANTENNAS — THE WEAK LINK, PART IX

PLANNING, CONSTRUCTION, ERECTION AND TUNING

A. P. ASHTON, G3XAP

From the previous articles we should now be in a position to choose the type of antenna required, obtain the necessary parts, erect and tune it. However, unless some form of plan is worked to there will be various snags and irritations — most of which are avoidable.

Planning

It is surprising how many amateurs put up an antenna without asking the basic question "will it do the job I require from it?" Perhaps the problem is best illustrated by an example. An acquaintance of G3XAP bought an expensive 4-band trapped vertical antenna because he wanted to work DX on 7 MHz. He had previously tried a simple half-wave dipole in the inverted-vee configuration with the apex at about 30ft, but had worked few DX stations. The manufacturer of the vertical had advised (in the normal instructions for the device) that only 4 radials were required — one for each band that the antenna covered. The device gave some DX contacts but the results were spasmodic and unpredictable, and the particular station involved was far from satisfied with the results. This was an example of lack of thought before purchasing what was an expensive antenna when a little thought could have saved a lot of money and produced far better results.

The idea of using a vertical for low angle radiation was sound, but if we consider the average trapped vertical, we see a very significant fact — the antenna in question had a physical height of only 20ft 6ins, compared with 33ft for a quarter-wave self-resonant device. Although electrically a quarter-wave long, the *physical* height of the antenna (when used on 7 MHz) is only a little over an eighth wave, resulting in an angle of radiation which must surely be much higher than that from a true quarter-wave vertical. Secondly, the manufacturers' statement that only one radial per band is required is true from the point of view of providing an electrical balance for the antenna to work against, but is far from the "perfectly conducting" earth mentioned in classic diagrams showing the angle of radiation from verticals of different lengths (this compromise also raises the angle of radiation!). So, the whole set-up was a compromise — not helped by the manufacturer's advertising which described the antenna as "giving low angle radiation, making an excellent DX antenna at low cost", and the rather dubious advice regarding the radials. The operator concerned and G3XAP therefore planned a system to cope with the task of providing 7 MHz DX coverage, and it is felt that the exercise will make a suitable example for our discussion.

Planning the system

Firstly, certain basic questions had to be answered, the first of which was "what results are required?" As mentioned earlier, the primary objective was to provide reliable DX communication on 7 MHz — the HF bands were covered by another antenna — but operation on 3.5 MHz would be a welcome bonus. The next question was what space was available for the antenna, and where it should be located in relation to the shack. It turned out that a total area of about 30ft by 50ft was available, and that the shack was located at one end of the area, *see* Fig. 1. A 30ft mast bearing a rotator and tri-band trapped Yagi was located close to the shack as seen in the diagram (the 7 MHz inverted-vee dipole had been suspended from this support, the ends running to the garage roof in one direction and the perimeter fence in the other). The garden was part-lawn and part-cultivated, and it was desirable that any guy wires used should be tied at the perimeter only — as with the existing mast.

It was decided that a vertical antenna was the answer from the low angle of radiation point of view, and it soon became apparent that there were two alternatives: (*a*) to ignore the bonus of providing 80 metre operation and erect an extended quarter-wave vertical antenna for 7 MHz tuned with a series variable capacitor (Fig. 2a), and (*b*) to erect a 7 MHz quarter-wave antenna with a 7 MHz trap at the top and a top wire to resonate the array on 3.5 MHz, *i.e.* a trapped inverted-L (Fig. 2b). From the 7 MHz DX point of view, the single band extended vertical was the better of the two devices, but the 40ft total height would cause problems in erection and siting as will be seen later. It also became apparent in more detailed discussion that the desire to use 80 metres was somewhat stronger than had been indicated, though if the extended quarter-wave had been erected, the operator involved would have "put up a piece of wire" for 80 metre inter-G working! So, the trapped inverted-L was decided upon as a suitable

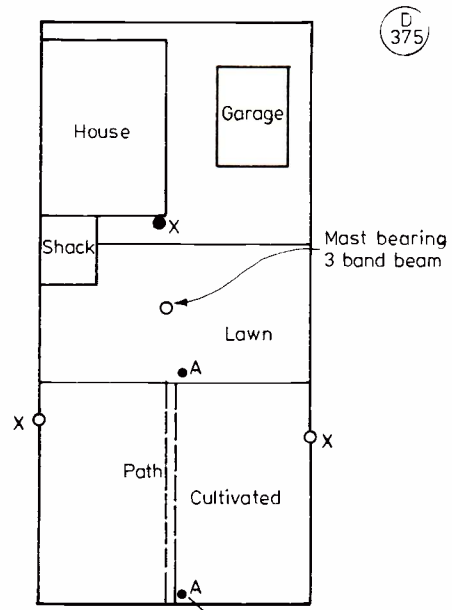


Fig. 1 LAYOUT OF EXISTING SET-UP

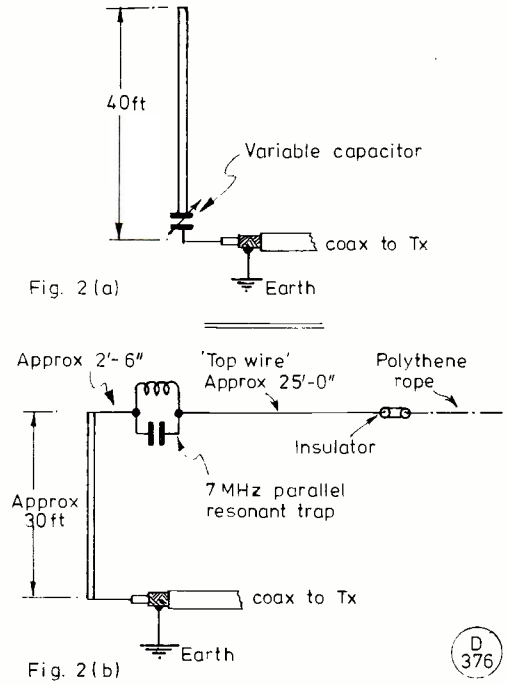


Fig. 2. (*a*) an existing quarter-wave vertical; (*b*) the trapped inverted-L antenna.

compromise, and attention next turned to planning the construction and erection stages.

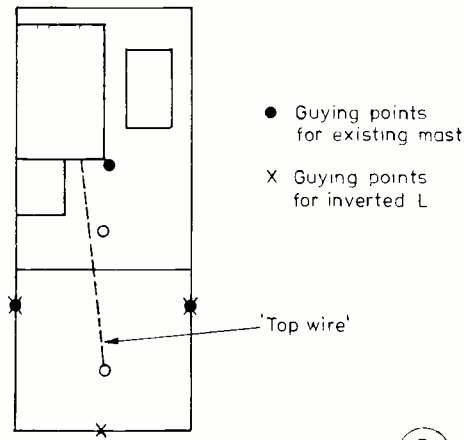
The first consideration was the physical siting of the antenna, and this was dictated to a very large extent by the fact that the antenna would need to be laid along the ground in the assembled state with its base on the fixed base mount. During the erection, the guy wires from the existing mast could be an interfering factor, and this point was also borne in mind. Finally, the layout shown in Fig. 3 was arrived at, and it can be seen that the two existing mast supports, plus one linen post, were decided upon as suitable guying points. Although, when constructed, the top of the vertical would extend beyond the existing mast, it was calculated that it could be raised whilst clearing the guy wires. This was proven by making a scale drawing showing the arc through which the antenna top would pass in relation to the position of the guy clamps on the existing mast during erection — Fig. 4.

The next consideration was the material to be used for the device, and it was decided that the vertical itself should be of aluminium tubing, rather than use a wire held vertical by some supporting structure. It was decided that two 15ft lengths of 1½ inch O.D. tubing with an insert of 2ft of a smaller telescoping diameter would provide a suitably strong structure. The 7 MHz trap could have been made simply enough, but two suitable traps were available from an old trapped dipole, so it was decided to use one of these. The guy clamps would consist of simple loops of steel wire held to the mast by *Jubilee* clips, and the guys would be positioned at approximately 13ft and 27ft from the base, and be of ¼ inch diameter nylon rope. The antenna would be mounted on a base mount consisting of a 3ft length of 2 × 2 inch wood, buried about 1ft into the ground, a suitable mounting for the base of the antenna being made from two pieces of angle-iron with a steel bolt passing through them and the antenna itself (this serving as a pivot during erection and a support for the antenna whilst raised). The base of the antenna would be insulated by the pivot bolt and hence from ground by putting a short length of plastic water pipe through the mast for the pivot to run through. Figs. 5a and 5b will illustrate these points. To prevent the antenna touching the angle iron at any point, the bottom few inches of the tubing would be wrapped with a few thicknesses of PVC insulating tape.

The next design consideration was the question of securing the trap to the top of the tubing, and it was decided that the strain should be taken by a short length of nylon rope as shown in Fig. 6 — this would prevent the joint to the tubing from being weakened by swaying of the top section during windy weather.

The final design consideration was the question of radials and, as was mentioned above, any compromise in this department will lead to an increase in the angle of radiation. Because of space limitations, it was not possible to install straight quarter-wave radials for either band so a compromise of some kind was obviously necessary. As DX was not important on 3.5 MHz, a real compromise was acceptable for this frequency, so it was decided to use a single insulated radial about 70ft in length, and run it as far as possible in a straight line, then run it around the perimeter of the garden. On 7 MHz three insulated radials about 35ft in length were used, and the placement of all four radials can be seen in Fig. 7. (It was also decided that for peak performance, these radials would be tuned to the operating frequency.) A 5ft earth spike was also provided right at the base of the antenna because, as the radials were to be insulated, this would be the only contact with true earth.

Still in the planning stage we must give consideration to the manner in which the device is to be tuned, and it was apparent that adjustment of the 7 MHz portion of the antenna could only be accomplished by lowering the whole structure and altering the length of the wire between the top of the



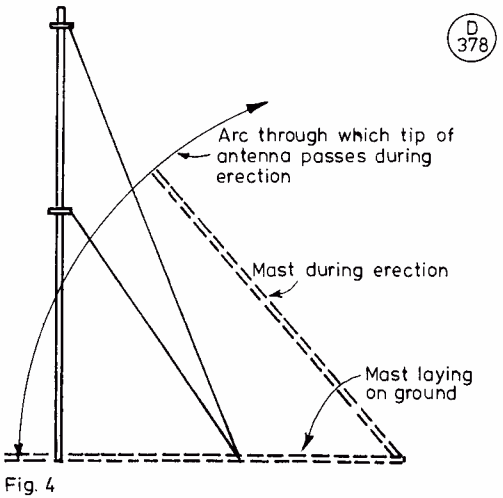
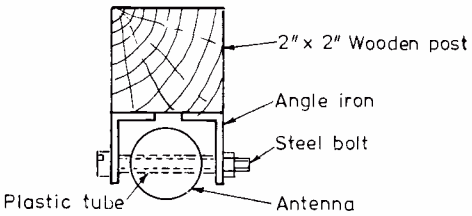


Fig. 4. Scale-drawing to ensure that the mast will clear obstruction during erection.

vertical and the trap. It was therefore essential that the whole question of raising and lowering the antenna be carefully planned in order to make this operation as simple as possible. Once resonance had been established on 7 MHz, the 3.5 MHz resonance could be simply attained by trimming the end of the top wire without the need to lower the vertical section.

The final stage of the planning was to take a last, close, look at the site to determine whether anything had been overlooked. At this point it was noted that the clothes line (which would be very close to the base of the completed



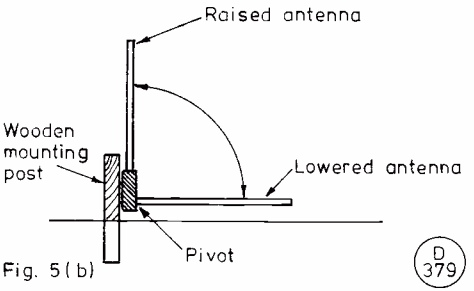


Fig. 5*a* and *b*. Detail of the construction of the antenna mounting.

antenna) was constructed of plastic covered steel wire, and that the total length of the wire was very close to a quarter-wave on 7 MHz! The line was promptly replaced with an all-nylon type.

Construction and erection

All of the parts required — including a suitable length of high quality 50-ohm coaxial feeder — were purchased (the money being available as a result of selling the new defunct vertical!). The first stage was the construction and mounting of the ground-post, and no problems were encountered with this simple task; although obvious, it should be noted that one face of this post will carry the angle iron and antenna, so it must face in the correct direction!

The radials were next installed and tuned (this is described under *Tuning*). They were buried about one foot below the level of the soil by digging a trench and pressing them into place. (This depth was chosen as being unlikely to interfere with digging and cultivating the garden.) The trench was then filled in with the exception of a few feet at the ends where the radial would need trimming during tuning. The 80 metre radial actually ran along the edge of the lawn, and here a slot was opened up with a spade and the wire laid in — afterwards the slot was closed by simply stamping on it; in this area the radial was only one or two inches below the surface.

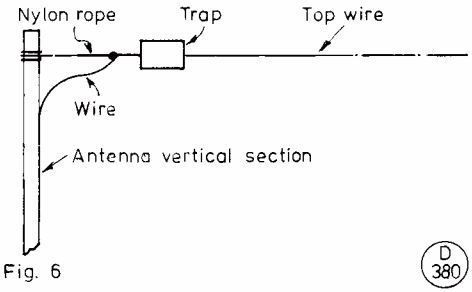


Fig. 6. Detail of method of supporting trap and top wire.

Next the ground spike was driven into the ground — a stout wire having been previously brazed onto it for connection to the radials. The bottom of the lower 15ft section of tubing was drilled, the insulating pipe inserted and this section was then fastened to the base mount on the ground post. The three lower guy ropes were attached and this lower section was then raised and the tension of the guy ropes adjusted to hold the tube vertical. Reference to Fig. 3 will show that the two guy ropes attached to the guy of the existing mast can be left tied — only the other guy need be released to lower this section.

The point at which the third guy rope was attached to the linen post was marked with a dab of paint, enabling it to be tied rapidly at the correct tension during erection of the completed antenna. The tubing was then lowered by undoing the "back" guy, and the other 15ft section plus guy ropes were attached. The complete 30ft vertical section was then raised and the tension of the top guys adjusted — the "back" guy again being marked at the tying position;

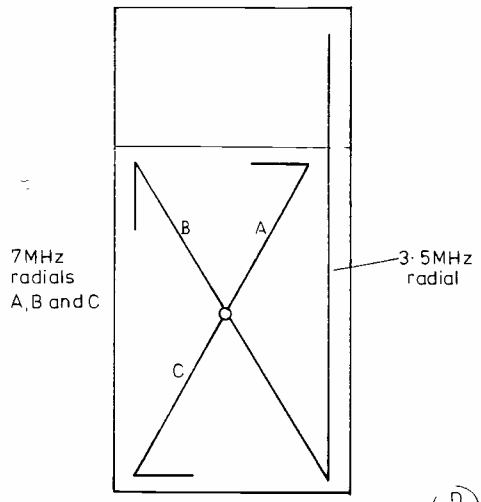


Fig. 7 Layout of the 4 radials (D 381)

the tubing was once more lowered to the ground, again undoing only the "back" guys. The trap, top wire and nylon strain rope were then fitted and the antenna raised, this time the top wire being pulled into the horizontal by tying the supporting rope to an upstairs window frame of the house.

The resonant frequency of the 7 MHz section was then determined by use of a GDO, using a communications receiver to determine the GDO's frequency. The antenna was then tuned, first for 7 MHz and then for 3.5 MHz. After tuning, the feeder was attached to the feed point and to the radials plus earth stake, and the whole structure was then weatherproofed. This consisted of wrapping generous quantities of PVC insulating tape round all self-tapping screws used for jointing and attaching the feeder and top wire, and also over the top and bottom of the tubing — in fact in any place where moisture could get in. The end of the coaxial feeder was taped up even more generously, as water getting into the end can render it unusable! The ends of the radials (after tuning) were similarly taped-up prior to burying their ends.

The final stage of the construction was to fit two "jumper wires" between the two 15ft sections of tubing, as any build up of corrosion between them would lead to deterioration of the antenna's performance. The wires were held with self-tapping screws, and again a liberal application of PVC tape was used for waterproofing; Fig. 8 shows the jointing sections plus jumper wires.

Tuning

The antenna described was simple to tune, the radials being tuned first. They were connected (as shown in Fig. 9a) one at a time through a single turn coil to the ground spike, and trimmed a little at a time until the GDO dipped at the required frequency: 7.01 MHz for the three short radials, and 3.75 MHz for the long one. The radials were then disconnected from the ground spike and the antenna was connected to it through a single turn loop — again using the GDO to establish resonance — as shown in Fig. 9b. Both sections gave absolutely no problems, and a well defined dip was noted on both bands. From figures quoted in various books, the feed impedance should have been around 30 ohms on both bands, so the VSWR should have been about 1.6 or 1.7:1. In fact the indicated SWR was 1.68:1 on 40 metres and 1.45:1 on 80 metres, and it was assumed that the presence of the 7 MHz trap was increasing the feed impedance slightly on 3.5 MHz. (Later measurements with an antennascope gave impedances of 28 ohms and 34 ohms on 40 and 80 metres respectively, tending to confirm the SWR's.)

This comparison of measured parameters with expected results is most important — had the SWR on either hand been below about 1.25:1 or above 2:1, this would have been an indication of possible malfunction.

Evaluation

The next stage is obviously the evaluation of results obtained with the new antenna. The 2-band inverted-L performed better than the operator's wildest expectations on 7 MHz, both VK and ZL being worked with 150 watts input on CW. On 80 metres reports were better than had been expected with inter-G contacts — obviously the compromise in height and earth system had led to high radiation angles being present; but the ease with which W1/W2 stations were also worked suggests that some low angle radiation is also present. The final evaluation must, of course, come from the station itself; this particular operator has no complaints — apart, that is, from regretting the money lost on the 4-band commercial vertical.

The author hopes that by going through the above project in some detail, the general principles of planning will have become evident. One point that should have become apparent is that planning is an essential part of the whole project: the construction, erection and tuning operations all need to be planned prior to commencement of the project. The author has devised a check-list which he

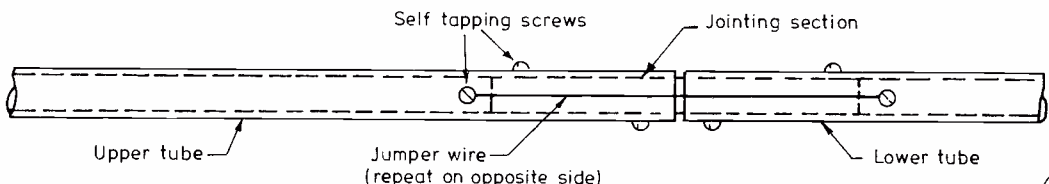


Fig. 8 (D 382)

Fig. 8. Method of joining the two sections of tubing needed to construct the inverted-L antenna.

uses with all antenna installations, and this is reproduced here in full. For those readers who intend purchasing the antenna rather than building it, please note that this list applies to them also — the construction stage is simpler, but the other considerations are still present. The list also applies to SWLs, as their antennas should be held in just as high esteem by their owners as transmitting antennas are by licensed amateurs!

Use of the check-list is very largely self explanatory, and the only section that may need some clarification is that on evaluation. This is a part of the complete process of installing an antenna, and careful planning can be helpful; it is wrong to gain an impression of the antenna's performance by results obtained at random over a few days or few weeks intensive operation (Murphy's Law will see to it that erection of a new antenna will be followed by a period of abnormally good or abnormally bad conditions!). Any evaluation needs a reference and we can either use an existing antenna (assuming that we do not need to take this down to make room for the new one!) or enlists the help of another, nearby station. By getting distant stations to compare the signal from the antenna with that from the assisting station, both from the old antenna and the new one, can provide a useful guide as to whether or not our signal has, in fact, been improved.

During the tuning stage of the project, ensure that results obtained are in line with those expected — this stage can make or break an antenna's performance, and no compromise should be made. When altering an antenna's dimensions, note carefully the exact change made, and the exact change in result, as this can save much time later. For example, if we are adjusting a wire antenna for resonance, and we note that removal of, say, 1ft of wire moves the resonant frequency by 50 kHz, it should be possible to calculate approximately how much more wire to remove in order to arrive at the required resonant frequency.

Investigate unexpected results very thoroughly, and if possible verify results by use of a second instrument; for example a feed impedance obtained with an antennascope can be checked by measuring the SWR at the resonant frequency and calculating the impedance from the SWR figure, or by measuring the feed point impedance directly with another instrument such as a noise bridge. However, it must be recognised that differences of 10 to 20% for results obtained by different methods are not uncommon, and it is pointless striving for exact agreement. Again, the results quoted in the case-histories described in the previous article give typical differences.

Erection

Erection of a mast (with or without antenna attached) can be a very simple task, or it can be made very difficult — the difference depending almost entirely on the amount of thought and planning that has been applied. The author has been involved in the raising and lowering of a great many masts, including a 40ft aluminium mast carrying a rotator and tri-band HF beam, and a 60ft mast with a 6-over-6 element 144 MHz Yagi. Many points have been noted that will make erection simpler and safer, and these are discussed below (in no order of priority).

Firstly, during the raising (or lowering) of the structure the base of the structure must be held rigid and must also

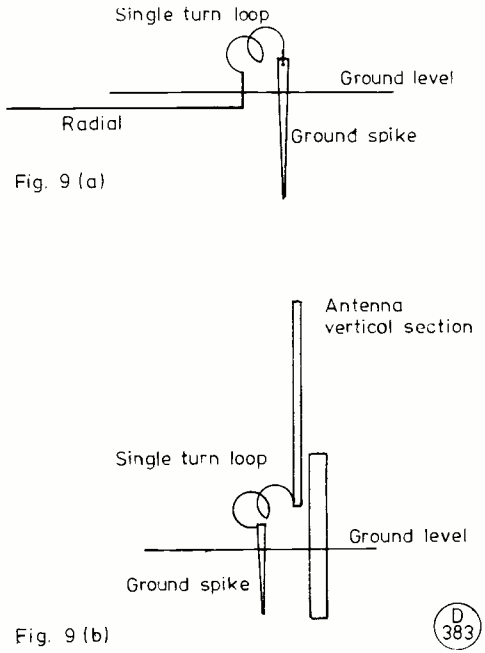


Fig. 9. (*a*) Coupling of radial to the ground spike; (*b*) Coupling of antenna to ground spike.

act as a pivot during the actual raising, and practical devices for this purpose can be similar to that described for the inverted-L discussed above. However, it must be recognised that during the actual erection the tendency is for the ground post to be lifted vertically out of the ground (until the mast has been raised to an angle of more than 45° to the ground), so any post used for this purpose must be firmly embedded.

The direction in which guy ropes run is an important factor, because with ideal positioning it is possible to have to guys already fastened, and the other one or two can be used to pull the mast up during the erection. If a multi-section mast is to be used, it is extremely useful to erect just the bottom section first, and mark the tying positions for the correct tension; it is also useful to repeat this exercise with the complete mast, but without the antenna/rotator etc. mounted. Guy wires (or ropes) should not be over-tightened as this can lead to distortion of the shape of the mast, and in any case reduces the life of the guys themselves. Also, if the guys are not over-stressed, then during windy weather they will absorb a large amount of the wind's energy: with very tight guying this energy is transmitted to the mast itself resulting in considerable flexing and wear of mounting components, such as ground posts and mounting brackets. Masts at G3XAP are always "slack guyed" with nylon rope, and the author has never lost sleep worrying about gales — in spite of having a 60ft mast guyed in only 3 directions. No damage has ever been noted either to a mast and its fittings, or to guy wires.

The biggest single mistake made by amateurs in raising masts is in not providing an "elevated point" from which to raise the structure. By relying on pushing the mast up

from underneath and pulling on the guy wires with help from no other structure, we literally make a mountain out of a molehill. At G3XAP, 4 people can erect and secure a 60ft mast in under 3 minutes — safely and with a minimum of effort! The answer lies in the use of an elevated point from which to *pull* the mast *upwards* — a tree or building is ideal, but a gin pole is usually necessary and normally adequate. Fig. 10a shows the arrangement — note that a pivot is provided on the ground mounting post on the opposite side to that on which the mast is mounted.

With the mast secured to the mounting post, a guy wire is tied to the gin pole so that the latter is in an upright position. (This can be done by lying the gin pole on the ground at right angles to the main mast.) Note that it is pointless to try to use a gin pole connected to the top guys as flexing of the mast during raising makes this practice almost impossible! With the back guys already fastened in the correct positions, one operator lifts the mast clear of the ground, a second pulls down on the gin pole while the third and fourth *hold* two top guy ropes — these being positioned behind the mounting post and on both sides of it (Fig. 10b). *These ropes should not be pulled:* they are used to stop the mast from swinging from side to side during the erection. However, when the bottom section of the mast is practically vertical, the top section will probably be leaning over at an alarming angle, and the top guys can then be pulled *gently* to pull the structure upright; *caution, do not jerk these guys or pull violently* or the structure can be damaged. Many operators become very alarmed when raising an aluminium mast because of the large degree of distortion at this stage, but provided the tubing is of sufficiently large wall thickness, no permanent damage results and the tubing straightens out when the structure is fully upright. However, light wall tubing can be permanently damaged and it is false economy to buy a cheap grade.

All masting in use at G3XAP is 1.29/32 inch O.D. aluminium alloy with a 7 s.w.g. wall thickness; this tubing is heavy (1.65 kgm. per metre) and expensive (about £3 per metre) but is extremely safe to use. Raising such structures also puts a colossal strain on the joints between adjacent sections and the author does not trust commercial coupling clamps. Instead, adjacent sections are overlapped 2ft and joined by two heavy-duty steel bolts. This has proved to be a very safe pactice, although the resultant mast may not look as elegant as one jointed by coupling clamps!

Prior to erection all helpers should be told exactly what is going to happen and exactly what each person's job is; they should also be warned about such matters as not pulling hard on the top guys, and to expect a lot of mast bending, etc. During erection it is *absolutely essential* that one person acts as a foreman, and that his sole job is to give instructions to the members of the crew. It is also essential that such orders should be obeyed accurately, immediately and without question. (Obviously, the foreman should desirably have had prior experience of raising such structures!)

Finally, and probably the most important point of all, under no circumstances should any risk be taken when raising masts. All materials used must possess sufficient strength and all methods used *must* be safe. The stresses encountered when a mast is raised or lowered are tremendous and *an accident at this stage can kill.*

If any doubt exists regarding either methods or materials, seek expert advice — the delay incurred could prevent serious injury or even save a life.

Check-List for Planning an Antenna Project

Choice of Antenna: frequency coverage required; single- or multi-band; properties required (low angle radiation, omni-directional etc.). Prepare list of suitable antennas. Make final choice from list by elimination (on grounds of size, cost, weight, comparative performances etc.) and then see that the chosen type will (*a*) meet all the properties required (gain, directivity etc.); (*b*) be within financial limit; (*c*) be within engineering capabilities; (*d*) be aesthetically acceptable (consider XYL, neighbours, planning regs. etc).

Choice of Location: site the antenna in the area available so that it will be (*a*) possible to erect it (consider obstructions such as buildings and trees during the raising operation); (*b*) not too badly screened; (*c*) as remote as possible from other metallic structures; (*d*) possible to provide an effective earth system (where applicable); (*e*) possible to run a feeder clear of obstructions; (*f*) remote from TV aerials (see Licence conditions); (*g*) possible to guy it safely; (*h*) radiating in the required direction (applies only to fixed arrays such as dipoles and long wires); (*i*) possible to use existing structures (*e.g.* guyed to trees, wire antennas fastened to chimneys, etc.); (*j*) unobtrusive through rotator noise (where applicable).

Choice of Materials, and Construction: list *all* materials required for the antenna, feeder, mast, guys, rotator, earth system etc; against each item list alternatives, making final choice on grounds of cost, strength, weight, corrosion resistance, stretching properties (wire for antenna, wire or

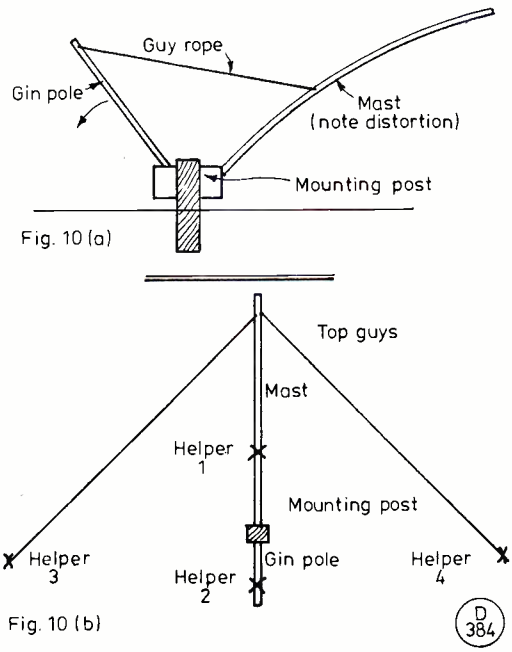


Fig. 10. (*a*) Method of mast erection using a gin-pole to obtain an 'elevated' support point; (*b*) layout of components and positioning of helpers, for safe, simple, erection of masts — *see* text for detailed discussion.

nylon for guys) and overall safety considerations. Under the heading of 'safety' comes the height of masts, supports etc., and as well as the above list influencing height, so does angle of radiation, antenna feed impedance, height of nearby screening structures, local planning regulations, aesthetics and ground area available (in regard to safe positioning of guys and the need to lay the mast on the ground before erection).

Erection: whichever type of antenna and materials are chosen, the device ultimately has to be raised into its operating position, and this single consideration can lead to final *rejection* of the chosen antenna type. The main considerations for mast-mounted antennas are: (*a*) is the antenna to be fastened to the mast prior to erection? If so, check back on choice of materials (especially strength) and that the rotator, if used, will withstand the leverage imposed on it; if not, consider in detail how to get the antenna and rotator to the top of the mast, remembering that there will be guys to negotiate. (*b*) can the mast be raised without meeting nearby structures (allow for the presence of guys and possibly the antenna itself). (*c*) can existing 'high points' (trees, upstairs windows etc.) be used for pulling up on guys during raising. (*d*) number of helpers needed (plus one to meet unforeseen snags).

Tuning: the method should be worked out prior to construction/erection, bearing in mind the following: (*a*) will the antenna need lowering to make adjustments? (*b*) what instruments will be used (these can be borrowed!); (*c*) any special items required (*e.g.* quarter- or half-wavelengths of feeder); (*d*) what sort of results expected (it helps greatly to have some idea of such factors as the likely feed impedance at resonance, etc.).

Evaluation: the evaluation of an antenna's performance is difficult for an amateur because of the need for a reference. There is little planning to be done here, but the following remarks are useful: (*a*) against what standard will the antenna be evaluated (*e.g.* an existing antenna, or a specially-erected half-wave reference antenna); (*b*) can use be made of contests or activity periods (these can provide useful comparisons with other stations, but are usually delayed; operating skill has a large influence also!); (*c*) can a link-up with nearby amateurs be made to get comparative signal reports (clearly comparative reports with existing antennas must be obtained first to find out whether or not our signal has been improved).

Summary

We have now progressed through a fairly broad spectrum of antenna theory and have discussed planning and construction, so we are now in a position to look at our own needs and install an antenna for the job. However, the newcomer may not be aware of the antenna types available and, even more important, the properties that such antenna exhibit. The final articles in this series will therefore describe and discuss various antenna types and give an indication of their properties. Although such a list cannot be exhaustive, it is considered that it will provide a valuable addition to this series.

to be continued

CLUBS ROUNDUP

BY *'Club Secretary'*

SOMETIMES it is as hard to round up the correct gen on Clubs as it is to change a 90p note, and with our slow postal services we have to do the best we can. All those who have reported for the last few months are noted as to dates, Hq address, name address and phone number of the Hon Sec — but we don't have a crystal ball with which to sort out changes of which we have no notifications. Admittedly, we do sometimes manage to surprise a dilatory club by noting their changes, but this is only because we happen to have a buddy who is a member and mentions the matter!

However, as long as we get the story in its essentials, that is the main thing. After all a note in *Short Wave Magazine* is, in a sense, a note to the converted, and one would think a regular run at some of the local papers would bear some fruit. They usually carry notes of the local organisations, and a deadline for material. A photo of the group *doing* something will help — currently what better even to "key" to than the up-coming Jamboree-on-the-Air. Either a note about what is already planned with local Scouts or an appeal for interested Scout groups to get in touch — either will rate a line in the paper, and a shot of the lads operating while Scouts look on, got in before the deadline time, is almost sure to rate an appearance. But take note of one thing: you must make your script as near as you can to their format, and like their style, while of course photographs *must* be of the right quality. Above all, be aware of their deadline for incoming material, and be sure they get it a bit early.

The Letters

We nearly always seem to kick off with **Acton, Brentford & Chiswick**; on September 18 they have a review of members equipment at Chiswick Trades & Social Club, 66 High Road, Chiswick, London W.4.

Addiscombe nowadays are a contest club in the main, but they can be found at the Spread Eagle, Portland Road, S. Norwood, on Tuesday evenings around 2115.

AMSAT-UK is the U.K. arm of the group responsible for putting up *Oscar* satellites — and using them. Details on membership and whatever from the Hon Sec — *see* Panel.

Our next is **A.R.M.S.** who look after the interests of the /M types. Again details from the Hon Sec, our own G3FPK — *see* Panel.

At **Ashford** in Kent, the venue is at the top of Hart Hill near Charing, where they can be found on Tuesday evenings.

B.A.R.T.G. are the people to get in touch with should you be interested in RTTY operation, whether by the old-type teleprinter, or the modern VDU-style machine. Other groups might note that any requests for a speaker on RTTY will be met if it is humanly possible — and from experience a good talk is given.

This time it's amateur television we are talking about, which means **B.A.T.C.** Colour or B/W, slow or fast scan, this is the group. Details from the Hon Sec — *see* Panel.

At **Bishops Stortford** they have a place at the British Legion club, near the top of Wind Hill which rises from the

town centre traffic-lights to the west of the town; the booking is for the third Monday in each month, and there is a programme already worked out which will take them through the next twelve-months.

Down south again, to **Bournemouth**, where they have the first and third Friday in every month at the Dolphin Hotel, Holdenhurst Road, Bournemouth.

Braintree are next on the pile, based on Braintree Community Centre, where they can be located in Room 3 on the first and third Mondays of the month. This is by the Bus Park in Victoria Road.

Bury have a new P.R.O. owing to G4FQE having to give up, but in G4GSY they seem to have found a worthy successor. They have two projects running at the moment, one of which is a micro-processor effort which is being backed by the local council using lottery proceeds; the other is an HF band linear amplifier. Find them at the Mosses Community Centre, Cecil Street, Bury, on Tuesdays, the formal meeting being the second one, the rest informal. At the moment they have a record total of some 80 members.

Band together all you YLs! **BYLARA** is the group for the licensed G8, G4 or whatever, XYL or YL/SWL; they have a cunning arrangement for a get-together at mobile rallies, and of course there is a net on Eighty as well. Details from the Hon Sec — *see* Panel.

A new format appears for the newsletter at **Cheltenham** with the Hq address at the Old Bakery Clarence Street, behind the public library clearly shown across the top. September 6 sees them having a talk from G3BA on his P.o.W. experience, while on September 21 they have a Natter night.

At Chichester the venue is at the Lancastrian Wing (Room 34A) of Chichester High School for Boys, Basin Road, Chichester, on the first Tuesday and the third Thursday.

It is good, once in a while, for an organisation to look at itself and take stock; **Chiltern**, in noting the odd loss of a member, are looking at themselves and wondering what, if anything, has gone wrong. Meetings on the last Wednesday of the month at the canteen of the John Hawkins Furniture factory in Victoria Street, off West Wycombe Road, the latter being the local bit of the A40 trunk road.

On we go now to **Cornish**; they are at the *SWEB* Club Room, Pool, Camborne, on the first Thursday of each month. Start nominally at 7.30, but get there on the dot if you want a seat — attendances are enough to fill the room!

The routine at **Crystal Palace** is to have the main date on the third Saturday evening in every month, at Emmanual Church Hall, Barry Road, S.E.22 for the talk, plus a visit to a member's home on the first Saturday. No doubt for the latter it would be a courtesy to contact the Hon Sec initially — *see* Panel for his name and address.

Another club based on a church hall is at **Crawley**, where the favoured spot is Trinity Church Ifield, or as an alternative a gathering at the home of a member; so again we suggest a contact with the Hon Sec first.

At **Cray Valley** we lack a copy of their newsletter for the first time in years; but we noted it down as Christ Church Centre, High Street, Eltham, on the first and third Thursdays: normally the former is for a lecture and the latter for a natter, but of course it is possible to do a switch to suit the needs for some special speaker.

Up to **Derby** now, to the top floor at 119 Green Lane, Derby, where on every Wednesday you can look in on one of the oldest clubs in the country (and one of the most powerful, too).

Not far away is the **Nunsfield House** lot; their base is in Boulton Lane, Alvaston, Derby, and they are in residence every Friday evening — obviously these two make up a pretty crowded club life for anyone who wants to be a member of both!

Nearer the metropolis we have **Ealing**, who foregather on Tuesdays at Northfields Community Centre, Northfields Road, London W.13.

A new reporter is the **East London RSGB group** who are based on Wanstead Community Centre, 21 The Green, Wanstead, London E.11. The nearest tube station is at Wanstead, and the date is Sunday September 16 for G3LMX to talk about getting started on fast-scan ATV. Looking a month on, we see October 21 as a time for G3RPE to come along and talk about RSGB and its workings.

Now we trot off to **Edgware**, and their Hq at Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. They foregather here on the second and fourth Thursdays.

Deadlines for "Clubs" for the next three months—

(October issue—August 31st)
November issue—September 28th
December issue—October 26th
January issue—November 30th
Please be sure to note these dates!

September 10 is the next one for **Exeter**, and it looks like a talk by G3OFY, at the Community Centre, St. Davids Hill, where they have the second Monday. In addition to the September date, we see the AGM appears on October 15, when doubtless they want all members to turn up.

Fulford is "the other one" around York; they have their base at 31 George Street, York on Tuesday evenings.

We must never overlook the **G-QRP Club**, where we find all the low-power buffs are members; the newsletter, SPRAT, gives much useful information, both directly by way of articles and also by such facilities as reprints of articles from other parts of the world dealing with their speciality; not to mention a very fine trophy awarded annually.

Guildford are to be found at the Hq of the Guildford Model Engineers in Stoke Park, where they foregather on the second and fourth Friday evenings. More details from the Hon Sec — *see* Panel for his address.

Moving on to **Harrow**, we find them at Harrow Arts Centre, High Road, Harrow Weald; which dates there we do not know, so we must refer you to the Hon Sec — *see* Panel for his address.

Up to Scotland next, to **Helensburgh**, where the venue is at East Clyde Street School, on the first and third Wednesdays of each month; among the activities they specialise in giving Morse and RAE tuition, and they welcome new members.

Hereford is a club which seems to have made steady growth, where we see from the newsletter that the Hq is at County Control, Civil Defence Hq, Gaol Street, Hereford on the first and third Fridays. Unfortunately, their

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London W3 8LB. *(01-992 3778)*
ADDISCOMBE: P. J. Hart, G3SSJX, 42 Gravel Hill, Croydon, Surrey CR0 5BD. *(01-656 9054)*
AMSAT-UK: R. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ
A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR2 1EZ
ASHFORD: J. A. Clarke, G3TIS, Yeomans Cottage, The Street, Brook, Ashford, Kent. *(Wye 812888)*
B.A.R.T.G.: J. P. G. Jones, GW3IGG, Heywood, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed SA62 4LR
B.A.T.C.: M. Cox, G8HUA, 13 Dane Close, Broughton, Brigg, South Humberside
BISHOPS STORTFORD: T. E. White, G8LXB, 79 Elmbridge, Old Harlow, Essex
BOURNEMOUTH: D. Wade, 70 Creekmoor, Poole. *(Poole 695502)*
BRAINTREE: D. A. S. Holmes, G3JSV, Thaddeus House, East Street, Coggeshall, Colchester, Essex CO6 1SH
BURY: M. Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs. BL8 2TT. *(061-761 5083)*
BYLARA: Mrs. D. Hughes, G4EZI, 3 Primley Park Crescent, Leeds LS17 7HY
CHELTENHAM: G. Cratchley, G8MZV, 47 Golden Miller Road, Prestbury, Cheltenham. *(Cheltenham 43891)*
CHICHESTER: T. M. Allen, G4ETU, 2 Hillside, West Stoke, Chichester PO18 9BL, West Sussex. *(West Ashling 463)*
CHILTERN: N. C. Ambridge, G4FRL, 53 The Avenue, Chinnor, Oxon. OX9 4PE. *(Kingston Blount 52006)*
CORNISH: S. T. S. Evans, G3VGO, Glengormley, Carnon Downs, Truro, Cornwall. *(Devoran 864255)*
CRAWLEY: A. Davis, G3MGL, 41 Gainsborough Road, Crawley, West Sussex RH10 5LD. *(Crawley 20986)*
CRAY VALLEY: P. J. Clark, G4FUG, 42 Shooters Hill Road, London SE3. *(01-858 3703)*
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. *(01-699 6940)*
DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. *(0332 56875)*
DERBY (Nunsfield House): I. Cage, G4CTZ, 25 Petersham Drive, Alvaston, Derby DE2 0JU
EALING: E. Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston-upon-Thames
EAST LONDON RSGB: R. Holmes, G3PKQ, 92 Dunedin Road, Leyton, London E10 5NJ. *(01-558 2928)*
EDGWARE: D. L. Lisney, G3MNO, 119 Draycott Avenue, Kenton, Harrow HA3 0DA. *(01-907 1237)*
EXETER: A. W. Bawden, 232 Exwick Road, Exeter EX4 2BA
FULFORD: G. W. Kelley, G5KC, 10 Deepdale, York YO2 2SA
G-QRP: Rev. G. C. Dobbs, G3RJV, "Willowdene", Central Avenue, Stapleford, Nottingham. *(Sandiacre 394790)*
GUILDFORD: L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey. *(Guildford 76375)*
HARROW: C. D. Friel, G4AVF, 17 Clitheroe Avenue, Harrow HA2 9UU. *(01-868 5002)*
HELENSBURGH: A. McCudden, GM4DLU, Cruachan 1 Balloch Road, Balloch G83 8SR. *(Alexandria 56118)*
HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. *(Hereford 3237)*
IRTS REGION: J. Ryan, EI6DG, 23 Dollymount Grove, Clontarf, Dublin 3
JERSEY (C.I.): S. Smith, GJ8EZA, 19 Parade Road, St. Helier, Jersey. *(Jersey 23249)*
LINCOLN: B. Bennett, G3EAM, 142 West Parade, Lincoln. *(Lincoln 23958)*
MAIDENHEAD: J. Patrick, G3TWG, Bedford Lodge, Camden Place, Bourne End, Bucks. *(Bourne End 25275)*
NORTHERN HEIGHTS: M. Topham, G8NUC, 1200 Great Horton Road, Bradford. *(Bradford 73271)*
NORTH KENT: Dr. C. P. Conduit, 49 Baldwyns Park, Bexley, Kent DA5 2BE
PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough
R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE
REIGATE: F. H. Mundy, G3XSZ, Westview, rear of Manor Farm, off Reigate Road, Hookwood, Surrey. *(Horley 73878)*
ROYAL NAVY: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth, Hants. PO8 8SQ
SALTASH: D. Bunce, 47 Hobbs Crescent, Saltash, Cornwall PL12 4JJ. *(Saltash 2839)*
SOLIHULL: R. A. Hancock, G4BBT, 80 Ulleries Road, Solihull, West Midlands B92 8EE
SOUTH BIRMINGHAM: Mrs. G. Apperley, G4GZI, 35 Denise Drive, Harborne, Birmingham 17
SOUTHDOWN: R. Jefferies, G8KQN, 84 Mill Road, Hailsham, East Sussex BN27 2HU
SOUTHGATE: J. Fitch, G8EWG, 16 Kent Drive, Cockfosters, EN4 0AP. *(01-440 7353)*
STEVENAGE: P. Byrne, G8MCV, 91 Jessop Road, Stevenage SG1 5LH
STOURBRIDGE: C. Williamson, G4IEB, 14 Lawn Street, Stourbridge. *(Stourbridge 2006)*
SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. *(01-642 9871)*
SUTTON & CHEAM: G. Brind, G4CMU, 26 Grange Meadow, Banstead
THAMES VALLEY: R. J. Blasdell, G3ZNW, 92 Bridge Road, Chessington, Surrey KT9 2ET
TORBAY: Mrs. G. Coker, 2 Causeway Cottages, East Street, Ipplepen, Newton Abbot. *(Ipplepen 812117)*
TYNESIDE: M. P. Cranage, G80FA, 69 Rectory Lane, Blaydon-on-Tyne, NE21 6PJ
VERULAM: A. Clarke, G8MAE, 24 Kiln Ground, Hemel Hempstead, Herts. HP3 8EZ. *(Hemel Hempstead 64751)*
WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent TN14 5AF. *(0732 56708)*
WINCHESTER: P. Simpkins, G3MCL, Lawn End, Park Road, Winchester, Hants.
WORCESTER: M. Tittensor, G4EKG, 16 Durcott Road, Evesham, Worcs. WR11 6EQ. *(Evesham 41105)*
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York

newsletter indicates the goings-on till the end of August only, but we can guess they will have something doing after that. If in doubt, contact the Hon Sec at the address in the Panel.

It's the first time for many moons that we have had an entry from **Jersey**, but although they have a most interesting newsletter we cannot put you in touch directly; they seem to be having some sort of a 'do' with a visit from a group of F stations, so we must refer you to the Hon Sec for more details, and whether or not you can attend this affair on September 23.

Still over the water, we have **IRTS Region 1**; a fine crowd, and the focus of amateur radio activity in Eire. Thus if you really want to know what is happening, or where your nearest EI club is, talk to the Hon Sec at the address in the Panel.

Back nearer home now, to **Maidenhead** and the Red Cross Hall, The Crescent, Maidenhead. On Tuesday September 18 there is a quiz, at home against Bracknell.

Lincoln meet at the City Engineers Club, Waterside South, Lincoln: more details from the Hon Sec — *see* Panel.

A change of address is noted for **Northern Heights**, the revised conditions under which they could continue to use the Hq being totally unacceptable. The upshot is a move to a place called the "Bradshaw Tavern," with a room available with separate access so junior members can get in without going through the bar; a further attraction at Grid Ref 303083 is that the cellar contains barrels of Webster's Ales, and a friendly landlord is behind the bar. Meetings

here will be on Wednesday evenings. For details, contact the Hon Sec — *see* Panel.

How nice it is to hear of the continued existence of a group we had given up for dead! Such a one is at **North Kent** who now have a home at St. Mary's Institute, 2 North Cray Road, Bexley, on the second and fourth Thursdays in each month.

There is sorrow at **Reigate** at the passing of G3JDN, who was a founder member and for many years served on the committee in various functions. Peter Lucas also will be recalled for his work with the youngsters, at his home, which resulted in many passing the RAE. Gone, maybe, but not forgotten. Not surprisingly, there is no note of the dates or venue, but we know they will be at the Constitutional Centre on the evening of September 18th.

At **Peterborough** the troops foregather at the Scout Hut, Occupation Road, on the third Friday. Unusually, we don't have details of the activity on file this time.

If you know anyone who is blind or invalid and needs some help to get on the air, either initially as an SWL, or later as a licensed amateur, the first move is to put them in touch with **RAIBC** — *see* Panel for the Hon Sec's name and address. If you or your club can provide any supporting activity, you can become a member yourself — as a supporter or representative; and fund-raising activities are much appreciated and well used.

On now to the **Royal Navy;** this is another of the spread-out groups where the main contact is either on the air or by newsletter; but of course there are some local groups, as well as the Hq at *H.M.S. Mercury.* More details from the Hon Sec.

At **Saltash** the venue is still Burraton Toc H, on the first and third Fridays of each month; you have to find the junction between Warraton Road and Oaklands Drive.

The Manor House, High Street, is home to **Solihull** on the third Tuesday in each month. Details from the Hon Sec at the address in the Panel.

South Birmingham have their corporate-being in Hampstead House, Fairfax Road, West Heath; the first Wednesday is the "formal" meeting, and each Thursday they operate on HF from the club shack, leaving room for an open evening every Friday.

A change of Hon Sec is noted at **Southdown,** the contact now being G8KQN, and his address is in the Panel.

We have the word from **Southgate** of a temporary change of venue; so we suggest you get in touch with the Hon Sec before setting off — *see* Panel.

Over to **Stevenage** where the group have the use of the Staff Canteen at the British Aerospace Plant B in the Industrial area. Contact the Hon Sec for details.

Stourbridge newsletter this time does not seem to mention the venue for their gatherings, so we have to aim you at the new Hon Sec — *see* Panel.

No shortage of information from **Surrey;** the Hq is at **T.S. Terra Nova,** a 'stone frigate' at 34 The Waldrons, South Croydon.

There seems the possibility of a temporary change of venue at **Sutton & Cheam** if, as so often happens, building works take longer than programmed. So, to be on the safe side, check with the Hon Sec before making a first visit to be sure you get to the right address.

On the first Tuesday in each month, Giggs Hill Green Library, Thames Ditton is the focus of the radio amateur activity of **Thames Valley** club.

We don't have the latest doings from **Torbay,** so we must refer you to the Hon Sec at the address in the Panel.

Every Monday the **Tyneside** chaps make for the Community Centre, Vine Street, Wallsend.

One we seldom, if ever, fail to get the gen about is **Verulam** and we now have it that they are re-settled, the new Hq being the Jubilee Centre, Catherine Street on the fourth Thursday. The September date (27th) will see them crowding in to hear about RAIBC from G3LWY herself — and who better, as she has been associated with it right from the beginning.

WACRAL is a club comprising a world-wide membership of practising Christians of whatever denomination, albeit since it began in Methodism it still has a majority there. Contact is maintained by newsletter, skeds over the air and various get-togethers. Details from the Hon Sec at the address in the Panel.

September 14 and 28 are the dates for **West Kent;** on the former a two-metre foxhunt and on the latter an Open Evening. The venue is the Adult Education Centre, Monson Road, Tunbridge Wells, and between the formals they also have natter evenings at the Drill Hall in Victoria Road.

It's a long while since we heard from **Winchester,** but they are alive and kicking — find them on the third Saturday in each month with a talk, lecture/demonstration, films or whatever; in addition an informal session on the first Friday of each month takes place at the Crown Hotel, North Walls, Winchester.

At **Worcester** the Old Pheasant (which, paradoxically, is in New Street) is the Hq and they are to be found there on the first Monday of each month.

There are all sorts of places where clubs can have an Hq, as a read through any "Clubs Roundup" will indicate: for an example of this, **Yeovil** are at Hut 101, Houndstone Camp, every Thursday evening.

Something to make it all worth while happened to the **York** chaps at the Great Yorkshire show. It appears that some 3 years ago, at the same show, they interested a farmer in amateur radio; this year he returned to tell them he had, on his own, passed RAE and then Morse, and when they spoke to him he was awaiting his callsign. If he reads this, our congratulations, too.

Deadline

As always, to be found in the 'box' in the body of the piece, and may we remind you to check and update your entry (by letter). Make *sure* it arrives by the deadline, which means allowing about five days for first-class post to reach us. Address to "Club Secretary", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

Late Flash

Stamford. It seems this club has been moribund for a year, but now a new committee has been elected and things are again happening. In the first place contact G.L. Kay, G3LQD, 6 Westbrooke Park Road, Woodston, Peterborough (tel: Peterborough 43530) for his latest situation report and the venue.

Cheshunt are trying to set up an RAE class at Ware — details direct from G3OJI, 18 Coltsfoot Road, Ware. They are at home every Wednesday evening in Church Room, Church Lane, Wormley.

MORE ON THE FRG-7

RON BARKER

IN a previous article on the FRG-7[1] a method was described for improving the SSB performance by the use of a 2.5 KHz bandwidth mechanical filter for SSB whilst retaining the existing ceramic filter for AM reception, the correct filter for the mode of operation required being selected by the existing mode switch of the receiver. Since the first article appeared the receiver has been fitted with a 100 Hz digital frequency readout facility, and the S-meter calibrated against a signal generator having an excellent attenuator. The S-meter calibration is interesting for its own sake but in conjunction with the digital frequency readout it has enabled accurate IF bandpass plots to be made; the signal generator was also used to calibrate the attenuator of the FRG-7. The receiver has been further modified to reduce the tuning rate from more than 100 KHz per knob revolution to less than 20 KHz, which has made the tuning of SSB signals very much easier; the circuit of the filter sub-assembly shown in the first article has also been modified slightly. It was thought that other owners of this very popular receiver would be interested in the details of the work which are presented here, and information on how to use the FRG-7 as a general purpose audio amplifier is also given.

The Filter Sub-Assembly

In the original, the 510 pF ± 5% mechanical filter resonating capacitors (C13 and C14) were a pair of rather dubious looking ceramic types supposedly of the correct value and tolerance. They have since been replaced by a pair of polystyrene capacitors of the same value. The effect of this change has been to reduce the small amount of passband ripple to a level at which it can not be detected by the test methods available. It is recommended, therefore, that only the best quality capacitors are used for this application.

Continuing on the theme of the termination of the Collins filter, it was originally estimated that the input resistance of the 2SC372Y silicon bipolar transistor first 455 KHz IF stage would be very much less than the 2 K required for correct matching, and a 1.5 K resistor (R10) was used in series with the input of the transistor; this estimation was based on studies made of manufacturers' specifications for 455 KHz IF transformers designed for use with similar transistors. In an attempt to get an actual measurement of the input resistance a simple bridge circuit was temporarily installed in the receiver between the filter sub-assembly and the transistor. The signal source to the bridge was obtained by tuning the FRG-7 to the internal 1 MHz crystal oscillator and the R.1155 was pulled out of retirement to detect the null; the set up of the bridge is shown in Fig. 1. A very sharp null was obtained indicating that the bridge was operating correctly and the input resistance of the transistor was found to be in excess of 2 K. This was very much higher than was expected and the reason has not been established — but it could be the effect of the 1 pF neutralising capacitor C424. The only literature found on this topic has included advanced mathematics which the writer could never hope to understand, or has been restricted to very generalised statements. (There must be *some* readers of *Short Wave Magazine* who are well informed on this subject and could write it up in a way that would be meaningful to ordinary mortals!) However, having got this result R10 was replaced by a shorting link. There was no deterioration of the response curve of the filter and the insertion loss was reduced by several dB to become the same as that of the ceramic filter, as near as could be measured.

A further modification has been made to the filter sub-assembly to reduce the current taken by the switching transistors: resistors R5 and R6 have been replaced by shorting links, and R3 and R4 increased in value to 5 K.

This change has reduced the current demand of the unit from 22 mA to 5 mA without changing the biasing current through the switching diodes. The voltage measurements on the collectors of the switching transistors with this modification are as follows:

Mode Switch Setting	*TR1*	*TR2*
USB/LSB	0.1	1.8 volts
AM/AM ANL	2.9	0.1 volts

The above refinements have made no noticeable difference to the performance of the receiver on the air.

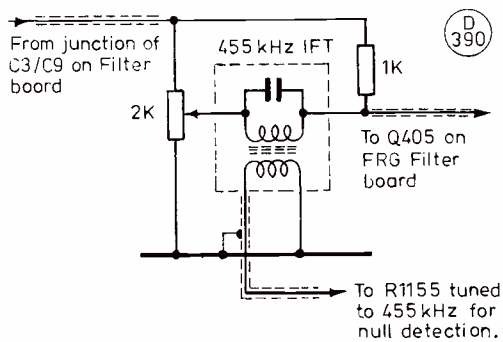


Fig. 1 Temporary bridge circuit installed to measure input resistance of Q405 under operating conditions

Calibration of the S-Meter

Whilst it is generally accepted that S-meter readings can never be absolute, they are exchanged in every amateur QSO so there should be some uniformity of calibration. The recommendations of the ARRL[2] on S-meter calibration are that S9 should be 50 μV and that one 'S' unit should be equal to 6 dB. The IARU Region 1 Conference[3] (Hungary 1978) adopted a standard for S-meter calibration which is based on the power delivered by the receiving antenna to the receiver, and is identical to the ARRL recommendations for frequencies below 30 MHz and a receiver input impedence of 50 ohms.

When operating the FRG-7 over the range which covers (10, 15 and 20 metres) it soon becomes evident that signals have to be fairly strong to give *any* reading on the S-meter, and that only a small increase in strength will take the meter to S9 and indeed when readings go above S9 + 10 dB, major

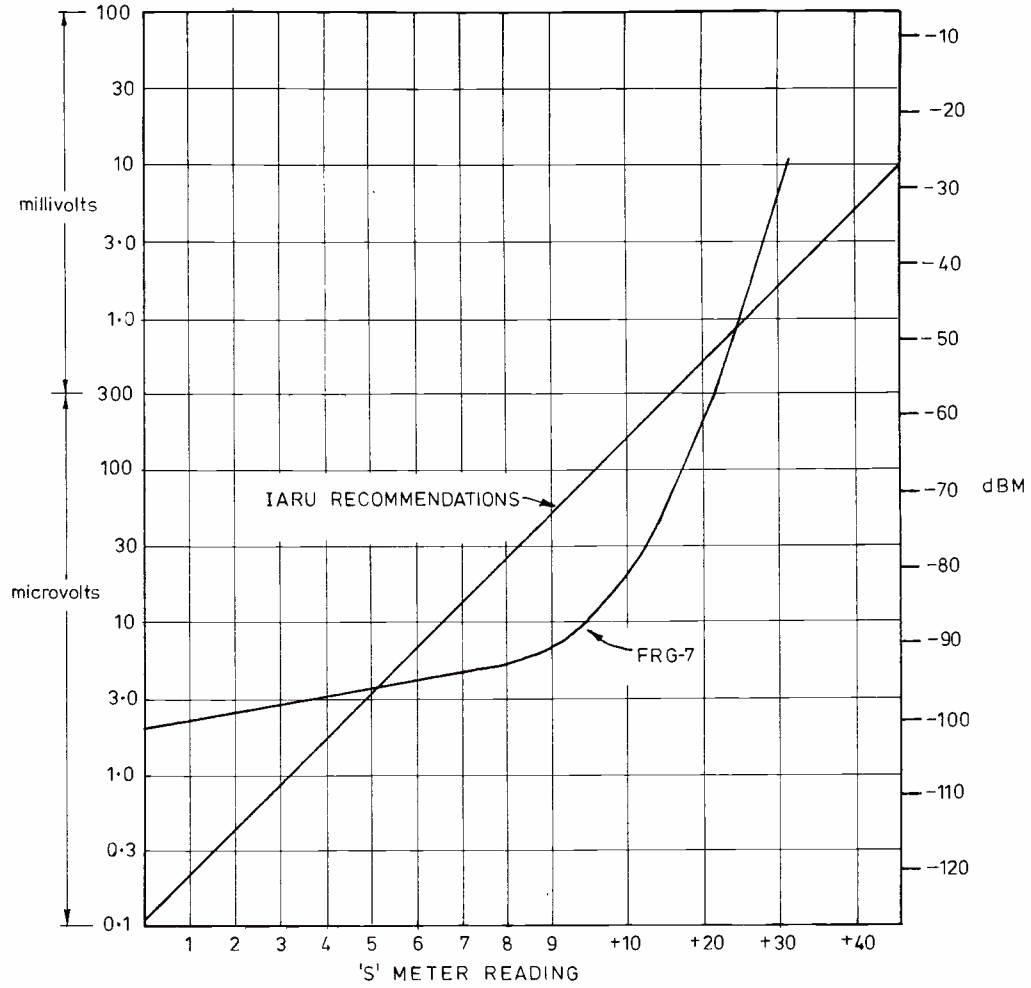


Fig. 2 'S' METER CALIBRATIONS

changes in signal strength are required to produce any change in S-meter reading. It was therefore decided to attempt to calibrate the S-meter so that readings could be corrected to the IARU standard. The signal source for the calibration was a government-surplus signal generator Type 106 of 1940's vintage made by *Salford Electrical Instruments*: this is an extremely well made piece of equipment with metered RF output and a superbly engineered attenuator. It was bought from a radio junk shop about fifteen years ago for £5 and still works perfectly.

The S-meter was calibrated at 14.2 MHz, 21.25 MHz and 28.6 MHz. There was no significant difference in the sensitivity at these three frequencies and a single curve was plotted, as shown in Fig. 2. The IARU standard is also shown on the same graph.

Calibration of the Attenuator

The instruction manual supplied with the FRG-7 gives no indication of the amount of attenuation given by the two position attenuator; the attenuator was therefore calibrated at each of the three frequencies used to calibrate the S-meter, and the following results were obtained:

	Attenuator Setting	
Frequency	*DX*	*Local*
14.2 MHz	10	19 dB
21.25 MHz	11	21 dB
28.60 MHz	12	20 dB

Measurement of IF Passband Characteristics

The first requirement for the accurate measurement of IF passband characteristic is an accurate method of frequency

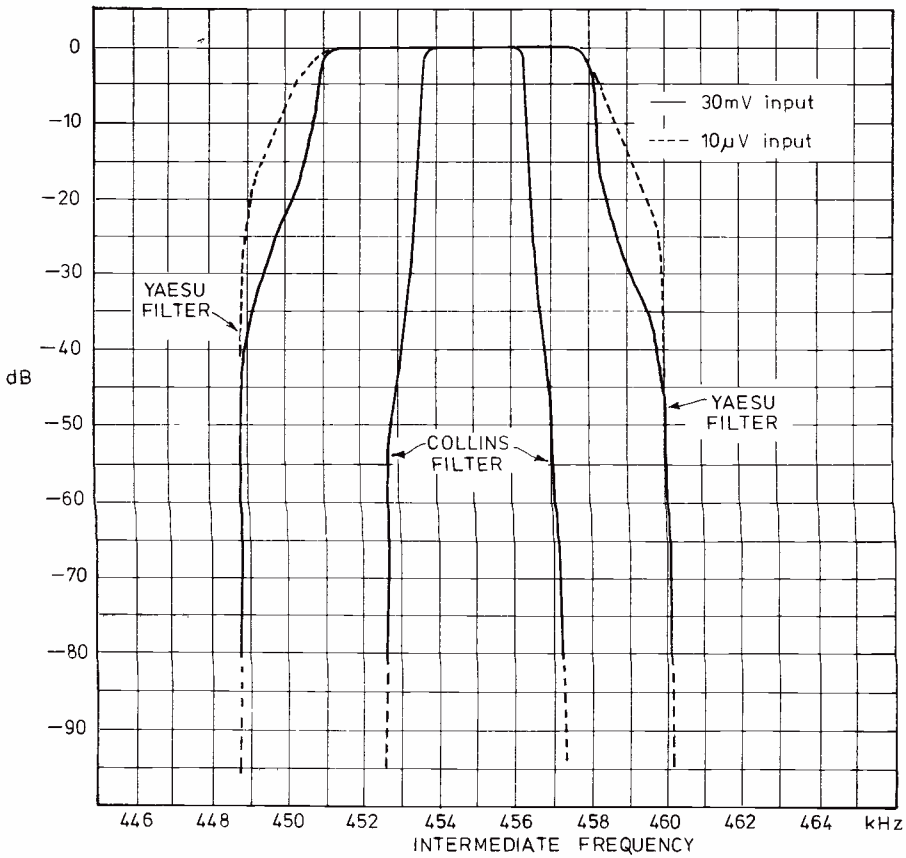


Fig. 3 BANDPASS CHARACTERISTICS OF I.F. FILTERS

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measurement, and this was provided by the *SMC* digital readout now fitted to the FRG-7 which gives readout to 100 Hz. The second requirement is a very stable signal source, which was provided by the 10,878 KHz crystal oscillator of an old fixed tuned converter. The Type 106 signal generator was used to calibrate the S-meter and the attenuator of the FRG-7 at this frequency for the purpose of the test. The curve was of identical shape to that shown in Fig. 2 but displaced downwards by about 15 dB. It was found that at the IF output socket of the converter the 10,878 KHz signal was 32 mV and at the antenna input socket it was 10 μV; by tuning the FRG-7 across the 10,878 KHz signal the curves shown in Fig. 3 were derived. Measurements were made in both selectivity positions at both input levels, and with the 32 mV input the FRG-7 attenuator was used where necessary to avoid the S-meter of the receiver exceeding S9+30 dB. It will be seen from Fig. 3 that the frequency scale has been converted to the actual IF frequency; this required some rather tedious calibration accurate to 100 Hz and a lot of very tedious arithmetic (the precise details of which would be superfluous in this article). The Collins filter was found to be symmetrical about 455 KHz with a 6 dB bandwidth of 2.8 KHz, and a 60 dB bandwidth of 4.2 KHz, giving a shape factor of 1.5, and exactly the same shape of curve was obtained at both input levels. The ceramic filter was centred on 454.3 KHz and the shape of the passband was different for the two levels of input signal, being wider across the top with the weaker signal. Taking the weak signal response, the 6 dB bandwidth was 8.5 KHz and the 60 dB bandwidth 11.3 KHz, giving a shape factor of 1.33. The results on the Collins filter confirmed the superb performance which would be expected from this product. Collins have very kindly provided the following information on a sample batch of 23 filters type F455FD25 which they gave permission to publish:

Parameter	*Average Value*	*Standard Deviation*
Passband ripple	1.24 dB	0.41 dB
3 dB bandwidth	2791 Hz	47 Hz
6 dB bandwidth	2865 Hz	134 Hz
60 dB bandwidth	5634 Hz	73 Hz

The characteristics of the ceramic filter are very good for a filter having a bandwidth of 8.5 KHz; for broadcast band use where 9 KHz channel spacing is used it is ideal, but it is three times too wide for SSB reception.

Reducing the Tuning Rate

In the reception of SSB, re-insertion of the suppressed carrier has to be within about 50 Hz of the correct value if good speech is to be recovered and this means, of course, that the receiver has to be tuned to within 50 Hz. The tuning rate of the FRG-7 on the main tuning knob is more than 100 KHz per knob revolution and a simple calculation shows that the knob has to be set to better than 1/5th of a degree: not an easy task with a 2" diameter tuning control. To overcome this difficulty all but the earliest models of the FRG-7 were fitted with a separate fine tuning control and whilst this improves matters it is not nearly as good as having the main tuning knob geared correctly. A note in *Short Wave Magazine*[4] suggested using a 6-to-1 epicyclic ball reduction drive mounted on the front of an AR88 receiver to get the tuning rate required for SSB, and it was decided to try this on the FRG-7; there was a problem, however, because the shafts and knobs on the FRG-7 are 6 mm diameter, whereas the 6-to-1 reduction drives readily available are 1/4" diameter. The difference is only 0.014" but is enough to prevent knobs fitting.

Epicyclic reduction drives are made with 6 mm. diameter shafts; there are two in the FRG-7, one on the MHz control and one of the Preselector control. It came as a pleasant surprise to find that *Yaesu Musen* actually use British made *Jackson Bros.* components for this application, so it should be possible to obtain them. However, in the writer's case, a 1/4" diameter component was obtained and the brass spindle reduced to 6 mm to take the FRG-7 tuning knob; this was then attached to the front of the receiver as shown in the note on the AR88 previously referred to. The tuning rate was reduced to between 15 and 20 KHz per knob revolution which was considered perfect but the appearance left a lot to be desired. After using the receiver set up this way for several months it was decided to install the reduction drive out of sight on the front panel of the receiver where it is covered by the plastic moulding which frames the tuning scales and S-meter. This was not an easy decision since it meant making changes to the receiver which for all practical purposes were irreversible, but it was concluded that in this case the advantages of the alteration outweighed the arguments against irreversible modifications. (It is not proposed to give precise details, since anyone wanting to tackle this modification should be able to work out how to do it; however, it is worth pointing out that with the reduction drive securely attached to the front panel it is necessary to include a flexible coupling between the reduction drive and the main tuning shaft and the only way to make room for the flexible coupling is to remove the overwind protection device.) Having completed the modification the results are considered to be well worth the effort and the original appearance of the receiver has been restored. However, it must be stressed that this is an irreversible modification and if you have any doubts whatsoever, don't do it.

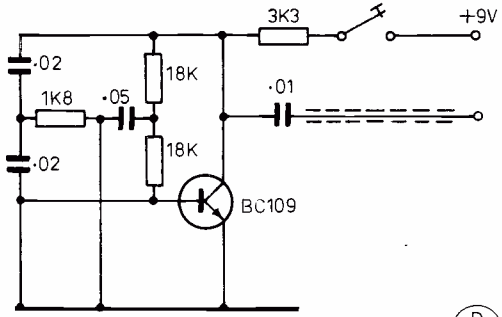

Fig. 4 800Hz Morse practice oscillator

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Using the FRG-7 as an Audio Amplifier

No doubt there are some who would argue that to use the audio stages of a communications receiver as a general purpose audio amplifier is like using the Coronation Coach to deliver coal. In *both* cases the equipment is much more expensive than it needs to be to do the job, and furthermore cheaper equipment designed for the purpose would do the job better! But having said that, it is always useful to have an audio amplifier readily available even if it is not in the hi-fi class and at most QTH's the receiver is normally available for instant use at the flick of a switch. With the FRG-7 audio signals can be fed into the "Record" socket on the front panel and output can be on either phones or speaker. Best results are obtained with the "Mute" terminal on the back panel earthed and with the mode switch in the AM position; both the volume and tone controls are operative. This facility with the FRG-7 has proved useful for amplifying the audio from a low output oscillator used for Morse practice (for which the circuit is shown in Fig. 4); this circuit gives a T9 note at about 800 Hz, the current requirement is only 2 mA and the output is at the correct level for driving the audio stages of the FRG-7.

References

1. "Switched Selectivity for the Yaesu Musen FRG-7 Receiver", by R. Barker, *Short Wave Magazine*, July 1978, pp. 296-301.
2. "The Radio Amateur's Handbook 1977," published by the American Radio Relay League, p. 255.
3. "New IARU Region 1 Operating Standards," *Radio Communication*, December 1978, p. 1072.
4. "SWL — Short Wave Listener Feature," by Justin Cooper, *Short Wave Magazine*, May 1978, p. 173.

October issue will appear on Friday, October 7th

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

PERHAPS, once in a way, we should look at the most important part of the SWL station — the operator. What is it that makes the dedicated SWL reach the top? On the face of it, it is easier to send an SWL report than it is to QSL a contact, if only because the unscrupulous SWL has only to hear a pile-up and listen for a while to know the DX station's call sign; common sense tells him the DX will be dishing out the same sort of reports as he is getting. If he sticks around the frequency and hears the "home" end of several QSOs, he can send an apparently good report without ever having heard the signals of the DX station. So also on the *SWL* HPX Ladder; the chap who moves up the tree fast is either listening for a lot of hours from a good site with good gear and aerial, or he is claiming signals he hasn't actually heard. Where we differ from the DX QSL Manager is that the Ladder appears regularly, and so we can sniff out the wrong 'un fairly easily. Usually he is so anxious to keep his score moving ahead that he fakes his claims to the point where he gives himself away. Usually he has brought the finger of suspicion on himself long before he needs to, for instance by claiming to have heard a DX signal from an expedition without realising that that particular DX-pedition was delayed, or didn't make it, or whatever.

The real, dedicated, SWL is a somewhat different animal. He may reach the top or near it, but his progress is very slow, and he will often comment about how long he had to struggle with the pile-up before he managed to find his man with certainty; but he will still be at the game, one way or another, years later, maybe after a break. The late Arthur Nielson was the last of the originals, in the sense that he had stayed with us all the way from the beginning.

On this theme of continuity, in an issue of *SWM* of some twenty years ago, appeared a list of equipment used by various named SWL's and it was of great interest to this writer to note that, in coming across this issue in his search for something else, quite a high proportion of those listed were still known to be active, or to have been active within the last, say, couple of years. This is in very marked contrast to the other end of the spectrum — the chap who passes RAE and Morse, then buys his first receiver or transceiver, often only to drop right out after a year or so, particularly if he has TVI problems; the reason usually is an inability to work stations at a distance in the manner he has been told about (even Hancock was able to find out the weather in Tokyo!), and the disillusion that follows. In other words, the station is *badly operated.* The savvy SWL who works his way through to the ticket will have heard so much bad operating that he won't follow suit — he grasps the idea that it's the good operator who lifts the DX from under the noses of the bad 'uns, and he noticed *how* it is done while he was still an SWL.

Design

There are, in our sense, essentially two aspects: *Active,* implying the presence of active devices such as valves, transistors or ICs, and *Passive* with which we can lump such things as aerial tuning units, station wiring inter-connections, and other such gadgetry, down to mains leads and plugs. Both are equally important. If the receiver howls its head off with no aerial connected, there isn't much point in fitting a pre-amp or ATU — so both aspects are equally important. However, very often the novice SWL shies off any home-brew bits inside the shack even though he is happy enough to hang up a wire outside and drive an earth spike outside; and in all probability a bit of thought, and a bit of paper, followed by a bit of effort on the kitchen table (or workshop if you are that lucky!) would make the working of the station twice the pleasure.

As an example of what we mean, the Old Man has a boat (which he calls *Short Waves*). Now, with WARC '79 in mind, he has been working out ways and means of stirring-up some interest and activity from the sort of places he visits, which are always more than a little out-of-the-way and hence can yield some interesting WAB squares for the gang to chase. We ran across him a couple of evenings ago, with pint pushed to one side, working out on the back of a cigarette-packet filched from the pub ashtray, ways and means of switching the engine electrical output at AC out to the nav-lights, or feeding them with DC, or feeding DC from the ship's battery out to all the accessories, or charging the battery from the AC, the while keeping AC away from such as the fluorescent cabin lighting. Lots of little toggle switches in a die-cast box, plus a couple of "chocolate-block" twelve-way connectors such as electricians use, about sums it up. Next we saw his ample butt as he dived into the pile of junk which constitutes the Junk Box; he came up with a rotary wafer switch having heavy wipers as all he had that was usable (he *never* buys anything save at club junk sales!). So — a re-design was in order, and a piece of paper was taken and a circuit sketched out. In rather less than an hour the business was at the cutting-of-metal stage; a stand for the *Black & Decker* drill, and one of the same firm's "Workmate" benches was dug out, and — there it was!

Aerials

Need supports. A few words on this topic may be worth while, saving some unnecessary toil, and possibly an injury. Lots of people make lots of effort out of getting a mast up; for one thing, there is a tendency for too many people to get under each other's feet, and for another they are all Chiefs and no Indians. Add to that an ill-prepared plan, and trouble stares you in the face. Sorry to mention 'KFE again, and his old boat, but we recall a covey of G3MWF plus G3KFE plus the junior-op of the latter giving up a mast-erecting exercise as too dangerous. When they were again together — lo! — that mast was stepped and rigged; the Old Feller had done it on his own. What's more, his mast doesn't run to a tabernacle at its foot, but we've seen him drop that mast, sails and all, to shoot a bridge, and re-step it on the far side in not much part of a minute and without loss of steerage way. The trick, believe it or no, is a ten-foot length of rope of fairly hefty section, plus another length which runs about 25 feet and is of much thinner stuff, plus

a few shackles of the 'D' and the carbine type; if you want to be economical, use galvanised 'D' shackles, but for preference all of them should be of the stainless-steel type. Again, the way to provide a fitting on the mast for the guys is to use a boat's masthead fitting, to which you can attach your guys. No-one uses steel or stainless guys for a ham aerial these days, but it is as well to recall a few points about "rope" to avoid disappointments.

Firstly, nylon stretches up to 20% which is fine for resisting shock-loading when towing, but no use for guys. As for polypropylene, it doesn't seem too resistant to chafe and in addition it tends to be slippery. What is needed is pre-stretched terylene in the ordinary three-strand configuration. The plaited ones feel nicer, which is why they are used on boats for sheets, but plaited multi-strand is a pig to splice. Which brings us to the next point. Any rope which is seriously bent or kinked will be crippled and therefore not to be trusted; crippling can occur when you take a rope round a sharp bend, so that half the rope is in tension and the rest in compression at the bend point. The result is that the rope is heated and fused at the stress areas, which gives the rope a rather odd feel in places (of stiffness greater than normal). Inspection will show you that one or more of the strands has turned into a lump of melted-and-cooled terylene at that point, and the rope is not now to be trusted in any situation where failure could be an embarrassment. So, the eye splice is the answer, and rather than a thimble worked in, a piece of plastic garden hose can be embodied by slipping the eye part through it before making the splice to the standing part — and at least *five* tucks of the splice are needed. While you don't have to whip terylene ends (or any synthetic rope) but simply fuse the end to itself with a match or red-hot knife, if you are going to make an eye-splice then you must fuse each strand (or whip it), *before you start splicing*! We don't expect many of you will want to know how to splice a rope, so for the odd exception we refer you to the nearest Boy Scout or sailing type! Meantime, before anyone thinks they're reading *Practical Chandlery,* on to the letters!

Mail

So far, this edition of "SWL" has been rather discursive, largely because we have been sitting waiting for five days while a packet of mail delivered by first class (!) took it's allotted standard time to stagger from Welwyn to your J. C. Rather comically, we had been on the phone on the day the stuff was posted, and noises on both sides were indicating things on the postal front were maybe looking up. Oh, well, hope on!

M. Law (Chesterfield) uses a Joystick with ATU, or a GM3RFR shortened vertical at three metres high, which gear lifted him to 964 in HPX.

Another letter from *K. Kyezor* indicates that the lack of South America is a chronic problem in *Brandon,* with only one PY logged and one station from San Salvador. That seems to have taken any question of time out of it, leaving just the problem of whether it is the aerial or, as would seem possible, the site.

H. M. Graham (Harefield) starts out with a beef about the erratic appearance of *SWM* of late; we ourselves are more than a little browned-off by it all as, despite the printing situation being much improved, we still can't rely on the posts. However with fingers crossed, the Editor reckons all should be well by the October issue — leaving us just the eternal problem of the efficiency of wholesale newsagents. But of course this is something over which, sadly, we have no control (a direct subscription neatly bypasses *this* particular snag from the reader's point of view!). Turning to the bands, Maurice has found the summer doldrums quite a bind as far as 28 MHz goes, with very few W openings and lots of short skip. On the other hand, even to be hearing short-skip stuff is an improvement on nothing! On 7 MHz, EJ4DJ was the IRTS expedition to Aran, an island in Galway Bay.

P. L. Shakespeare (Foulness) seems to have found a hard-working phoney, in a CW 'ZA2BC' who was on 21 MHz all afternoon, and down to 14 MHz in the evening, well operated and even listening 3 KHz up! Odd how our friend Phred Phoney prefers CW of late years. However, with such, the policy is to log them, and find out the QSL route, and either speculate a card or wait until it becomes clear that a card would be wasted. In this case, it is known that a couple of SMs have been trying for an Albanian permit while on holiday — it *might* have been. . . .

E. W. Robinson (Bury St. Edmunds) does some philosophising on the W prefix system; but then he goes on to a very useful bit of news when he says that that HV2VO is known to have QSL-ed. That can't be bad!

Next stop *Worcester,* where *B. F. Hughes* is battling with the problems of re-vamping his filing-system to cope with all the changes of late. Since he has some 1825 prefixes to sort through, he has a sizeable problem!

A very interesting letter from *A. Cuthbert (Jarrow)* details how he manages to remote-tune his receiver; a method which supersedes an earlier attempt involving nylon cord and bobbins fixed to skirting-boards. Now there is a tin-lid attached to the main tuning-control which is driven by a small DC motor. The motor in its turn is driven by way of a rectifier bridge and a variac from the mains, with the speaker leads brought from the receiver in the bedroom down to the hi-fi speaker by the chair downstairs. Next move is a counter to indicate frequency — a tricky one this, as first you have to mix the output of the oscillators in the receiver correctly so as to arrive at the frequency it is looking at, then isolate the signal so generated before feeding it down below in co-ax, to a counter; depending on co-ax loss and the length of the run, a stage or so of amplification may be in order before showing it to the counter. There isn't any question of showing the received signal directly to the counter; what you do is, knowing that the crystal oscillator setting the band, the VFO permitting tuning, and the BFO inserting carrier, are all on the right spots to process the signal, take a whiff off each (in the

ANNUAL HPX LADDER

Starting Date, January 1, 1979

SWL	PREFIXES	SWL	PREFIXES
D. W. Waddell (Herne Bay)	499	C. Stevens (Spondon)	253
S. B. Harris (Coventry)	449	M. Pilsbury (Leyton)	241
G. F. Green (Middlesbrough)	422	Miss J. Ribton (Oxted)	216
P. Ford (Longlevens)	332	B. P. Collinge (Enuqu, Nigeria)	212
P. L. Spindler (Bradford)	324	R. Miller (Chelmsford)	209
F. C. D. Barnes (Cardiff)	288		

200 Prefixes must have been heard for an entry to be made, all since January 1, 1979. See also HPX Rules.

HPX LADDER

(All-Time Post War)

SWL	PREFIXES
PHONE ONLY	
K. Kyezor (Brandon)	2087
B. Hughes (Worcester)	1825
S. Foster (Lincoln)	1735
R. Shilvock (Kingswinford)	1650
J. Fitzgerald (Gt. Missenden)	1610
E. W. Robinson (Bury St. Edmunds)	1519
M. C. P. Bennett (Datchet)	1385
H. A. Londesborough (Swanland)	1381
H. M. Graham (Harefield)	1169
J. H. Sparkes (Trowbridge)	1164
M. Rodgers (Harwood)	1063
P. L. Shakespeare (Foulness)	1025
M. Law (Chesterfield)	1003
D. Taylor (Harborne)	962
M. Ribton (Oxted)	945
J. A. Nicol (S. Croxton)	916
M. Shaw (Huddersfield)	881
K. Linge (Willington)	867
D. Brooks (Loughborough)	837
D. Hill (Crawley)	800
A. Twelves (Rho-on-Sea)	751
L. Stockwell (Grays)	700
P. Leather (Camberley)	669
G. Brazil (Dublin)	635
D. C. Casson (Reading)	619
D. G. Sim (Southampton)	599
J. Doughty (Birmingham)	551
T. Anderson (Stroud)	549
B. Shepherd (Staines)	549
R. Middleton (Bury St. Edmunds)	528
R. C. Mackay (New Romney)	516
B. L. Henderson (Chetnole)	501
Mrs. J. Brooks (Loughborough)	500
CW ONLY	
H. A. Londesborough (Swanland)	1164
D. W. Waddell (Herne Bay)	963
H. Scott (Wetherby)	674
P. L. Shakespeare (Foulness)	775
D. L. Hill (Crawley)	376
K. Kniveton (Kingswinford)	310

Minimum score for an entry: 500 for Phone, 200 for CW. Listings include only recent claims, and are in accordance with HPX Rules. A 'Nil' return is allowable, to hold a place.

right order), mix together, and count the result which must be on the frequency you are tuned to.

From *Chetnole, B. L. Henderson* has sent a letter in which he lists prefixes enough to move him just out of the annual and into the All-Time at 501.

P. L. Spindler (Bradford) was 13 when last he wrote, when he lived in North London; trouble with the receiver and shortage of finance to repair it killed the interest off, or rather changed its direction into Hospital Broadcasting and thence into the broadcasting world. A couple of weeks before his letter, Paul decided to get an RTTY set-up going at home, so he went out and bought a Racal RA-17L. A turn round the dial to see what was changed and what the same (and of course the old Star SR-150 of twelve years ago didn't do as well as the RA-17 on the amateur bands). Result — he's hooked again! Fourteen days after the start, the first 324 prefixes have been heard, and the queries begin: in essence we accept as a Prefix anything that comes in accordance with the Rules. Doubtful ones, usually, are entered and noted with all relevant information, so we can decide what is good or bad, sometimes directly, sometimes after reference to Geoff Watts or one of the other DX Bulletins. We notice Paul fished up one U.S. station on 3.798 MHz, in the form of AD2J. This is fair enough, provided the station is operating within his own band allocations; in the States, Eighty goes right up to 4 MHz, and Forty to 7.3 MHz. On the other hand, they don't have 70 MHz; so the fair rule is to accept any amateur prefix heard operating legally and within the bands it has permission for — clearly a G operating 3.85 MHz would be ineligible. Pirates using amateur call signs also don't count, and of course other occupants of a shared band aren't amateurs anyway!

In answer to *G. F. Green (Middlesbrough)* we don't want to see the QSLs, and the first showing of the new Annual Table is always in May. For the latter, just think it out; the January "SWL" is put together well before Christmas, so it can't carry the final showing for the old year; this must appear in March, which means the first showing of the new year list is in the May issue. Anyway, George has taken the RAE so we expect his interest in being an SWL will be overtaken by an interest in operating!

R. Middleton (Bury St. Edmunds) has a FRG-7000, which he bought for retirement, having been interested in SWL since the fifties, with a progression from a 'Globe King', through Lafayette and Trio to the present. Contact has been made with E. W. Robinson, and they now work as a team on the listening, which is one of the better ways of getting the DX into the log.

On we go, to *D. C. Casson (Earley),* who was quite pleased to switch on the receiver and find 9M2RR without even tuning! Derek has become a member of RSGB, and is hoping, work permitting to develop his radio interest.

Next a most interesting letter from *M. Ribton (Oxted)* who remarks that the new QTH resulted in a question of new three-piece suite or new car — that one was resolved by the XYL, so Mike invites visitors to come in and sit on what might have been a new car! Still, there is still SWL, and the pleasure of watching daughter Julie finding her own interest in the hobby and setting up her own log; Dad soon gave her a "proper" book for the purpose, and she now appears in the list in her own right. Good for Julie! On a different tack, from the new place, reception is good of both the LO and SN repeaters, which means that one of them is being heard by means of the same effect which is noted with light (or knife-edge) diffraction, the light being bent downwards as a result of contact with the top of the hill, or the "knife-edge" — both being electro-magnetic waves.

L. Stockwell (Grays) has been sticking at it, and now has some 700 prefixes logged; he uses a Joystick and an HRO-MX.

B. Collinge (Enuqu, Nigeria) sends a first entry for the Ladder and mentions that as at June 5, the only legal stations were 5NØNAS, 5NØAAM, 5NØAAJ, and 5N1AAE, the first-mentioned being ex-5N2NAS. In essence what has been done is to divide the country into call areas, as is done in some other countries, with the Ø area comprising Lagos state and Abuja the Federal capital, with the rest of the call areas using numbers 1 to 9.

F. C. D. Barnes (Cardiff) has misread the Rules a little, in that he has produced a list of all the stations heard, some 1048 in all; this leaves him, after the mis-hearings and the duplicates have been deleted, with a score of some 288 left to go into the Table. We cannot over-stress that an amateur callsign consists of *two parts,* namely the prefix, which defines nationality and, maybe, location within the country, and the callsign proper.

Others

Thanks to *K. Linge, Willington; D. Taylor, Harborne;* and *D. Hill, Crawley* for their lists, which have been taken in.

Finale

Which is where we give you your deadline for the November issue as September 20, addressed as always to your scribe, "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts, AL6 9EQ.

These two photographs show some of the results of 5 years dedicated collection by one man — C. H. Matthews of the Electrical Engineering Dept. of Edinburgh University. He conceived the idea of a "Museum of Communications" after rescuing a receiver he helped design from a Corporation dust-cart. The museum has examples of equipment and components of all kinds stretching back to 1890, and includes early radar gear and even one of the first 'pace-makers'. Housed in the King's Buildings of the University, the collection is open to the public on Wednesdays from 3.30 to 5.30 p.m.; clubs and groups can arrange special evening visits by telephoning Mr. Matthews, 031-667 1081 ext. 3273. We reckon this museum would be well worth a visit; and since it is not funded, donations of all kinds will be most welcome.

AN EASY IC MODULATOR

F. G. RAYER, T.ENG.(CEI), A.I.E.R.E., G3OGR

For low power or portable operation, AM has the advantage of low building cost, little complication, and simplicity. A single integrated circuit, with associated components, offers a particularly easy method of modulating a low power transmitter, and the circuit in Fig. 1 has been found to give excellent results, and employs the TBA810AS IC.

This IC has an audio output of about 7 watts maximum, and is here operated at about 4 watts maximum. It was found to provide enough gain so that a pre-amplifier was not necessary, when using the customary type of high output crystal microphone.

RF Section

This will be for the band or bands required, and may be VFO or crystal controlled in the usual way. Bands actually worked were 80m. and 10m. TR1 is the driver, and for 80m. L1 can be twenty-three turns of 24 swg wire on a ⅜ in. dia. cored former, tapped at seven turns for the collector; the low priced BFY51 is suitable here. L2 is three turns, on L1; L3 is similar, tapped at six turns, and L4 is five turns, but may be modified to produce suitable coupling and loading of the PA TR2. For the LF bands, an audio type transistor with a high fT, such as the BD139, is suitable for TR2.

The RF section will be adjusted in the usual way, and checked for output, etc. A 2·2w. 14v. MES bulb is suitable as a load for this purpose, and is about 80 ohm, when lit.

Modulator

The board identification in Fig. 1 is for the "Chekit" printed circuit amplifier, which is ready prepared with sink, and allows the IC to be used with a minimum of difficulty. K1 is the microphone input, and K2 the signal ground; the lead to K1 must of course be screened. On the other side, K3 is the positive supply line, K4 the audio output, and K5 the power supply ground.

To match the IC output to the PA in this circuit, a transformer ratio of 1:2 is sufficiently close. As audio output is more than required, some power is dissipated in R2/R3 (This permanent resistor load improves reproduction). At the same time, the resistors R2 and R3 are selected so that roughly one-third of the total secondary audio swing is applied to the driver TR1. This results in adequate modulation of the RF section, with excellent quality.

For other PA stages, the approximate modulating impedance can be calculated from the collector current and voltage, in the usual way, and the transformer ratio can be chosen so that a load of between 4 and 8 ohms will be presented to the IC.

The power unit ought to be able to supply peaks of 1A without voltage drop, but for battery running and slightly reduced power a very useful signal is obtainable with dry batteries.

Drive to TR2, and loading and tuning of L3, are adjusted for best output and modulation, as heard with the station receiver, or phones with a diode and loop coupled to the L4 circuit.

Table of Values

Fig. 1

R1 = 330R, ½w.	C5 = 4700 μF, 20v.
R2 = 33R, 1w.	TR1 = BFY51
R3 = 82R, 1w.	TR2 = BD139
C1 = 390pF	Coils etc. = *see text*
C2 = 20nF	IC amplifier: "Chekits" 75-B
C3 = 10nF	(Chekits Ltd., 56 Fortis Green
C4 = 390pF	Road, London N10 3HN).

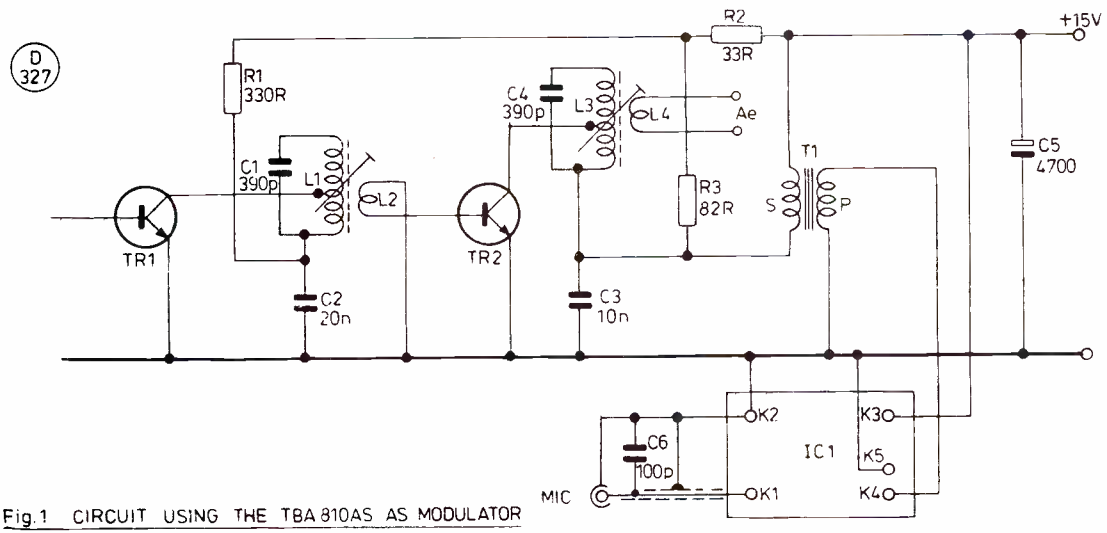


Fig.1 CIRCUIT USING THE TBA 810AS AS MODULATOR

VHF BANDS

NORMAN FITCH, G3FPK

Awards and Tables

INGEBRIGT Lunde, LA3WU, from Bergen in Norway is the first overseas reader to join the QTH Squares Century Club. Certificate No. 5, dated July 30, 1979, has been awarded to him for 2m. operation. LA3WU is a callsign familiar to most DX-ers and it is regularly heard during *Auroral* and tropospheric openings. As might be expected of station at latitude 60° 24″ North, 55% of the squares in the initial 100 were worked *via Ar* mode, all but one on CW. Ingebrigt is a keen MS operator and 27% of the squares listed were worked on this mode. Only 14% of the contacts were on tropo., the rest being *E's*.

Our erratic publishing schedule this year, coupled with the continual postal delays has resulted in fewer entries in the Three Band Annual table than usual. Some of the "regulars" of previous years are missing but it is hoped they will send in their scores if they are active. G4DEZ had to start all over again following his move from Oxfordshire to Essex in mid-July.

As mentioned last month, it is proposed to delete those calls from the squares table whose owners have not reported this year. Since the 23 cm. All-Time table was last published, there have been some additions so it is included this month. It is hoped to publish this table more regularly now.

Beacon Notes

GB3SU (ZN61a) on 70.695 MHz now boasts a new solid-state Tx giving 20 watts output and which replaces the old valve Tx which has been in use hitherto. On 2 m, the Ulster beacon GB3GI (XO41j) is now on its new frequency of 144.945 MHz. The 3 cm beacon GB3LBH (AL31c) was taken out of service on July 10 until further notice. It will be recommissioned later from a new site.

Brian Bower, G3COJ, sent along his regular U.K. Beacon status list dated July from which it is noted that 2 m beacons GB3ANG and GB3LER; 70 cm beacon GB3SUT, 23 cm one GB3IOW and 3 cm one GB3IOW are all listed as "temporarily QRT". Brian mentions hearing a new French 70 cm beacon recently on 432.83 MHz approx., sending, "FX1UHF BI21b report to F1KBS," but he has no further news at present.

From the GB2RS News Bulletin of August 12, it was learned that the 2 m, 4 m and 6 m Gibraltar beacons, ZB2VHF, went QRT on August 1 for resiting and/or rebuilding.

Contests

Result; The 144 MHz Portable Contest run on May 26/27 was won by the G4BPO team with 7952 points from 643 contacts. Second place went to GW8BHH, 7210 (624) and the GW6UQ team came third, 6642 (584). G3ZIG and G6UW were respectively fourth and fifth.

Coming events; The 11th BARTG VHF/UHF Contest is scheduled for 1800-2300 on Sept. 8 and the second leg is 0700-1200 on the 16th. This is for 144 and 432 MHz but no cross-band, repeater or satellite QSO's. The weekend Sept. 8/9 sees the International ATV Activity Contest from 1800-1200 on 432 MHz, 1.3 and 10 GHz. The 144.75 MHz 'phone calling QRG may be used to initiate QSO's. Scoring for two-way QSO's only at 2 pts/km on 432 MHz; 8 pts/km on 1.3 GHz and 16 pts/km on 10 GHz.

Sept. 16 from 0900-1700 is when the RSGB Region 1 Contest takes place on 70 MHz, 144 MHz, 432 MHz and 1.3 GHz. Entrants can choose any three from those four. This is a two section affair comprising either multi-operator or single operator categories. Complicated scoring system too long to record here. Region 1 comprises Cheshire, Cumbria, Greater Manchester, the Isle of Man, Lancashire and Merseyside, by the way.

Sept. 22 from 1900-2300 sees the German AGCW CW Contest on 2 m. There are three classes; "A" = less 3½ watts output: B = less than 25 watts output and "C" more than 25 watts output. Exchanges to consist of RST, serial number, class and QTH locator, *e.g.* 579001/B/EL25a. Complicated scoring system with multipliers. The final legs of the 10 GHz and Microwave Cumulative Contests are scheduled for Sept. 23 from 0900-2000, the latter being a 2.3 GHz affair.

The weekend Oct. 6/7 is devoted to the IARU Region 1 UHF/SHF Contest coinciding with the RSGB's 432/1296/2304 MHz event from 1600-1600. One point/km in the IARU event and only report/serial number plus locator need be exchanged. All the above times are GMT.

The Satellite Scene

AMSAT's *Oscar 7* and *8* continue to function but *0-7's* half battery voltage is very low now so it is surprising its transponders work so well still. *0-8* crosses the Equator well ahead of the times printed in the AMSAT-UK calendar and the best way to get the latest information is to listen in on the 80m net on Sunday mornings from 1015 local time around 3780 kHz G3RWL in North London is net control and AMSAT-UK secretary Ron Broadbent, G3AAJ, is usually on, too.

Ron has supplied a Progress Report from the University of Surrey on *UOSAT,* the British Amateur Satellite Project, from which it seems that a launch opportunity will now occur in August, 1981. What the "bird" will *not* incorporate are transponders; instead there will be some interesting experimental packages including SS/TV, a magnetometer, radiation detectors, HF band beacons on 7, 14, 21 and 28 MHz, synthesized speech telemetry, microcomputer control of the "housekeeping", power command and TLM facilities, engineering/data beacons on 2 m and 70 cm, and 1.3/10 GHz beacons, if possible after WARC 1979. UOS was having difficulty in finding a suitable, second, full-time engineer to work on the project. Someone with practical ability was sought, details from Martin Sweeting, G3YJO, Dept. of Engineering, University of Surrey, Guildford, Surrey GU2 5XH.

As far as can be ascertained, the two Russian satellites *RS-1* and *RS-2* will not be available to transpond amateur signals anymore, not that either was ever much use. It seems that *RS-2* may be switched on to TLM mode when over Moscow, occasionally.

Four Metres

"A few lines re 70 MHz, for a plea for more activity on a sadly neglected band." That is how John Baker, GW3MHW (Dyfed), starts his letter. He has been on 4 m from various locations since 1960 and advises he is QRV again on SSB from his Dyfed QTH and on AM from the *Call Book* one in Powys. John hopes, ". . . we have seen the finish of B44 and radio taxi 'phones." He plans to try four 6-ele. *Quads* stacked and phased in Dyfed; half wave ones at that. When in Dyfed, the QTH is 8 km NW of Tregaron — which your scribe calculates as XM60d — and John proposes to put out a CQ call nightly at 2200 GMT on 70.205 MHz. As all signals are weak and fluttery, only CW and SSB is feasible. During VHF NFD, signals were of a good standard, only two having FM on them. However, some distant stations seemed to have deaf Rx's, like the GI4 who was a genuine S9 but who did not respond to persistent calls. John wonders why most all the activity seems concentrated between 70.15 and 70.3 MHz, when the band is 700 kHz wide. He is pleased to note a considerable swing to SSB which he and G3FDW and a few others were using ten years ago.

Syd Harden, G2AXI (Hants.), reports ZB2VHF on 70.262 MHz, at S9 on July 6 at 1730 GMT. The Gibraltar beacon fading out at 1930. GW3MHW copied it earlier that day. Syd made numerous A1 calls ZB2-wards on '262 and '200 but to no avail. NFD weekend gave G2AXI 19 new 1979 counties for the table and the Telford club lad's foray into Wales produced another four, thanks to GW3UKV/P. Frank Howe, G3FIJ, (Essex) used NFD to notch up 24 counties and worked GW3UKV/P in five Welsh ones between July 26 and 30.

Alan Scott, G4BYP, is now well installed in the new Cheshire QTH but at present is only using indoor aerials. A makeshift dipole was made for NFD resulting in 28 counties and four countries for the table. Recently, Ray Elliott, G4ERX, (Essex) has been concentrating on 4 m and stayed home for NFD weekend. The reward was 11 all-time new counties and one all-time new country towards the goal of his Senior RSGB award. In all, 52 stations were worked in rare counties such as Gwynedd, Durham and Somerset. Ray worked GW3UKV/P in all the six counties they visited, and would welcome skeds with stations in Avon, Wilts., Cheshire, Lancs., Cleveland, GJ and any Scottish Region.

David Thorpe, G4FKI, (Essex) also heard the ZB2VHF beacon on July 6 on his 3-ele. *Yagi*. Time was 1845 and it was S9-plus. "By pure luck" the 4 m transverter was finished on the eve of NFD. Operating portable from AL21a, Dave had 79 QSO's, the best being with GM3WOJ/P. Arthur Breese, GD2HDZ, used NFD weekend to good effect adding 17 new 1979 counties and GI to his band total. He was using the Millenium "GT" prefix but expresses surprise at receiving no requests for QSL's. During a weak *Aurora* on June 22, George Szymanski, GM4COK, (Edinburgh) worked G6WR in YO square, on CW.

THREE BAND ANNUAL VHF TABLE
January to December 1979

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	TOTAL Points
G2AXI	47	5	55	13	41	5	166
GD2HDZ	41	5	49	14	38	5	152
G3FIJ	46	4	54	11	20	3	138
G3CO	41	4	47	10	22	4	128
G4ERX	45	5	30	8	26	6	120
G8LHT	—	—	66	19	28	7	120
G3SPJ	30	3	47	6	25	2	113
G80PR	—	—	66	13	28	5	112
G8KGF	—	—	57	15	33	3	108
GI8EWM	—	—	63	8	20	6	97
G3KPU	—	—	54	6	28	4	92
G3FPK	—	—	72	19	—	—	91
G4BYP	28	4	38	8	10	2	90
G4ERG	—	—	66	24	—	—	90
GM4COK	3	2	58	22	1	1	87
G8IFT	—	—	47	28	8	3	86
G8KAX	—	—	38	7	28	7	80
G4IGO	—	—	60	18	—	—	78
G8ITS	—	—	40	6	25	4	75
G4FBK	—	—	49	16	—	—	65
GM4CXP	6	2	37	12	1	1	59
G4GHA	—	—	39	17	—	—	56
G4AEZ	—	—	27	10	13	4	54
G4GXT	—	—	38	7	—	—	45
G4DEZ	—	—	35	8	—	—	43
G4HAO	—	—	36	6	—	—	42
G8JGK	—	—	23	5	—	—	28
G4FKI	6	1	6	1	4	2	20

Two Metres

"The joker has been on again in July using SV1AB's call on the 10th and 11th, so beware of reports from N.E. England on these dates." Thus advises *s.w.l.* Mike Allmark from Leeds, who then goes on to list some nice, genuine *E's* stations heard in the grand opening of June 28. He switched on at 1554 and promptly heard four 14's in FE and GE squares, 9H1CD (HV03e), three IT9's in GY and HX, 17HVP (IB74c) and YU2RQG (HE77h) until 1715. At

1934 the path to YU re-opened with stations in HE, HF and HG squares copied, plus YT9MI (ID 33f) and DD4DZ/YU2, the latter working an I4 and apparently unaware of the *E's* opening. Final fade-out was at 1950. On July 12, Mike reports good ducting *via* tropo. into the Bremen and Hamburg areas. From 2120 on the 17th, Icelandic TV on channels E3 and E4 was copied, the signals being quite strong and possibly propagated via *Auroral E*? On June 30, he noted *E's* reception of Norwegian Band I TV from Varanger (PD21f); Kantokieno (LD68h) and Hadsel (HB35e). All were very strong.

In a letter listing the Summer's events, G2AXI reports working his first Italian on 2 m in 19 years on May 29. The June 28 affair produced a contact with YT9MI. At 1630, a few seconds burst from an SP9 was heard and an LB2? likewise at 1720. Roger Thorn, G3CHN, (Devon) only worked three Spanish stations during their contest on Aug. 4/5; EE1EH (YC); ED1ECO (WD) and EA2BK (ZC). Note those new prefixes. Roger says that most EA's seem to be using vertical aerials and is sure that, if they turned them horizontal, many would be able to work into the U.K. quite often over Biscay.

Bob Lane, G4AWU, (S. Yorks.) was in on the *E's* event on June 28 and contacted I4GBZ (FE10f); 9H1CD; IT9ZGY; IT9PLT (HX77h); 17HVP; YU3ER (HG63d); YU2CMS (IG); YU3DJD (HF08j); YT9MI and YU2RQG. G4ERX worked EA1CR (XD32d) for his first EA on 2 m on June 20. Ray was the winner of the Barking club's 2 m contest on March 25 with 3535 pts, by the way.

Jon Dougherty, G4FUT, (Tyne & Wear) mentions an *Ar* event on June 22 when he worked SM4GGC (GT80c) at 1725, OY5NS (WW77f) 10 mins later and GM4GUQ (XR40d) at 1810. *Ar* signals faded out at 1827 and no *Doppler* shift was noted. Later, LA6HL mentioned that DM stations were working into UA3 in this one. Jon did not copy *Ar* signals from any beacons. He was in on the *Ar* of July 26/27 which started at 2335 with LA3WU (CU47a) and ended at 0200. This produced four LA's, eight SM's and a PA. The only beacon positively identified was SK4MPI but there was a constant, unkeyed carrier on 144.134 MHz. Now get this! Some weeks ago a couple of sea gulls went into "an amorous embrace" on the driven element of Jon's 6-ele. *Quad* and bent it so badly that he has now replaced the thing by two 9-ele. *Yagis* at 35 ft. The *Quad* was tilted at 10° elevation which enabled G4FUT to work the "higher" *Auroras* when others could not hear any Ar *signals*. Jon suggests tilting a beam is beneficial anyway as it enables one's signal to get into a tropo. duct that much sooner, thus suffering less attenuation on the way into it. He plans to evaluate the performance of the two stacked *Yagis* in this respect.

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3POI	—	—	275	275
14EAT	—	25	238	263
G8HVY	12	73	130	215
G3JXN	34	70	93	197
G31MV	—	—	197	197
DK3UZ	—	—	191	191
G8LEF	22	61	101	184
G8GML	11	63	106	180
GJ4ICD	—	47	133	180
G3CHN	—	—	179	179
G3SEK	—	—	179	179
G3COJ	24	66	84	174
9H1BT	—	11	163	174
G4CMV	—	30	140	170
GM4CXP	—	25	134	159
G3FPK	—	—	157	157
G2AXI	2	53	93	148
G4BWG	—	29	118	147
GM4COK	—	12	135	147
GJ8KNV	—	34	112	146
G30HC	4	33	104	141
9H1CD	—	13	127	140
G41JW	1	30	108	139
G8LHT	3	37	93	133
G3XCS	—	21	111	132
G8HHI	—	30	101	131
G8ATK	—	38	91	129
G4HYD	—	40	83	123
G3BW	3	25	91	119
G4ERG	—	—	119	119
GD2HDZ	11	34	73	118
G4FCD	—	22	89	111
G3VYF	—	—	111	111
G3KPU	—	21	84	105
G4DKX	5	30	68	103
G4AWU	—	1	102	103
G4ERX	1	32	69	102
G4IGO	—	—	102	102
G8KGF	—	16	85	101
G4FBK	—	5	94	99
G8LGL	—	12	84	96
GM8NCM	—	12	84	96
G8IFT	7	18	68	93
G3FIJ	—	27	66	93
G4AEZ	3	28	61	92
GJ3RAX	1	24	67	92
G3SPJ	5	21	63	89
G4GEE	—	28	60	88
G8KAX	—	29	59	88
G8GII	—	22	63	85
G6UW	—	—	85	85
GI8EWM	—	21	62	83
9HIC	—	—	83	83
G8EOP	8	36	38	82
G8KPL	—	7	74	81
G8JAG	—	7	73	80
G8JHX	—	—	80	80
G8JJR	—	—	79	79
G8KSP	—	2	76	78
G8ITS	—	16	56	72
G8MFJ	—	11	61	72
G4GET	—	—	70	70
G8LFJ	—	—	69	69
GD3YEO	—	8	59	67
G8KUC	—	7	60	67
G4GVB	—	1	62	63
G8OPR	—	13	49	62
G4CIK	—	—	62	62
G4GCQ	—	—	61	61
G4GHA	—	—	58	58
G4IJF	—	—	58	58
GW4FJK	—	—	57	57
G4GSA	—	1	48	49
G4GXT	—	—	43	43
G8JGK	—	—	42	42
G4EYL	—	—	41	41
G4DEZ	—	—	30	30
G8PRG	—	—	15	15

Starting Date January 1, 1975. No satellite or repeater QSO's.

Bob Nash, G4GEE, (Coventry) has missed most of the activity this year but did work some useful DX in the NFD weekend, noting consistently good signals from GM from XO, YP and YQ squares, plus G4AAX/P in Northumberland for an all-time "first" with the county. John Cleaton, G4GHA, (Dorset) now has a 100 watts amplifier on the end of his *Trio* TS-700S and has been in on six E's openings this year. By the way John, IT9 is *not* counted as a separate DXCC country, but is counted as Italy. However, IS0 *does* count as another country. June 28 was a notable day for new correspondent Brian Osborne, G4HWU, (Blackpool) for a confirmed contact with YU3ER during the *E's* opening. This was near the end, at 1946. Brian was using a *Trio* TR-7010 at 8 watts to a loft-mounted, home-made 6-ele. *ZL-Special,* 25 ft. *a.g.l.*

Ken Osborne from Bistol, is now G4IGO (ex-G8KSS) and his first QSO with the new call was on May 21 with YU4VIP (JD12c). On June 28, in about 45 mins he worked six IT9's, 9H1CD, 9H1CE and YU2RSD (HF64c) up to 1514. At 1858, YU2RQG and at 1943 HG1YA (IH63b) were worked with LZ2CBI, OE6BGG (HH78h) and a couple more YU's heard in the last phase. Main inspiration for Ken's getting the G4 licence was to get in on CW MS.

Graham Taylor, G8HVY, (Dorset) was another reader who took full advantage of the June 28 *E's* working no less than 18 Sicilian stations, plus five 9H1's. Other successes included Capri stations IC8EGO and 'EJG (HA); 18CYF (IY); YT9MI; OK2PGM (IJ); IS0PDQ (EZ) and F0HI/FC (EB). Dave Gregory, G8JDX, (Plymouth) sent in *E's* lists from May 21 to date and remarks upon the very selective nature of *E's* reception whereby stations only 25 kms away are working stuff he cannot hear and *vice versa.* The June 28 event ended at 1939 after hearing a couple of HG stations. However, Dave reports hearing two I0's having a local natter at *2146.* He writes:— "They heard me, paused, then continued, unbelieving!" He makes two interesting observations; first, his take-off to the southeast is *extremely* poor but nevertheless, he gets strong reception of *E's* signals suggesting that these come in "from above." Good news for valley dwellers! Second, during all *E's* openings, local stations within a 50 kms radius drop right down into the noise returning to normal at the end of the opening.

TWENTY-THREE CENTIMETRE ALL-TIME TABLE

Station	Counties	Countries	Total
G3JXN	35	9	44
G3DAH	36	8	44
G3NHE	24	5	29
G6NB	22	6	28
G3COJ	19	8	27
G4ALN	20	5	25
G3JVL	21	4	25
G3OBD	20	3	23
G8LEF	16	6	22
G8ARM	20	2	22
GD2HDZ	15	6	21
G8GML	17	4	21
G8EOP	11	5	16
G8IFT	11	4	15
G5DF	13	1	14
G8AOD	11	2	13
G8FMK	12	1	13
G8AII	7	2	9
G4DKX	7	2	9
G30HC	8	1	9
G3BW	3	5	8
G8ABH	7	1	8
G8FJG	7	1	8
G8LHT	6	1	7
G8GNZ	4	2	6
G2AXI	5	1	6

Chris Baker, G8JGK, (Essex) has added the "wet" square BN to his total thanks to PA0ULY/A (BN80d) on a gas platform. The QSO was on June 3 on 145.55 MHz FM. Operator Hermann runs 10 watts to a 5-ele. aerial at 40 metres *a.s.l.* On SSB, Chris now uses a *Yaesu* FT-101 driving a *Magnum 2* transverter to a 6-ele. *Quad,* plus *G3LLL* speech clipper. Paul Broadhurst, G8LGL, (Avon) is away from home much of the time so has missed most of the *E's* affairs apart from the latter end of the June 28 event when, over a three minute period from 1942, he contacted YU1QEO (KF77a); YU1BCX (KF44f); HG8CH and HG1YA (IH63b). Earlier, on June 18/19, he worked some nice DX down the west coast of France, plus EA1CR in XD.

Ian Harwood, G8LHT, (S. Yorks.) is another who mentions the idiot in the area "borrowing" DX calls during *Es* openings, so is not yet counting a QSO with SV1AB. He also does a lot of TV DX-ing on Band I and has seen pictures this year from CT, HB, I, HG, LA, OE, OK, SM, TF, UA, YO and YU and writes: ". . . at least I know none of these are fakes!" George Gullis, G8MFJ, (Wilts.) when sending in his latest squares totals, mentions he now runs a *Mizuho* SB-2m into a *Nag* 144XL amplifier and 9-ele. *Yagi.*

GD2HDZ is delighted not to have missed the *E's* of June 28. The first station heard was a 9H1 whom Arthur called without switching on the PA HT. "Not surprisingly he did not come back to me!" he writes. Unfortunately the Maltese has not found again but Arthur did work three YU's and three Italians, including an IT9. Geoff Brown, GJ4ICD, continues to pile up a big squares score. During the June 28 *E's* fun he worked five new ones, IT9XIX (HX16j); IT9AJH (HY68c); F0HI/FC (EB14c); YU1NXA (KF77a] and HG8QB (KG16g) and is claiming the FC and HG as "firsts" for Jersey. NFD yielded EI1AA/P in WN and E12VQL in VL, while July 28 brought F1AVG/P in BC21c. Phil Johnson, GJ8KNV, also worked the FC on June 28, plus 12 IT9's, 3 9H1's, and 4 I's. During NFD, Phil worked portables in WN, WO and XO squares, ". . . and all the usual stations."

GM4COK has been busy on MS and during July George completed skeds with SM2BYC (MZ); YU3UAN (GF); DK5RQ (GI); YU3TCD (GF); I6WJB (HC); SM2AZH (KY); DK2DO (EK); PE0IPP (CN); I3LGP (GF) and OH3AWH (LV). The *Ar* of July 27 produced eight SM's, one German and one Dutch station. The SM's peaked at QTF 340° and the following beacons were heard: DL0PR, GB3's CTC, GI, NEE and VHF and SK4MPI. In the June 28 *E's* George connected with 15LOO and 'MZY (FD); I0CEP and ZMZ (GB); IW0AIO (GB) and YT9MI.

Some interesting QSO's came the way of your scribe in the past four weeks with EI2CA/P (WN69b) on July 11 and GM8AGU/P in XO18c, XQ80e and XQ62h. On the 23rd, GU5CXM (alias DF3XH) was worked

in Sark which is rather a rarity these days on 2 m SSB. The Telford group, GW8JZH/P provided the missing 1979 county of West Glamorgan on the 29th. Another German visitor, DF1ZE, was worked on CW on the 28th as GW5CZJ/P from XM square. On the 27th and 28th, conditions down western France were quite good with stations in the D and C squares coming through. On Aug. 8, Eric Grosssmith was worked as GM3WOH/P on Islay (WP30f) and later on that evening, G5DAA (alias ON6UG) in the Scillies (WJ).

Seventy Centimetres

The GB2RS news bulletin on July 29 carried news of a 2550 *miles* tropo. QSO between WB6NNT in California and KH6HME in Hawaii, a new World record QRB for this mode.

During NFD weekend, Mike Allmark heard some good DX, such as GJ4ICD/P and many GW and GM portables. He heard GM8AGU/P from most all the regions and squares activated. On July 12 Mike copied DC1HV (FN31d); DC9DX (FN53f); DB2BZ (EM04a); SM6HYG (FS58f); DB2BP (EN) and DC1XC (FN31a). A Swedish TV station on Ch. 43 at Karlstad was also seen, a QRB of 1100 kms.

For G2AXI, NFD provided 15 more 1979 counties plus GJ. It enabled G3FIJ to add five plus one, too, with GW8FSV/P in Gwent on the 26th for good measure. G4FKI now has 10 watts of SSB on the band so should improve his present score soon. G8LGL has been QRV since April with 400 watts output from a pair of 4CX250B's in a cavity amplifier. The present aerial is an 18-ele. *Parabeam* with something more gainy in mind. On July 7, Paul worked F6CTT (ZH04j) who was using *sixteen* 21-ele. *Yagis*! G8LGL complains of the low level of activity outside of contests and wonders where everybody gets to. He would be pleased to make skeds with anyone on the band.

GD2HDZ managed eight counties plus GM in NFD but had not even heard a single continental on 70 cms for six months! Steven Ruff, GI 8EWM, (Antrim) added 8 counties plus one more country during NFD. For GJ4ICD, NFD weekend brought another 8 squares in G and PA. Later in the month, Geoff added AI, BC, BE and ZC, the last being F6CIS/M, to bring the band total to 47.

Gigahertz Bands

G4ERX's main 23 cm activity has been —/P from Dartmoor with the *Hadrabs Contest Group,* from whence 12 counties and 3 countries have been worked. The group will be there again for the October contest with high power and four *Quad Loop* aerials: Devon seekers please note! Thanks to G3SPJ/P in Co. Durham, GD2HDZ added one point to his all-time total on 23 cms.

On June 17, GJ8KNV worked F6DLA/P on 10 GHz FM for the first GJ/F QSO on 3 cm over a 52 kms path.

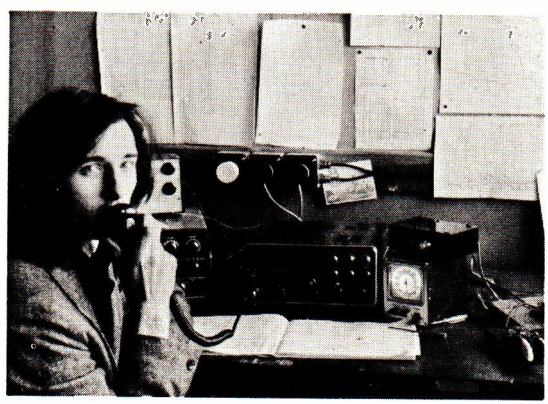
Overseas News

Edmund Ramm, DK3UZ, (EN20c) writes: "So far this year, *E's* has been a nearly total loss without insurance!" IT9ZHA (GX) on June 27 was his only new square. They have a landline alert network in the Hamburg area but Eddi advises that, when an opening to the east happens, one needs AM to work the UB5's, etc., as they can copy neither CW nor SSB. He mentions another gas platform operator, Franz, PA0CCN/A (BN67h) with 20 watts to an HB9CV aerial. On the MS topic, Eddi advises against the use of very narrow beamwidth aerial arrays which is why he uses an 8/8/8/8 stacked job. He writes: "I am finally off linears comprising tetrodes and now have a single 8874 which will deliver 450 watts on SSB." His DXCC country score is now 40.

From G3CHN comes news that Gérard Le Falchier, F1COF, (XI48f) worked six stations in the Canary Islands *via E's* on July 26 between 1700 and 2327 GMT, including EA8LC/M who was using a five-eighths wavelength whip aerial! EA8AK was the only one using SSB over the 2440 kms path to RO square.

Fausto Minardi, I4EAT, (FE60e) is now QRV only on 2 m and reckons he is the only amateur to have worked *all* types of propagation; *i.e.* tropo., *E's, Ar,* MS, EME and TEP/FAI. He intriguingly mentions: "We have also discovered a new type of VHF propagation; it seems to depend upon the *E's* phenomenon but with a different characteristic."

Writing about the ZS3B QSO, Fausto received the ZS3B beacon on 144.120 MHz on March 30 from 1840 to 1905, ". . . very strong, about S3/4 without QSB. The signal was absolutely the same as an *Auroral* one." Unfortunately, ZS3B was not QRV so no QSO took place. At 1850 GMT on March 31, I4EAT again copied the beacon, called ZS3B on 10 metres, then ZS3B immediately copied Fausto's report to him of RST 444. However, when I4EAT listened for the ZS, the signal was going down and he only copied "42" so they did not feel that a proper QSO had been made. However, subsequent correspondence with other TEP folk, *e.g.* 5B4AZ, 5B4WR, ZE2JV, has revealed that, because signals are usually very *Ar,* they do not bother to send a tone report but use a special TEP reporting system: T1, meaning



P. S. Lindsay, G4CLA, operating Nottingham University Radio Society's station, G3UNU. Left to right: TS-820, Europa 2 m transverter, TS-700DX and the rotator controller.

very weak, partial copy; T2 denoting weak copy but all received and T3 confirming good signal with easy copy. Therefore, Nik Kyriazis, 5B4AZ, says it was a QSO by their standards so Fausto and ZS3B should claim a new world record for TEP of 7700 kms on 144 MHz. Your scribe fully agrees, so this brings I4EAT to 51 countries on the band.

Fausto makes the point that this type of TEP is a sunset related event so it is worth mentioning that the sunset for a possible G or F path to ZS3 would come about 1½ hours later than for an SV/5B4 to ZE/ZS path.

During the *E's* event on June 28, I4EAT operated from 1355 to 1610 working 6 EA's on SSB in AB, BB and ZB squares and a further 9 on FM in XA, XB, ZB and ZC, plus UB5JIN (RE01f) on SSB. Fausto believes that the CT1WW/OD5MR, 4000 kms. *E's* contact that day was double hop as there was propagation at the time from southern Italy to both Portugal and the Lebanon.

G4FUT passed along some news about the recent Irish Republic operation by three Dutch amateurs. The team concluded 14 MS QSO's; 9 PA; 3 DL; 1 OZ and 1 SM. Via *E's* on July 8 at 1830, they worked YU3TCD (GF39d). Operation was from VL34e and the team consisted of PA0LSC, PA0SWS and PE1BZH who held the respective reciprocal calls, E12's VQL, 'VQM and 'VQN.

Late News

As always seems to happen when your scribe is writing this piece, some kind of lift, etc. occurs. This time it was an *Aurora* which probably started around 1630 and fizzled out at 1808 GMT on Aug. 13. At G3FPK, GM3JIJ (WS69c) was the most consistent signal, and SM4GGC (GT80c) was good, the latter at QTF 345° — the SM4 phenomenon again. *Perseids* news will have to wait till next month.

Finale

Another interesting period with a lot of welcome letters and reports. Keep them coming. Everything for the October issue by Sept. 5 please and for November by October 3, to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. *73 de G3FPK.*

NEW QTH's

This space is for the publication of the addresses of holders of new callsigns, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code. In the case of direct subscribers needing Change of Address, please state for card index adjustment. Address items for this space to: "New QTH Page," *SHORT WAVE MAGAZINE, 34 HIGH STREET, WELWYN, HERTS., AL6 9EQ.*

EI4DM, M. F. Fogarty, 167 Battery Heights, Athlone, Co. Westmeath.
G3DKO, J. W. Stevenson, 52 Trulock Court, Tottenham, London N17 0PE.
G3IOU, G. W. Allen, 61 Southwood Avenue, Coombe Dingle, Bristol BS9 2QN.
GW3NYY, W. A. F. Davidson. *pse QSL via GM3NYY.*
G4HIJ, R. C. Woolley (ex-G8LYZ), 29 Belle Vue Road, Ashbourne, Derbyshire DE6 1AT.
GJ4HSW, F. Le Quesne, Brookhill House, Prince's Tower Road, St. Saviour.
GW4HXO, M. J. Probert (ex-GW8AWR), Ynys Dawel, Solva, Haverfordwest, Dyfed SA62 6UA. *(Tel: Solva 491.)*
G4HZN, T. Lockwood (ex-G8CUI), 8 St. Nicholas Road, Thorne, Doncaster, South Yorkshire DN8 5BS.
G4IAQ, Mrs. Judith Brooks, 28 Avon Vale Road, Loughborough, Leics. LE11 2AA. *(Tel: Loughborough 217655.)*
G4IAR, D. R. Brooks, 28 Avon Vale Road, Loughborough, Leics. LE11 2AA. *(Tel: Loughborough 217655.)*
GI4IBD, K. A. Fillmore, 26 Mosside Road, Derriaghy, Dunmurry, Belfast. BT17 9HQ. *(Tel: Belfast 621148.)*
G4ICC, M. J. E. Gater (ex-G8OXB), 268 Main Road, New Duston, Northampton NN5 6PP. *(Tel: Northampton 52601.)*
G4IFB, G. T. Hinson, 72 Sandy Lane, Cheam, Surrey SM2 7EP.
G4IGY, G. L. Southwell (ex-G8PJY), Mill House, Atwick Road, Hornsea, North Humberside HU18 1DZ. *(Tel: 04012-2874/3331.)*
GD4IHA, E. R. Robson (ex-GD8CFA), 13 King Edward Park, Onchan.
GD4IHB, J. Whitmore, "Glion Darragh", Ballacurry Road, Greeba, St. John's.
GD4IHC, R. H. Furness (ex-GD8NZT), "Breryk", Windsor Road, Ramsey.
G4IHF, E. Fielding (ex-G8MZM), "The Hawthorns", 12 Moorland Avenue, Bagslate, Rochdale, Greater Manchester OL11 5XS. *(Tel: Rochdale (0706) 40877.)*
GM4IIR, A. R. Nelson, Chapland Cottages, Bellefield Road, Lanark ML11 7RH. *(Tel: 0555-2737.)*
G4IJG, J. R. Owen, 75 Merseybank Avenue, Chorlton, Manchester M21 2NW.
G8PPR, D. G. Bancroft, 4 High Fernley Court, Wyke, Bradford, West Yorkshire BD12 8AN. *(Tel: 0274-674396.)*
G8PQM, P. Tregear, 106 Sea Lane, Ferring, West Sussex BN12 5HB.
G8RTM, D. Patton, "Innisfree", 33-C Carr Road, Deepcar, Sheffield S30 5PQ. *(Tel: 0742-884345.)*
GW8RZU, P. Long, "Arfryn", Upper Baptist Street, Holyhead, Anglesey, Gwynedd LL65 1SH.
GW8SBM, Mrs. P. K. Kemp, "Poldhu", 259 Delffordd, Rhos, Pontardawe, Swansea, West Glamorgan SA8 3EP.
GW8SBN, J. T. Kemp, "Poldhu", 259 Delffordd, Rhos, Pontardawe, Swansea, West Glamorgan SA8 3EP.
G8SDD, A. A. Austin, 15 Brockholme Road, Mossley Hill, Liverpool, Lancs. L18 4QG.
G8SEP, L. B. Bailey, 2 Bromleyhill Close, Nunthorpe, Middlesbrough, Cleveland TS7 0LY. *(Tel: 0642-311309.)*
G8SGJ, B. Pashley (ex-G6PJ), 15 Annesley Road, Greenhill, Sheffield, South Yorkshire S8 7SB. *(Tel: 0742-740185.)*
G8SJH, N. M. Lister, 80 Sarum Hill, Basingstoke, Hants. RG21 1ST. *(Tel: 0256-67338.)*
G8SNS, R. J. Martin, 4 East Elloe Avenue, Holbeach, Spalding, Lincs. PE12 7NB.
G8SOR, S. P. Richardson, 52 Salterns Lane, Hayling Island, Hants. PO11 9PJ. *(Tel: 070-16-3504.)*

Change of Address

EI4BY, T. F. Campbell Davis, The Manse, College Road, Sligo. *pse QSL via G3YMM.*
G2BZQ, R. Q. Marris, Flat 2, 14 Grange Park, Ealing, London W5 3PL.
G2CXO, G. Miles, O.B.E., British Consul-General, 700 Washington Square, Philadelphia, Pennsylvania 19106, U.S.A.
G2HIX, G. G. P. Holden, "Brook Lodge", 2 Westbrook Drive, Chesterfield.
G3JHI, R. L. S. Hathaway, 30 Berkeley Drive, Hornchurch, Essex RM11 3PZ.
G3 KDQ, J. C. D. Brock, 147 Wollaton Vale, Wollaton, Nottingham. *(Tel: Nottingham 285254.)*
GM3LEY, J. Dunlop, 15 Clober Road, Milngavie, Glasgow.
G3YMM, T. F. Campbell Davis, 9 Cloister Road, North Acton, London W3 0DE.
G3NKW, H. White, 16 Turnberry Close, Statham, Lymm, Cheshire WA13 9LY. *(Tel: Lymm 6472.)*
G3TYJ, A. S. Carpenter, "Alola", Adderwell Close, Frome, Somerset BA11 1NW.
G3UCV, R. C. Cartwright, 124 Pendas Way, Leeds LS15 8HP.
G4BEZ, J. Phillipson, 4 Homefield, Wellington, Somerset TA21 9AJ.
G4BXL, F. Day, "Jean Villa", Shop Lane, Goulceby, Louth, Lincs. LN11 9UW. *(Tel: Stenigot 741.)*
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