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Linear Amplifier
1200 watts PEP complete with built-in psu and SWR indicator.

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The KW 201 is now being manufactured with 2 detectors (i) product detector for SSB and CW, (ii) diode detector for AM. The KW 201 has been specifically designed for optimum performance on SSB. 11 ranges give coverage 1.8 mc/s to 30 mc/s. A mechanical filter gives an IF selectivity of 3.1 kc/s at 6 db, and 6 kc/s at 60 db. A 'Q' multiplier is available giving a variable range of 3-1 mc/s to 200 cycles selectivity.

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The finest value available, with no extras to buy. 160 watt PEP operation on all amateur bands 10-160 metres, complete with AC psu, VOX control, crystal calibrator, independent receiver tuning. Upper/lower sideband tuning. Top band included, automatic linearity control or transmit. Special attention to TVI proofing.
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An amateur bands double-conversion superheterodyne receiver, for a.m., c.w., and s.s.b. reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

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You've had your ration of pretty pictures for a bit—they're very nice but they cost money and you know me. Parting with money is something I don't do readily. In fact, every time I see a bill I throw myself on the floor. I writhe in agony, mumbling obscenities accompanied by the odd wail, tears streaming down my face as my legs thrash and my palms beat the floor. Quite a performance, boy, I'll tell ya. At one time I used to beat my head against the wall—but these days, well, there just aren't the decorators about.

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Sommerkamp prices : FR-500, £130; FL-500, £145; FT-150, £215; FT-500, £250.

Star Line : Customers come and look at it, twiddle knobs and say, "Looks terrific, but what's it like, Bill?" I always say, "Excellent!" The keenest Customers who make every penny count, look at it, twiddle, delve inside it, go carefully over the circuit diagram and then say, "Looks terrific, but forget you're a dealer and tell me what it's really like." I always say "Excellent!" Like I say, unless I am absolutely convinced a thing is honest value for money, I just will not sell it. The tragedy of being a dealer of course, is that nobody ever believes you. Ah well, never mind. Bash on!

Star SR-700A Rx : £215 ; FT-500, £250.

Star ST-700 Tx : £80. Companion p.s.u./speaker, £30. The lot, as a package deal, £165.

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- The primary windings are connected for operation from 230v.
- The power supply jack incorporates speaker line terminals, as well as the power transformer primary connections so that AC power switching is made from the transceiver
- Incorporates specially designed 63µm. communications speaker—frequency range 150-5000Hz.
- Size 7½ x 8½ x 11½in.

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- Precision, double gear tuning mechanism and linear tuning condenser provides kHz direct reading divisions on all bands
- Besides SSB, AM (3AH) and CW communication is provided
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- Undistorted output more than 1W.
- Covers all amateur bands from 3.5 to 29.7 MHz with a 7 band tuning system in both transmitting and receiving modes
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<th>Model</th>
<th>Description</th>
<th>Features</th>
<th>Price</th>
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<tr>
<td>SB-301E</td>
<td>Amateur Band Receiver</td>
<td>SSB, AM, CW and RTTY reception on 80 through 10 metres + MHz WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.</td>
<td>Kit SB-301E, 23 lbs. (less speaker): £140, 12.0 P.P. 9/- Ready-to-use: £170, 12.0 P.P. 9/-</td>
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<tr>
<td>SB-200 KW</td>
<td>SSB Linear Amplifier</td>
<td>1200 watts PEP input SSB, 1000 watts CW on 80 through 10 metres. Built-in antenna relay, SWR meter, and power supply. Can be driven by most popular SSB transmitters (100 watts nominal output).</td>
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<td>Ready-to-use £145, 18.0 P.P. 10/-</td>
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<tr>
<td>SB-101</td>
<td>80 Through 10 Metre SSB Transceiver</td>
<td>180 watts PEP SSB, 170 watts CW (the practical power level for fixed/mobile operation). Features USB/LSB on all bands, PTT &amp; VOX, CW sidetone, and more. Unmatched engineering and design.</td>
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<tr>
<td>RG-I</td>
<td>High Sensitivity General Coverage Receiver</td>
<td>High performance at lowest cost. Covers 600 kHz to 1.5 MHz, 1.7 MHz to 32 MHz. Full specifications available.</td>
<td>Kit RG-I, 18 lbs., £39, 16.0 P.P. 9/-</td>
<td>Ready-to-use £53, 0, 0 P.P. 9/-</td>
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<tr>
<td>RA-I</td>
<td>Amateur Bands Receiver</td>
<td>Covers 10-160m. Half-lattice crystal filter at 1.6 MHz. Switched USB and LSB for SSB. Provision for fixed, portable or mobile uses.</td>
<td>Kit RA-I £39, 6.6 P.P. 9/- Ready-to-use £52, 10.0 P.P. 9/-</td>
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**SB-401E Ammeter Band SSB Transmitter** | 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates “Transceive” with SB-301—I requires SBA-401-I crystal pack for independent operation. | Kit SB-401E, 34 lbs., £157, 10.0 P.P. 10/6 Ready-to-use £192, 10.0 P.P. 10/6 SBA-401-I crystal pack, 1 lb., £17, 3.0 P.P. N.C. | | |

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<table>
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<th>Total Credit</th>
<th>Price</th>
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<th>19 monthly payments</th>
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<td>£135 7 0</td>
<td>£125 0 0 P. P. 9/-</td>
<td>£31 16 0</td>
<td>£5 9 0</td>
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</table>

TRANSMITTER. DC Power input: SSB: (A3a emission) 180 watts P.E.P. (normal voice : continuous duty cycle). CW: (A1 emission) 170 watts (100% duty cycle). RF Power output: 100 watts on 80 through 15 metres; 80 watts on 10 metres (50 ohms, nonreactive load). Output impedance: 50 ohms with less than 2:1 SWR. Oscillator feed-through or mixer products: 55 db below rated output. Harmonic radiation: 45 db below rated output. Transmit-receive operation: SSB PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. CW Sidetone: Internally switched to speaker or headphone, in CW mode. Approximately 1000 tone. Microphone Input: High impedance with a rating of 45 to 100 db. Carrier suppression: 45 db down from single-tone output. Unwanted side-band suppression: 45 db down from single-tone output at 1000 Hz reference. Third order distortion: 30 db down from two-tone output. RF Compression (TALC): 10 db or greater at 1 ma final grid current. GENERAL. Frequency coverage: 3.5 to 4.0; 7.0 to 7.3; 14 to 14.5; 21 to 21.5; 28 to 28.5; 29 to 29.5; 29.5 to 30.0 (megahertz). Frequency stability: Less than 100 Hz per hour after 30 minutes warmup from normal ambient conditions. Less than 100 Hz for 1% line voltage variations. Modes of operation: Selectable upper or lower sideband (suppressed carrier) and CW. Dial modulation: 5 kHz. Dial mechanism backlash: Less than 50 kHz. Calibration: 100 kHz. crystal. Audio frequency response: 350 to 2450 Hz. Front panel controls: Main tuning dial. Driver tuning and Preselector. Final tuning. Final loading. Mic and CW Level control. Mode switch. Band switch. Function switch. Meter switch. RF Gain control. Audio Gain control. Side controls: Meter Zero control. Bias VOX Sensitivity. VOX Delay. ANTI-TRIP. Neutralizing. Valve complement: OA2 Regulator (150 V); 6AU6 RF amplifier; 6AU6 1st receiver mixer; 6AU6 Isolation amplifier; 6AU6 1st IF amplifier; 6AU6 2nd IF amplifier; 68NB Product detector and AVC; 6AU6 VFO Amp.; 6C6B 2nd transmitter mixer; 6CL6 Driver; 6EA8 Speech Amplifier and cathode follower; 6EA8 1st transmitter mixer; 6EA8 2nd receiver mixer and relay amplifier; 6EA9 CW sidetone oscillator and amplifier; 6GW6 Audio amplifier and audio output; 12AT7 Heterodyne oscillator and cathode follower; 12AT7 VOX amplifier and calibrator oscillator; 12AU7 Sideband oscillator; 6146 Final amplifiers (2). Diode complement: 6 Germanium Diodes: Balanced modulator; RF sampler; and crystal calibrator harmonic generator; 9 Silicon Diodes: ALC rectifiers, anti-ripple rectifiers, and DC blocking; 12Zener Diode: cathode bias. Transformers: 240VAC/24VDC; 2093S Voltage regulator. Rear apron connections: CW Key jack; PTT output; Speaker and power supply. RF output: Antenna. Power requirements: 115 volts at 50 ma with 5% maximum ripple; 12 volts AC/DC at 4.76 amp. Cabinet dimensions: 14-13/16" W. x 6-5/16" H. x 13-3/8" D.

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**JUNE, 1968**  
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PART EXCHANGES WELCOME
Neophytes

That the subject of a Beginner Licence—as recently discussed in this space—is still live is shown by correspondence lately emanating from the office of the new Postmaster General, Mr. Roy Mason, MP. He writes as follows:

"I am at present considering the terms under which the licence can be issued and the qualifications we shall require from candidates... I aim to have the licence ready in the autumn of this year. Because of the need to consult other interested bodies... we shall be hard pressed to achieve this timing... I cannot at the moment say whether... the holders of this licence will be confined to frequencies above 144 mc..."

These interesting observations were made in reply to an enquiry by Sir Ian Orr-Ewing, Bt., OBE, MP, the Member for Hendon North, who is himself a licensed amateur holding the active callsign G5OG. We are fortunate in having a senior Member like G5OG in the House, with background knowledge and the experience of years of Amateur Radio, prepared to take a stand on matters affecting our interests. In this context (though they are on opposite sides politically) he has the support of Mr. George Wallace, Member for Norwich North, who is himself a keen SWL and whose son holds a callsign.

Our own guess is that the PMG will make whatever announcement he may find possible on the opening of this year's Amateur Radio Exhibition, on October 2. Any further comment before then can only be conjecture.
SIX-BAND CW TRANSMITTER
MODERNISED VERSION OF A STANDARD DESIGN—INCORPORATING RX PRE-AMP., BREAK-IN AND FULLY KEY CONTROLLED

M. A. SANDYS (G3BGJ)

THOSE who possess an ageing transmitter, the wiring in disarray and the metal work mutilated after numerous modifications, will have felt at some time the urge to tidy the whole thing up a bit. The experienced resist the impulse, knowing that the refurbished product seldom betters the performance of the original job! The writer, however, did succumb to this temptation—to the extent of completely refashioning a modern version of his CW transmitter, incorporating the many modifications as orderly features of the new construction. The description herewith, which covers the salient points of the new transmitter, may prove of interest to those home constructors who still have a feeling for the CW mode. In general, constructors are always seeking ideas to adapt to their own needs, rather than complete instructions on building somebody else's conception. Details of construction, therefore, take second place to the design itself.

Circuit Layout

The original Tx at this station involved a two-tier chassis system, with the PA top cap connection protruding into the upper deck, which contained only the pi-section matching circuit. This layout, although restricting access to the lower section, was found to give good isolation between input and output and was retained in the new transmitter. The stages appropriate to each chassis will be found in the block diagram, Fig. 1, which shows that basically the transmitter consists of a VFO, followed by two stages of amplification or multiplication (depending on the band switched in) and a PA with clamp-valve protection. The lower chassis contains two power units, a high voltage supply for the PA and a low voltage PSU for the initial stages. The PA feeds into a
conventional pi-network in the upper chassis, which also contains a receiver pre-amplifier and its associated power unit. For the sake of clarity the keying and switching has been omitted from the block diagram, and is described separately (p.209).

Power input is 70 watts and the frequency coverage Top Band to ten metres. Provision is made for reducing input to 10 watts to meet 160m requirements, a facility which is also useful for initial tuning. In the Tx as described, CW is the only mode of operation.

The RF side was made to follow closely the well tried and conventional circuitry of the original CW transmitter, in the reasonable expectation that the performance would be as good, but some of the miniature valves proved less docile than their old-fashioned counterparts! In particular, the VFO and PA required modification. Troublesome aspects are dealt with in the appropriate sections.

**General Construction**

The constructional method employed is shown quite well by the photographs. Upright lengths of 1-inch angle aluminium are fixed to each corner of the lower chassis, the pair at each side being joined by a length of angle aluminium to form the seating for the upper chassis. This is made as a plug-in unit, employing Bulgin "Domina" connectors. (It is fitted with plastic feet to protect the connector pins when the unit is placed on the bench.) A U-shaped cover fits over the complete assembly, the overall dimensions of which are: Width, 15½ ins.; height, 9¼ ins.; depth, 10 inches.

**The VFO Section**

The complete circuit diagram is as Fig. 2, pp. 206-207. As will be seen, the VFO follows the pattern made popular by the Geloso model but differs slightly in the selection of fundamental frequencies. It avoids the Geloso fundamental oscillator frequency selection of 7 mc for output on the 40-metre band, which the writer felt could lead to overall instability. Table I sets out the oscillator coverage given by the three coils, also the frequency-selection required of the succeeding stages to produce the final output drive. Here, straight through-amplification is given only on Top Band, where the risk of overall instability is minimised, both by the lower frequency and the reduced power output. Nevertheless, reasonable steps were taken to ensure that RF energy did not find its way back to the initial stages.

The 3-gang tuning capacitor C3, C5, C7 consists of one 90 μF and two 13 μF sections, and is the type specified by Electroniques for their six-band version of the G3RKK transmitter (SHORT WAVE MAGAZINE, June-July, 1964). Ideally, the capacity of each section should be no larger than that required to give 180 degrees of bandspread on each range. However, it is possible, if the tuning covers more than the required range, to restrict the capacity swing to the required value by putting in a series capacity. The method adopted for this was temporarily to connect a likely condenser in series and then check the bandspread before making a rigid connection. These series condensers are not shown in Fig. 2, since they will depend on the choice of tuning capacity and coil.

As initially conceived, the VFO valve was a 6AH6, with iron-cored coils and a fundamental frequency of 7 mc for output on 28 mc. But the 6AH6 defied all attempts to produce chirp-free keying and was finally abandoned in favour of the 6AU6, which keyed well but refused to oscillate at 7 mc, necessitating a change of frequency to 3.5 mc!

[cont'd p.207]
Figure 2

Table of Values

<table>
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</tr>
<tr>
<td>C13, C14</td>
<td>100 µF mica</td>
</tr>
<tr>
<td>C25, C27, C37</td>
<td>= 100 µF mica</td>
</tr>
<tr>
<td>C2, C4, C6</td>
<td>100 µF pre-set</td>
</tr>
<tr>
<td>C3, C5, C7</td>
<td>10 µF mica</td>
</tr>
<tr>
<td>C8, C9, C33</td>
<td>= 001 µF mica</td>
</tr>
<tr>
<td>C11, C14</td>
<td>0.01 µF paper</td>
</tr>
<tr>
<td>C12, C15, C16, C21, C22, C23, C24, C25, C34</td>
<td>= 005 µF disc cer.</td>
</tr>
<tr>
<td>C38, C43</td>
<td>= 15 µF var.</td>
</tr>
<tr>
<td>C20</td>
<td>= 25 µF pre-set</td>
</tr>
</tbody>
</table>

R1 = 100 ohms, 1w.
R12 = 100,000 ohms, jw.
R13 = 100,000 ohms, jw.
R14 = 68,000 ohms, jw.
R16 = 50,000 ohms, 20w.
R19 = 330 ohms, jw.
R17 = 100 ohms, jw.
R18 = 15,000 ohms, 2w.
R20 = 100,000 ohms, 2w.
V1 = 6AU6
V2 = 6AH6
V3 = 6CL6
V4 = 6146
V5 = 6AQ5
V6 = 6AQ5
V7, V8 = ECC85

R1 = 2,5 mH
R2 = 1 mH
R3 = 50,000 ohms
R4 = 2,500 ohms
R5 = 10,000 ohms
R6 = 2,200 ohms
R7 = 330 ohms
R8 = 100 ohms
R9 = 15,000 ohms
R10 = 68,000 ohms
R11 = 47,000 ohms
R12 = 470 ohms
R13 = 2,200 ohms
R14 = 47 ohms
R15 = 4,700 ohms
R16 = 4,700 ohms
R17 = 4,700 ohms
R18 = 4,700 ohms
R19 = 4,700 ohms
R20 = 4,700 ohms

V1 = 6.3, 1.5A htr. trans.
V2 = 6.3, 1.5A htr. trans.
V1 = 6.3, 1.5A htr. trans.
V2 = 6.3, 1.5A htr. trans.
V3 = 6.3, 1.5A htr. trans.
V4 = 6.3, 1.5A htr. trans.
V5 = 6.3, 1.5A htr. trans.
V6 = 6.3, 1.5A htr. trans.
V7 = 6.3, 1.5A htr. trans.
V8 = 6.3, 1.5A htr. trans.

S1 = Three Maka-switch
S2 = Two Maka-switch
S3 = Latch on, push to make, push to break
S4 = BY100
D1 = Contact cooled metal rectifier
D2 = Contact cooled metal rectifier

Geloso RFC (see text)

Three Maka-switch
Two Maka-switch

Fig. 2. Circuit of the Transmitter complete

To PSU
(see Fig. 4)
As a consequence the drive on 28 mc dropped somewhat but is still adequate. Whilst the note of the VFO alone was pure, the radiated signal had a slight "burby" sound which only disappeared when the iron cores were removed completely. New coils had to be obtained having the approximate inductance without the core. Therefore, if the writer's experience is any guide, on no account use iron-cored coils in a VFO and if oscillator keying is contemplated (which can give excellent results) leave the 6AH6 severely alone! Why the 6AH6 should key so poorly is hard to explain, for its characteristics show it to be an equivalent of the 6AC7, which behaved perfectly in the old transmitter.

The choke in the anode of the VFO, RFC 1, was taken from the cathode of a Geloso VFO Type 4/101 and, fortuitously, appeared to have a parallel resonance around 7 mc since the drive on 28 mc dropped considerably when it was temporarily replaced by a standard one milli-Henry RFC.

The VFO tuning capacitor is rotated by a 6:1 epicyclic ball drive, a small bracket attached to the rear bush supporting the dial, which was cut from 20g. ali. Plain drawing paper was pasted to the face of the dial and concentric circles drawn in Indian ink. After calibration, Letraset Instant Lettering was used for the frequency numbering. (Those who may have not used Letraset will find it much
The Frequency Multipliers

The two stages following the VFO perform the multiplication necessary to arrive at the final output frequency, as laid out in Table I. On the LF bands, V2 functions as an untuned amplifier with resistive load, but on the higher frequency V2 is tuned. It is common practice in many designs involving two stages of multiplication to resonate this stage at a fixed frequency somewhere in the middle of the band. Then, on each side of this frequency the drive will tend to drop off. More ambitious designs overcome this defect by utilising a wide-band amplifier, but inevitably an extra stage is required as the bandwidth can only be increased at the expense of amplification. An alternative method of maintaining the drive over the whole band, and the one adopted at G3BGJ, is to gang-tune the two multipliers. The tracking of two tuned circuits which are harmonically related is quite simple. The bandspread capacity $C_B$ required to cover a range of frequencies $f_1$ to $f_3$ is given by:

$$C_B = C \left( \frac{f_3^2}{f_1^2} - 1 \right)$$

where $C$ is the total capacity across the coil. The same value of $C_B$ will cover the harmonic range, since the expression remains unaltered by multiplying $f_1$ and $f_3$ by the same number, provided the value of $C$ is the same in each case. All that is then required to obtain (theoretically) perfect tracking is to equalise the circuit capacities.

To this end a fixed capacity C28 was placed across V3 tuned circuit and a trimmer C20 across the untuned circuit of V2. The trimmer was adjusted simply by trial-and-error, retuning L5 and L11 after each move, to give near constant drive over the entire 28 mc band. The validity of this method may be questionable in a transmitter operating only in the narrow CW sections, but those who work phone as well would derive the full benefit.

One pole of the 2.P6.W “Maka-switch” wafer is used to switch the tuning capacitor C19 into circuit on the HF bands. It will be noted that on 28 mc, V2 is tuned to 14 mc, its original function being to double from 7 mc. With the VFO on 3·5 mc, L4 could also be selected for 28 mc, quadrupling to that frequency on V3.

The PA Stage

The PA is a 6146, one of the very robust HF types, with clamp valve protection and series-C neutralisation. The 6146 can be seen in the screened compartment at the rear right of the lower chassis. It protrudes slightly into an opening in the upper chassis where the top cap connects to the $pi$-coupler. The plug to the left of the 6146 screen mates with a socket in the upper chassis and links the neutralising capacitor C29 to C25 in the lower chassis. All other connections are made by two Bulgin “Domina” connectors. One socket can be seen in the left-hand seating. The other, not visible in the picture, is in the right-hand seating. Most of the components of the $pi$-coupler can be identified in the view of the upper chassis.

The compartment at the left houses the receiver pre-amplifier, which consists of a grounded-grid amplifier and a cathode follower. This is a useful device well worth including in the initial planning of any transmitter. All too often, it is added as an afterthought. Unlike the normal T/R switch, however, this one is not connected permanently in circuit, the input being earthed by relay C on transmit. The band switch, S4, which selects the tap on the $pi$-circuit coil also operates, via a right-angle bevel gear drive, the band selection switch, S5, of the receiver pre-amplifier. Ideally, it should also be coupled to the band selection of the lower chassis, but mechanical complications precluded this. Some difficulty was experienced in obtaining the thin bevel gears—the normal amateur sources, radio dealers and model shops all being tried without success. For the interested reader they can be obtained quite easily at reasonable cost from S. H. Muffett Ltd., Mount Ephraim Works, Tunbridge Wells, Kent.

The neon V5 in series with the PA screen was not included in the initial design. It was assumed that the 6AQ5 alone would provide adequate clamp control and limit the PA current to around 40 mA in the absence of drive. The drain of 40 mA would then have served admirably as the standing current called for by the choke input filter of the high-voltage supply, eliminating the need for a bleeder resistor. In practice, however, the 6146 drew about twice this figure, making a series neon essential (a cathode resistor could be used instead). The standing current was thereby reduced to 10 mA, which was below the minimum drain demanded by the power unit. It was brought back up to about 30 mA by placing the resistor R13 across the neon.
To reduce the power input to the PA the short across R11 in the PA anode is removed by the push-button switch S3, which protrudes through a hole in the top of the cover. The method is a bit crude but suffices for the occasional foray on Top Band, besides being useful for initial adjustments. All tuning can be done on the PA anode and grid current meters. The meter M3 in V3 anode is not essential and was the sole concession to front-panel symmetry.

Keying

Two types of operation are provided by the switch S2, Fig 2, "Normal" and "Break-in." An explanation of the "Break-in" system will be given since the "Normal" mode is a simplified case in which the relays are energised during the entire period of transmission.

The principle of operation is best understood by referring to the block diagram of Fig. 3. On the "Break-in" position of the switch the key is inserted in the cathode of keyer V8, and when the transmitter is switched to "Send," operating the key energises the three series connected relays. The relay contacts perform the following functions:—

A1, keys the VFO; B1, keys the driver; B2, restores reception; C1, earths the receiver input.

A key with back contacts is required. The back contacts open as soon as the key is touched, removing the short across the muting resistor in the receiver, but the transmitter does not radiate when the key makes. A further slight delay is introduced by the operating time of the relay. On lifting the key restoration of the receiver does not commence until B2 completes the earth path through the back contacts. Most receivers employ a muting system in which the cathodes of the IF amplifiers are returned to a higher positive potential in the muted condition. An appreciable time must elapse before the muting voltage is completely established, whereas restoration takes place very quickly. Using the back
key contacts in this fashion provides an extra delay ensuring that the receiver is fully muted before the transmitter radiates.

In the "Normal" position of the switch the key is connected to the VFO, the keyer cathode is earthed and when the transmitter is switched to "Send," C1 earths the receiver input and B2 mutes the receiver. The other contacts are not used. When the transmitter is switched to "Receive" the relays de-energise.

The system therefore offers a choice of either the normal type of amateur operation—no reception during transmission—or full break-in. The break-in is completely click-free but suffers from an increase in receiver noise when HT is applied to the transmitter. The noise is reduced by keying the driver as well, but is still too high for use with very weak signals. To reduce the noise to a very low level all the transmitter stages would have to be quiescent with the key up. Removing the resistor R13 across the neon V5, and using a bleeder resistance across the PA HT to furnish the required drain, might also reduce the noise reaching the receiver. (This will be done eventually in any case, because on reflection, it would seem to be a more satisfactory method than allowing the PA to idle at close to maximum anode dissipation.)

The use of separate relays instead of a single multi-contact device has the decided advantage of allowing the relays to be placed close to the circuits

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**Table of Values**

Fig. 4. The Power Supply Unit

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>10,000 ohms, 2A.</td>
</tr>
<tr>
<td>R2-R13</td>
<td>470,000 ohms, 1W.</td>
</tr>
<tr>
<td>R14, R15</td>
<td>100,000 ohms, 2W.</td>
</tr>
<tr>
<td>R16</td>
<td>4700 ohms, 10W.</td>
</tr>
<tr>
<td>C1</td>
<td>0.05 µF, paper</td>
</tr>
<tr>
<td>C2, C3</td>
<td>32 µF, elect, 450V.</td>
</tr>
<tr>
<td>C4, C5</td>
<td>16 µF, elect, 450V.</td>
</tr>
<tr>
<td>T1</td>
<td>150V, 120mA, 6.3V.</td>
</tr>
<tr>
<td>T2</td>
<td>350V, -0.350V, -100mA, 6.3V.</td>
</tr>
<tr>
<td>D1-D12</td>
<td>BY100</td>
</tr>
<tr>
<td>S1</td>
<td>2P on-off</td>
</tr>
<tr>
<td>S2</td>
<td>4P 3W, ceramic</td>
</tr>
<tr>
<td>Lamps</td>
<td>6.3V, 3A bulbs</td>
</tr>
<tr>
<td>F1</td>
<td>500 mA fuse</td>
</tr>
<tr>
<td>F2</td>
<td>250 mA fuse</td>
</tr>
</tbody>
</table>

---

**Fig. 4. Power supply unit for the G3BGJ Transmitter.**
TABLE II
Coil Values for the CW Transmitter

<table>
<thead>
<tr>
<th>Table II Coils</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFO</td>
<td>L1</td>
<td>Electroniques SHQ N/PC</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>Electroniques SHQ L/PC</td>
</tr>
<tr>
<td></td>
<td>L3</td>
<td>Electroniques SHQ L/PC</td>
</tr>
<tr>
<td>Buffer Multiplier</td>
<td>L4</td>
<td>Osmor Q04</td>
</tr>
<tr>
<td></td>
<td>L5</td>
<td>Osmor Q03</td>
</tr>
<tr>
<td></td>
<td>L6</td>
<td>Geloso L3</td>
</tr>
<tr>
<td>Multplier</td>
<td>L7</td>
<td>Geloso L7</td>
</tr>
<tr>
<td></td>
<td>L8</td>
<td>Geloso L8</td>
</tr>
<tr>
<td></td>
<td>L9</td>
<td>Geloso L9</td>
</tr>
<tr>
<td></td>
<td>L10</td>
<td>Geloso L10</td>
</tr>
<tr>
<td></td>
<td>L11</td>
<td>Geloso L11</td>
</tr>
<tr>
<td>PA Anode</td>
<td>L13</td>
<td>5 turns 18 SWG</td>
</tr>
<tr>
<td>PI Circuit</td>
<td>L14</td>
<td>5 turns 16 SWG 1in. diam. 1in. long</td>
</tr>
<tr>
<td></td>
<td>L15</td>
<td>20 turns 22 SWG enam. copper close wound 2in. diam.</td>
</tr>
<tr>
<td>Rx Pre-Amp</td>
<td>L16</td>
<td>Osmor QA8</td>
</tr>
<tr>
<td></td>
<td>L17</td>
<td>Osmor QA4</td>
</tr>
<tr>
<td></td>
<td>L18</td>
<td>Osmor Q04</td>
</tr>
<tr>
<td></td>
<td>L19</td>
<td>Osmor Q03</td>
</tr>
<tr>
<td></td>
<td>L20</td>
<td>Osmor Q02</td>
</tr>
<tr>
<td></td>
<td>L21</td>
<td>Osmor Q01</td>
</tr>
</tbody>
</table>

Another view of the layout of the 6-band CW Tx. The PA and output stages fit above this section—see p. 312.

they control. The keying of a number of relays, however, does not appear to be common practice. Presumably, the objection is that no two relays have precisely the same operate time. That being so, the obvious course would be to permute all three (they are of the plug-in variety) for optimum results! A form of differential keying would result if the VFO were to key before the driver, which effect, of course, could also be deliberately introduced by making relay A a high-speed type. Neither of these expedients proved necessary. Actually, a form of this system was tried out on the old transmitter and the writer was confident it would give satisfactory results.

The relays are miniature 700-ohm plug-in types having two change-over contacts and key well with as little as 12 mA. The keyer V8 is an ECC85 with both sections connected in parallel but most other double-triodes would be suitable. The operating current is adjusted by VR1, Fig. 2.

The Power Supply

The power units are shown in Fig. 4. Both use silicon rectifiers and choke input filters. Those aspects of the choke input filter which the amateur should know about are fully covered in the British and American Handbooks, whilst many articles have appeared in SHORT WAVE MAGAZINE on the use of silicon rectifiers. Some constructors have found that silicon rectifiers are prone to damage by switching surges. So far this unit—it has been in operation about six months—has not suffered any rectifier failures.

What did fail was the original high voltage transformer! It was obtained from a firm who undertake to wind transformers to individual specification. The writer ordered a centre-tapped transformer without mentioning that it was to be used in a bridge-rectifier circuit. After several hours of use it developed a partial short between primary and secondary. The firm refused to accept any liability. Good quality centre-tapped transformers have adequate insulation between primary and secondary for this application, as was confirmed by Gardners Ltd., who supplied an exact replacement. Readers who intend to use a bridge rectifier would thus be well advised to ascer-
tain beforehand that the transformer they choose has the necessary insulation. It is perhaps unnecessary to add that only half the rated current should be drawn from a centre tapped transformer which feeds a bridge rectifier.

Switching

Closing the mains switch S1 brings on all heaters, lights the green “Receive” lamp and supplies the receiver pre-amplifier with HT. The latter is derived from a half-wave rectifier fed from a heater transformer placed back-to-front; R1 and C1 form a surge suppression device. The transmitter is now in the “Receive” condition. Going over to “Send” switches the negative side of each HT feed. This form of switching appears to be very kind to the silicon rectifiers. The “Net” position of switch S2 applies the stabilised voltage to the VFO and also connects the low voltage supply to relay A (point D). The latter provision allows the “Net” facility to be used on “Break-in,” only relay A, which keys the VFO, being energised when the key is pressed. The diode D1, Fig. 2, prevents the voltage from also appearing at the anodes of V2 and V3 by the path which exists via relays B and C. A fourth section of the switch S2 earths the receiver mute line on “Receive” and “Net.” On “Send” the earth is removed, muting the receiver (if switch S2, Fig. 2, is at “Normal”) and lighting the red “Send” lamp. When switch S2, Fig. 2, is at “Break-in,” muting will be effected by the back key contacts. The muting on “Normal” is slightly different in the block diagram of Fig. 3, which was drawn to explain the principle of operation.

All the paint work was done with car “touch-up” sprays, which turned out to be an uneconomical process and it would have been cheaper to use Belco Brushing Cellulose for the interior metal work. Before spraying, the surfaces were rubbed down with emery paper and thoroughly cleaned with turps. Substitute. The spraying, however, imparts a very nice finish to the front panel, which was initially sprayed blue. The control panels and dial border were then outlined in masking tape and the whole surface was sprayed black. White transfers were used for the lettering.

Due no doubt to the advent of the transistor some high-voltage components seem to have disappeared from the amateur market. Such items as 2500v. DC mica capacitors, ceramic rotary switches and high wattage resistors, all so plentiful after the War, may now be difficult to find in the ordinary advertising, and unless the intending constructor is aware of their last resting place, equivalents will have to be found for some of the listed components.

The two-tier layout may not appeal to everyone and there is no doubt it does add to the work involved. The transmitter took about one year to build, the metal work occupying at least 75 per cent of the time! Constructors who work on a table with hacksaw and file will understand this division of labour! The work could be simplified and the construction time reduced by building the transmitter on a single chassis, for the actual circuitry is straightforward and could safely be attempted by the average constructor. Others might wish to add the facilities they consider desirable—a switched meter to measure more current and voltage points, for instance—but the majority, no doubt, will merely extract those features which could usefully be incorporated in their own design.

The old transmitter on which this description is based is still leading an active life under the call G3PZL. Readers who chance to hear both transmitters on the air will be able to judge if, in this case, the maxim quoted in the first paragraph has been disproved.

Our Small Advertisement section is the U.K. market-place for anything of radio amateur interest—see pp.245-254 this issue.
**VHF/DX WORKING BY METEOR SCATTER**

**TERMINOLOGY, PROCEDURE, METHOD, EQUIPMENT AND EXAMPLE**

**A. H. DORMER (G3DAH)**

Though a certain amount of information and guidance with reference to MS working has appeared in the American radio amateur press, this is the first full discussion on the subject to be published in this country. It will be seen that using meteor showers for working VHF/DX poses interesting problems of its own, including the need to know a little about making celestial calculations. That all this is quite possible is proved by the fact that a number of U.K. and European amateurs have achieved some remarkable DX on the two-metre band.—Editor.

**SINCE** the early fifties, when meteor scatter signals were first observed on 144 mc by amateurs, interest in this mode of transmission has steadily increased and, with the advent of higher transmitter powers, more efficient antenna systems and more sensitive receivers, many contacts are now being made in the range 500 to 1,500 miles which would not have been possible by other transmission modes.

However esoteric the term “Meteor Scatter” may sound, there is nothing fundamentally difficult about it, although the technique does require efficient equipment and a lot of patience.

This article is intended to explain in simple terms the propagation mechanism involved and to indicate the minimum equipment requirements for a reasonable chance of success. Considering the number of amateurs in Britain who already have efficient equipment for 144 mc, it is surprising that only relatively few have made long-distance contacts using this mode. It is hoped that this short expose will encourage operators not only to investigate the possibilities of Meteor Scatter more closely, but also to attempt the allied technique of communication via satellite and passive reflectors.

**Meteors**

First, let us look at the correct terminology. A “Meteors” is a small particle, usually varying in size comparable with a grain of sand up to about a quarter of an inch across. It can exist singly or in company with many other particles of similar size, in which latter case we have a “Meteors Shower” or “Stream.” Under normal circumstances, a particle of this size approaching Earth at high velocity will quickly burn up from the heat generated by friction in its passage through even the low atmospheric densities existing some sixty miles or so above the surface of the earth—that is to say at a height between the top of the E-layer and the lower ionosphere. Light and heat are produced, and the result is the familiar Shooting Star. Those particles which are not so consumed, but which reach the ground, are termed “Meteorites.” Note that a meteorite is not a small meteor.

Occasionally, very large bodies pass through the atmosphere and strike the surface of the earth producing large impact depressions, of which the crater some three-quarters of a mile across in the Arizona desert is an example. Such large meteors are termed “Bolides.” Sometimes they break up during their passage through the atmosphere and the particles resulting from this explosion are known as “Aerolites.”

**Meteor Showers**

As the earth travels round the Sun it intercepts the path of millions of small particles of dust and stone. Many of these bodies are randomly distributed and widely dispersed and are not, therefore, a recurrent phenomenon. They are accordingly known as “Sporadic Meteors.” At certain times of the year, however, the Earth passes through large conglomerations of particles which are themselves circling the Sun in fixed orbits. The occurrences are repetitive and predictable and of such number and extent as to constitute a visual shower or stream. Counts of between fifty and one hundred trails per hour are registered during these periods and these numbers are such that communication is possible using reflections from the ionisation which they produce. Fig. 1 on p.215 shows this pictorially.

**Reflections from Ionised Trials**

Let it be clear from the start that radio signals are not reflected from the meteors themselves, but from the trails of ionisation produced by their passage through the upper atmosphere.

Most amateurs are familiar with the E-layer, which envelops the Earth at an average height of sixty miles, and with its function in relation to radio communications in general. Normally, frequencies of 70 mc and higher penetrate the E-layer and travel on out into space. However, if for some reason the level of ionisation in the E-layer increases, then these signals can be reflected. Such an increase in ionisation can be caused by Aurora, the effect known as Sporadic-E, and by meteors.

Meteors entering the earth’s atmosphere burn up and produce a column of ionisation which can be dense enough to reflect signals which would normally pass straight through the E-layer. This column of ionisation disperses by diffusion and through the action of high altitude winds, and so the signal level declines and eventually disappears.

There are two categories of meteor trails. The first is called the “Underdense,” and is so named because the ionisation density is too low for complete reflection of the signal, which is scattered rather than reflected. These trails can give short-term reflections which quickly die away and are audible as the familiar “ping.” The signal strength from underdense bursts drops off in intensity as the third power of the wavelength, while the duration drops off as the second power. The second category is the “Overdense,” and here most of the incident signal is reflected with constant strength until the ionospheric density drops below the critical value. These trails provide strong signals of up to two minutes or more in duration.
The apparent origin of the meteor shower is known as the "Radiant." This is the point in the sky from which the meteors appear and we then only need to know this in order to time the transmissions so that the radiant is in the optimum position for the path that we wish to work. The radiant rises in the east, passes across the sky at a height which is determined by its angle with the Pole Star, and sets in the west. The table on p.94 gives details or right ascension and declination of the major meteor showers. The charts in the sketch on p.215 show radiant paths and locations, together with a worked example for a North/South transmission path.

If the radiant declination and right ascension (Celestial Latitude and Longitude) are plotted, a very simple calculator can be constructed which will trace the radiant path across the sky as a function of time and, knowing that propagation will be optimum when the radiant azimuth is at right angles to the desired path and above the horizon by an angle of between 30° and 60°, an optimum time for a given path can be determined.

There is one other aspect of timing which merits consideration. The procedure outlined above is applicable to the recurrent meteor showers or streams, but there remain the sporadic meteors, trails from which can also be used for communication over long distances. Because of the relative velocities of the earth and the meteors, the greatest number of sporadics occurs at around 6 a.m., exceeding by a factor of three those observed at 6 p.m. when the count is down to 1-3 per hour. So, if you don't want to wait for a predicted shower, early rising is indicated.

**Procedures**

In Europe, the procedure for meteor scatter contacts has been fairly well standardised. Obviously it can be varied to suit individual tastes, but the following has been shown to work well in practice, and can be recommended.

(a) Each station calls the other for a five minute period using each callsign once only, e.g. G3ZZZ de SM2AAA.

(b) As soon as a signal is heard, a report is included in the next transmission. This takes the form of the letter "S" followed by two figures. The first figure indicates the duration of the signal heard and the second the strength. A special scale is used to indicate duration as follows:—

1. Pings.
2. Bursts up to five seconds.
3. Bursts from five to fifteen seconds.
4. Bursts from fifteen seconds to two minutes.
5. Bursts of longer duration than two minutes.

The report should not be the subject of any second thoughts, or confusion is certain. A sample transmission containing a report would be "G3ZZZ de SM2AAA S 24."

(c) As soon as one station has copied both the callsign and the report, the letter "R" is sent at the start of the report, e.g. "G3ZZZ de SM2AAA RS 24."

(d) When the other station has received everything including the "R," he sends the letter "R" for thirty minutes after the last signal is heard.

(e) If a station has not copied the report or some other part of the message, but has received an "R" from the other station, then the
following code is used to inform the transmitting station of what is still needed to complete the contact:

- **ALL** — I still need everything
- **MC** — I need my call only
- **YC** — I need your call only
- **BC** — I need both calls
- **MS** — I need my call and report
- **YS** — I need your call and report
- **SSS** — I need my report only

Once a station receives one of the above signals, the missing information is sent until the RRRRR is received. Although this procedure may seem complicated at first glance, it is not so in use, and allows the maximum information to be transmitted in the minimum time.

Should nothing have been heard from the distant station at the end of thirty minutes, then the chances are that the specified frequencies have not been set with the required accuracy. In such cases, one of two procedures should be adopted. Either the receiver may be swept over above five kc or so for a ten-second period, or the receiver may be tuned in 1 kc increments above and below the nominal frequency on each successive transmission period. The former method is to be preferred. It is an obvious sine qua non that an accurate frequency meter should be available.

While most workers in the United Kingdom have standardised on the five-minute cycle, one could use one minute, or even half-minute, cycles, always provided...
that the timing arrangements at the two ends were accurate enough. The main advantage of the shorter time cycle is that there is a chance of the QSO being completed during one long burst, but as the time period becomes shorter, the demands on accuracy in all respects becomes more stringent and the longer period may have some advantages. Whichever cycle is selected the requirements of accuracy in timing and frequency measurement are of paramount importance.

**Equipment**

As indicated in the introduction to this article, many amateurs will already have all the equipment required to undertake Meteor Scatter communication, but the following summarises the requirements in concise form:

(a) As much power as possible, not less than the legal limit for the band in any case.

(b) A receiver with a noise figure of better than 3 dB.

(c) A beam as high as possible and in the clear. A ten-element Yagi is adequate, but the feeder must be low loss. A ten-over-ten Yagi would be better so as to keep the vertical radiation angle low.

(d) A high site is not essential, but it should be clear and quiet.

(e) A receiver band width of 1 kc maximum.

(f) Frequency measuring equipment to give an accuracy of ±500 c/s on both transmit and receive.

(g) A frequency marker giving 10 kc points throughout the band is desirable but not essential.

(h) An automatic keyer. This can conveniently be a rotating disc and photo-electric device.

(i) Plenty of patience!

The author wishes to acknowledge with thanks the guidance given by G3LTF in the preparation of this article.

**Reference**


**APPENDIX**

The charts on p.215 (Fig. 2) give details of the major meteor showers and the following notes should make clear the way in which they can be used.

1. The numbers on the concentric rings are the elevation in degrees of the radiants.

2. "P" denotes the sub Polar Star point.

3. "C" is the centre of the ellipse which is the plot of the circular radiant inclined to a plane, on that plane.

4. "O" is the observer, or your station.

5. Station bearings are always laid off from "O." Time scales are always laid off from "C."

6. Time scales are always laid off from "C."

7. The East and West points are reversed because the observer is assumed to be looking up at the sky while on his back with his feet pointing South.

**How to Use the Charts on p.215**

Assume that a contact is to be arranged from London with a station at around 1,000 miles to the North-east. Taking the Orionid shower as an example, draw a line at right angles to the bearing of the station from point "O" (the observer) which intersects the locus of the meteor radiant at "X," as shown. We see that this is within the bounds of 30° to 60° elevation and can now determine the time by measuring the angle XCS, dividing this by 15, and subtracting the answer, which represents a number of hours, from the transit, or culmination, time of 0400. In this case the angle is 37°, equivalent to 21/2 hours before transit, i.e. 0130. This is the path midpoint and so the time is not GMT but local time, calculated at one hour for each degree of latitude. In the example, a correction of one hour will be sufficient, thus 0130 mid point local time becomes 0030 GMT. The schedules should run for, say, one hour on each side of this time. It can easily be seen that the distant station will obtain the same result as he would calculate on the reciprocal bearing. A certain degree of latitude is permissible in choosing times, but signals will peak at midpoint.

Although the curves are plotted to Latitude 52° North, they should be substantially accurate for up to Latitude 60°. No responsibility is accepted, however, for missed QSO’s by GM’s!

**THEFT BY FRAUD**

We were very sorry to hear from George Francis and Bill Lowe—regular advertisers in the *Magazine*—that they had both been defrauded by an exceedingly smooth individual, well dressed and accompanied by a woman. They called at Newark on Sunday, April 28, and departed with a Swan-500 Transceiver (serial H289019) and AC/PSU (Q182709). For this, he gave a cheque which turned out to be a stumper.

The previous Sunday, 21st, they had been to Lowe Electronics, and obtained a Sommerkamp FT-150 Transceiver, the cheque also being worthless.

Giving an address in London, probably false. this precious couple’s story was that they were emigrating to Papua (or Australia), mentioning a certain VK5 as being a brother-in-law. The man is about 5ft. 10in., aged 30-35, well built and very plausible. The woman sounds Scottish, 5ft. 8in. in height, with black hair, and also expensively dressed.

The whole matter is, of course, in the hands of the Police, but anyone who in the last few weeks may have been offered gear of the type described should ring Newark 4733 or 2578, or Matlock 2817 or 2430 (reverse charges) with the information—because both George Francis and Bill Lowe are offering a £20 reward for the recovery of their equipment. It is a reasonable assumption that both transceivers will somehow, somewhere be offered for sale.

**LATEST AMATEUR LICENCE FIGURES**

We are obliged to the Post Office for the following details: As at 30 April '68, Amateur Sound Licences A totalled 12,785; Amateur Sound B (the G8/3’s), 872; the A-licence mobile came to 2,467 and the B’s /M, 55; for Amateur TV transmission, VHF only, 185; and for Model Control on their own special frequencies the total was 13,602 (1). This makes it that the aggregate of U.K. transmitting licences in current issue is 13,657, of whom 2,522 have additional permits for Mobile. While the licences in issue for Model Control have nothing in common with the *pratique* of Amateur Radio, it is interesting to see how many people are interested in this aspect of radio operation, mainly on the 27 mc band.
SOME GELOSO VFO/EXCITER MODIFICATIONS

SUGGESTIONS FOR IMPROVING STABILITY, HF-BAND DRIVE AND NOTE

C. J. REES (G3TUX)

These notes deal with the modification of the Geloso 4/101 and 4/102 exciter units. The only difference between them is that the 4/101 has a 6V6 driver stage, whereas the 4/102 has a 6L6. The unit possessed by the writer is built into a K.W. “Valiant” transmitter, and is standard equipment for this and their “Vanguard” models.

In unmodified form, the writer’s unit exhibited signs of poor note and instability on the HF bands, and the drive it produced was extremely marginal for the 6146 PA. The valves and alignment of the unit were checked, as were the operating conditions, but nothing was found to be seriously amiss.

It was then decided to investigate the Geloso circuit itself, with a view to improving the apparent shortcomings. It was found initially that a good match from the aerial to the PA materially improved the situation as regards “pulling” of the oscillator, but it was felt that the unit should be independent of this factor.

An investigation of the circuit revealed that the multiplying sequence shown in Table I was being used.

<table>
<thead>
<tr>
<th>Band</th>
<th>Oscillator Freq.</th>
<th>Buffer Anode</th>
<th>Driver Anode</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mc</td>
<td>7 mc</td>
<td>Untuned</td>
<td>3.5 mc</td>
</tr>
<tr>
<td>7 mc</td>
<td>7 mc</td>
<td>Untuned</td>
<td>7 mc</td>
</tr>
<tr>
<td>14 mc</td>
<td>3.5 mc</td>
<td>7 mc</td>
<td>14 mc</td>
</tr>
<tr>
<td>21 mc</td>
<td>7 mc</td>
<td>7 mc</td>
<td>21 mc</td>
</tr>
<tr>
<td>28 mc</td>
<td>7 mc</td>
<td>14 mc</td>
<td>28 mc</td>
</tr>
</tbody>
</table>

It was evident that this arrangement could result in lack of drive on some bands and did not particularly benefit suppression of harmonics and oscillator pulling. This sequence seems to have been designed to provide maximum bandspread on the dial, rather than the best electrical method of deriving the output frequency. The writer also does not like the principle of running “straight-through,” as on the 3.5 and 7 mc bands, because this is usually detrimental to oscillator stability by the pulling effect of the PA. It was decided that better use could be made of the existing circuitry just by a few simple rearrangements. The multiplying sequence was therefore altered as shown in Table II, opposite.

This modification was carried out by rearranging the connections to the bandswitch and substituting a 1.75 mc oscillator coil for one of the 3.5 mc inductances. Counting back from the front of the unit, the coil so substituted is the third one along and is made up by stripping the

![Fig. 1](https://example.com/fig1.png)

Fig. 1. The modified driver circuitry. Except where marked, all components are as originally fitted.

Initial Results

This modification resulted in an increase of drive on the 14 and 21 mc bands, and a marked decrease in oscillator pulling on all bands except 10 metres. The only detrimental aspect of the modification was that the bandspread on 21 mc was quite severely reduced (and on 14 mc to a lesser extent) but this was not found to be original former and scramble winding about 90 turns of 34g. enamelled wire on to it. The necessary connection modifications can be worked out from the tabulation in Table II, and inspection of the unit itself.

It is now also possible to use the unit on 160m, if it can be arranged to switch in a 1.8 mc tuned circuit into the driver anode. This could be done in several ways—substituting 160m. for one of the other bands; installing an additional switch for the driven tuned circuits; or, and perhaps the neatest way, changing the whole bandswitch for a six-way type, which will save any unsightly modifications to existing equipment. Even though the unit would then run straight-through on 160m., as the PA input is only 10 watts, pulling whilst keying should not be any problem.

<table>
<thead>
<tr>
<th>Band</th>
<th>Oscillator Freq.</th>
<th>Buffer Anode</th>
<th>Driver Anode</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mc</td>
<td>1.75 mc</td>
<td>Untuned</td>
<td>3.5 mc</td>
</tr>
<tr>
<td>7 mc</td>
<td>3.5 mc</td>
<td>7 mc</td>
<td>7 mc</td>
</tr>
<tr>
<td>14 mc</td>
<td>3.5 mc</td>
<td>14 mc</td>
<td>14 mc</td>
</tr>
<tr>
<td>21 mc</td>
<td>7 mc</td>
<td>7 mc</td>
<td>21 mc</td>
</tr>
<tr>
<td>28 mc</td>
<td>7 mc</td>
<td>14 mc</td>
<td>28 mc</td>
</tr>
</tbody>
</table>
any great disadvantage, and considered a small price to pay for the improvement in performance.

However, this was not the end of the experimentation, as the note (whilst considerably improved), as well as the drive on 10-15 metres, was still not good enough.

In an attempt to increase drive and at the same time be able to run the driver at a lower level and hence reduce pulling still further, a 5763 was substituted for the 6V6 in the writer's unit. (This mod. might not be so relevant in the case of a Geloso using a 6L6 driver giving output to a QRO PA stage.) This involved a couple of component changes and the fabrication of an adaptor plate to take the B9A valvebase. (See Fig. 1, p.217.) Results were as expected, some 4 mA of drive being obtained on 21/28 mc and more than sufficient on the other bands.

Note Quality and Drift

The note was by now pretty acceptable on each band, but a final improvement was desirable and the problem of VFO drift had still to be tackled. The first precaution taken was to bypass all heater pins to earth with miniature 0.01 μF condensers. It might also be advisable to have an entirely isolated heater network to obviate the possibility of AC ripple being introduced into any of the stages by a chassis heater return. A stabilised supply to the VFO is essential. So that the VFO could be run at a lower level and hence realise an improvement in stability, the 6J5 oscillator valve was replaced by a 12AT7 double-triode. The first half was used as the oscillator (with the existing components) and the second half was wired as a buffer amplifier. This afforded an extra stage of isolation and meant that the VFO could be run at a lower level due to the slight gain of this stage, without any loss of drive. Reducing the level at which the oscillator operates can be done by reducing the HT applied or reducing the value of C1 (nominally 100 μF, see Fig. 2) or preferably both. It is a matter for some experiment so as to obtain reliable oscillation on all ranges. It also goes without saying that all dubious components in the unit should be replaced.

A further aid to increasing stability by reducing pulling was found to be by running the screen of the 6AU6 multiplier stage from a 150v. stabilised supply.

Results

As modified, the unit now produced a stable T9 note on all bands, but it is recommended that an ATU be used with a Tx incorporating the Geloso exciter, as the protection against unwanted harmonic radiation given by the small number of tuned circuits is still pretty marginal.

Final points: After every modification, the unit was realigned and tested—and note that when peaking the driver anode coils, the external trimmer capacitor should be set at half-mesh and the slugs peaked for mid-band. The multiplier stage coils should be peaked to give fairly consistent drive over all bands. It will of course be necessary to recalibrate the dial and is best done by letting the unit warm up for half an hour or so before any calibration is attempted.

In conclusion, the writer must say that his experience must not be taken as typical of all such Geloso units, nor is this article intended to be exhaustive in its coverage of the modifications—but it may serve as a useful guide to anyone who feels his Geloso exciter is not up to the mark.

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OBITUARY

We very much regret to have to record the deaths of the following radio amateurs:

—G2BOJ, Leslie Bennett, of Doncaster, Yorkshire, suddenly, of a heart attack, at the age of 59. A valued member of the South Yorkshire Amateur Radio Society.

—G3IOO, Nat Brown, of Oswestry, Shropshire, after a short illness. Well known in the North-West for his VHF and sporting activities, he was 59 at his passing.

—G5CG, Clarence Gregg, of Bulwell, Nottingham, an amateur of many years' standing.

—G8ABW, Kenneth Parsons, of Timperley, Cheshire, at the age of 56, as the result of a car accident.

—G8SB, Harold Boakes, of Sale, Cheshire, after a short illness, at the age of 59. He was a keen member of the North-West VHF Group, and active in local radio amateur affairs.

—Norman Crane, of Birmingham, 24, a well-known SWL of long standing, who had been an experimenter since the early 1920's. He was a founder-member of the "Radio Dozen Club."

Our sympathies are offered to the families, relations and friends of all these radio amateurs.
VERTICAL AERIAL SYSTEMS FOR THE COMMUNICATION BANDS

MATERIALS, METHODS OF MOUNTING AND A CO-AXIAL DIPOLE FOR TEN METRES

A. D. TAYLOR (G8PG)

Vertical aerials are capable of giving very good results on both the LF and HF bands, and they are particularly useful at a station where the space available for horizontal aerial runs is limited. This article gives hints on how inexpensive, readily available ex-Government whip aerials can be used to construct all or part of such vertical aerials, including a novel form of co-axial dipole for the 28 mc band. Besides their use as vertical aerials, whip sections put together in the way to be described can also be used to construct rotary dipoles and simple Yagi arrays for the HF bands.

Selecting Whips

Most of the readily available ex-Govt. whips fall into two categories. Twelve foot, 3-section whips (often called "ex-tank whips") are commonly available, and a certain number of dealers offer a similar 16ft., 4-section whip. Both these are particularly useful as they are strongly constructed and the number of joints is kept to a minimum. A second commonly available model is 11 feet long and made up from a number of sections about 18 inches in length. A multi-strand steel wire is usually run through the sections to keep them together when the whip is dismantled. This model is not so useful for LF-band applications, but it can be put to good use at 21 and 28 mc. A much heavier (and more expensive) 16-foot whip, ex the U.S. Army BC-610 transmitter, occasionally appears on the market, but because of its weight and cost it is not covered in this article.

The most suitable items for the purpose are the 12 and 16 foot assemblies mentioned at the beginning of the previous paragraph.

Making Up a Given Length

When used by the Services, the push joints between the whip sections provide both an electrical and a mechanical joint. As far as permanent amateur aerials are concerned, they should be treated purely as a means of mechanically linking the sections together, the electrical connections being made by the method to be described later. This is electrically far more efficient, and it allows considerably increased flexibility in using various combinations of whip sections to make up a given length. For example, if two 12-foot whips are available, one can be assembled in the normal way, then the base section of the second can be firmly wedged into its lower end to provide an overall length of about 15 feet. As the two remaining sections of the second whip can be put together to make a length of approximately 8 feet, the two whips now provide the basis for, say, the radiator elements of a 14 mc ground-plane and a 28 mc ground-plane. Where specific lengths are required which are not a multiple of four feet, spare sections can be cut as necessary and jointed by the method which will now be described.

Fig. 1. Method of securing Whip base to mast or pole.

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[over]
Fig. 2. Two ways of mounting a Whip when it overlaps the mast.

Electrical Joints

The whip sections are made of steel which is then copper plated and painted. Provided fine sandpaper is used, the paint can be removed easily, leaving exposed a bright copper surface which is very easy to tin for soldering. It is essential to use fine sandpaper and not to apply too much pressure, otherwise the copper plating itself may be scraped off. An ideal tool for the job is one of the cardboard nail files sold by chemists and beauty-aid shops. These consist of a stout card which has very fine sandpaper on one side and a coarser grade on the other. To make the connection, first ensure that the two whip sections are pushed firmly into each other so as to provide a really firm mechanical joint, then use the sandpaper to clean an area about one inch long and half an inch wide on each section at the point where they meet. Next, carefully tin the cleaned areas with a hot soldering iron, then strip the outer covering from about four inches of plastic-covered lighting flex and cut off the four inches of stranded conductor thus left care. Double the stranded conductor back on itself at the centre, tin it, then carefully solder it between the tinned patched on the whip sections. When the solder has cooled, rotate the whip sections through 180 degrees and repeat the process to make a second connection. Connections of this type ensure that the ohmic resistance of the joint is kept to a minimum, a point of great importance at the lower frequencies where the aerial may only represent a small fraction of a wavelength. The efficiency of LF band aerials can be still further improved by soldering a suitable conductor to the bottom of the lowest section.

Weather Proofing

To ensure long life, the whole assembly should be thoroughly weatherproofed. When the soldering is completed each joint should be well covered with tape, then the whole whip should be given two coats of paint. In most instances mid-green outdoor paint will harmonise well with the surroundings and help to make the whip inconspicuous. If the top section is open at its upper end, a wooded plug should be inserted before painting is begun.

Hints on LF Band Verticals

Whips up to 12 feet in length can be mounted at the top of a light wooden mast, provided it is guyed, or on the top of a pole. Under these conditions the amount of movement will not be excessive, even in gale force winds. Light masts are usually constructed from lengths of wood having a square or rectangular cross-section. The simplest method of mounting a whip at the top of such a mast is to make a small wooden platform, supported by a wooden strut, and screw this to the mast near the top as shown in Fig. 1 (A). The whip base is then mounted on the platform. A solid base should be used, as flexible rubber bases are only suitable for very short whips. If a self-supporting pole is used, the whip base can be screwed directly to the wooden weather-proofing cap at the top of the pole. The cap used should be an inch thick and four 2-inch woodscrews should be used to secure it to the pole head, as shown in Fig. 1 (B), p.219.

When whips in excess of 12 feet in length are made up, some overlap between the whip and the mast which supports it will usually be necessary unless an exceptionally rigid whip happens to be available. The exact amount of overlap will depend upon the type of whip sections used and the actual location of the station. The
writer regards his own location as being in the "worst case" category, as wind gusts in excess of 100 m.p.h. occur in winter. Under these conditions an overlap of 6 feet is allowed between a 20-foot assembly made up from "tank whip" sections and a 22-foot guyed mast of lightweight construction. With this amount of overlap the sway at the top of the whip is acceptable, even under gale conditions. This is very important, as excessive sway can break the whip or even bring the mast down.

Most handbooks suggest that the method shown in Fig. 2 (A) be adopted when mounting a whip on a mast with an overlap. It involves the use of stand-off insulators and clamps, and is an excellent method if suitable stand-off insulators happen to be available. Unfortunately, they rarely are! Anyone who has acquired a few of the heavy duty stand-off insulators used to support copper tubing runs in a marine radio installation can use them with complete confidence, but the lighter type of stand-off sold for amateur use is usually not strong enough for the job.

An alternative and inexpensive method used by the writer is illustrated in Figs. 2 (B), (C) and (D). The materials required are several cup hooks, a few inches of plastic outer covering stripped from a length of 3-core mains cable (used as sleeving), a rubber grommet of suitable size and a roll of plastic insulating tape. The method of securing the base, which should be done first, is illustrated in Fig. 2 (C). A rubber grommet of suitable diameter is slid over the bottom of the lowest whip section and pushed up until it butts against the shoulder where the whip section increases in diameter. The multi-strand wire which will form the lower part of the aerial is then soldered to the bottom of the whip section and this joint and the grommet are covered with a layer of tape which is then painted. The jaws of a cup hook are then opened out with pliers until the joint will go through them easily, and the hook is screwed into the mast and a length of insulated sleeving is slipped over it. The bottom of the whip is then put into the hook and pushed down until the grommet butts against the hook, after which the hook jaws are tightly clamped around the whip with a pair of pliers, the jaws of which have been covered with rag to prevent damage to the sleeving.

The remaining cup hooks should be fitted at about 18-inch intervals using the method shown in Fig. 2 (D), the last one being placed about 2 inches below the top of the mast. They must be clamped around the whip tightly, using the method already described. The end result is a really rigid mounting for the whip. The lower part part of the aerial should consist of a length of heavy, multi-strand cable. This can be brought down clear of the mast if desired and anchored to a stake two or three feet from the bottom. An inexpensive source of suitable cable is the 60-foot aerials issued as an accessory for the PCR range of Govt. surplus receivers.

Coupling methods and earth systems are outside the scope of this article, but the importance of the earth system cannot be over emphasised, particularly when considering LF band vertical aerials.

Ten Metre Co-Axial Dipole

A conventional ground-plane aerial may be beautiful to the eyes of its owner, but it hardly adds to the appearance of a residential area! A further disadvantage is that it must be fed with 52-ohm co-axial cable, which is not so easily obtained as the 75-ohm variety. The co-axial dipole, in which the radials are replaced by a quarter wave tube which has the feeder running through it, gives the same performance as a conventional ground-plane, but with a 75-ohm feed point impedance. It is also much more inconspicuous when erected. The basic construction is shown in Fig. 3 (A). When contemplating the erection of such an aerial for ten metres it occurred to the writer that thin coax cable of the type used for electric guitar connections was small enough to pass through the centre of the two bottom sections of a 12-foot "tank type" whip. When put together these two sections were a few inches too short to resonate at the required frequency, so a suitable length cut from a spare whip section was pushed over the narrow end and soldered into place, thus making the length a quarter wave. The other half of the dipole was made up in a similar manner. As the centre of a dipole is a low-voltage point, the two halves were joined together mechanically by making suitable clamps from strips of aluminium and clamping them to a length of dry, well varnished wood as shown in Fig. 3 (B). Once this was done the feeder was soldered into place and the open ends of the whip sections were sealed with Bostik strip to prevent water getting in. The lower end of the thin co-axial cable was made off into a female connector and this in turn was connected to a male connector on the end of a heavier cable leading back to the shack. To prevent undue strain on these two connectors the
BOOK REVIEW


ONCE again the time comes round with the difficult task of reviewing the Radio Amateur's Handbook. Since 1926, when it first saw the light of day, ARRL have kept this book up to date with continuous revisions and additions, which have made it and kept it an essential part of the fabric of Amateur Radio.

This year one notices at once a marked change; the cover design which has been in essence the same for thirty years or more has been altered completely (to your reviewer's regret). Inside, one observes that the Editorial chair has passed from Byron Goodman, WIDX, to Doug DeMaw, W1CER, and a major revision has been undertaken throughout. The spirit is unchanged; there is still the same clear and sensible approach to the difficult problem of writing a handbook to cater for all readers from the novice to the full-blown professional, but there has been an enormous revision. It is indeed a credit to the new Editor that there has been no falling-off in the overall standard, and we must congratulate him.

Looking inside, one is faced with the difficulty that so much has changed that it is almost impossible to pick out all the new material. In the SSB chapter a version of the circuit which appeared in the RSGB Amateur Radio Circuits Book is given a chance to demonstrate that a transistorised Vox unit can be made to work; and incidentally the circuit, as compared with the original, has an error corrected as well as being shown to be useful for the CW man. An SSB transceiver for 3-5 mc makes its bow this year, and will surely provide the basis for quite a lot of home-construction.

In the chapter on receivers, the regenerative preselector and the 80/40 metre converter disappear, along with the HB-67 five-band receiver, and an FET converter comes in. As for transmitters, a transistor five-watt job appears, together with some very useful notes on modulating transistor rigs; the four-band fifty-watt device becomes a five-band transmitter, the additional band being 28 mc, and the 75-watt transmitter, using a 1625 PA, has been replaced by one with a 6HF5 and incorporating a built-in reflectometer. FET's appear in this chapter also, with a rather nice VFO which can be used either at 1-8, 3-5, 5 or 9 mc, details being given for all these ranges—the latter two would be extremely handy for anyone contemplating SSB.

Integrated circuits make their appearance in the section on Morse code transmission, in the form of the micro-TO keyer, which is accompanied by a valve-and-relay add-on unit to enable such keyers as the Heathkit to be used with those transmitters for which they are not normally considered suitable. This one also provides facilities for connection to a tape-recorder for automatic CQ-sending if desired.

And so it goes on; FET converters for VHF, another for Top Band mobile use—wherever one looks one notes differences. Summing it all up, it can be said that while the book is still the same in approach it is largely new in content and would be a most valuable addition to the shelves in any shack where the operator is at all interested, not only in construction for its own sake, but in keeping his station as efficient as possible. Few could afford to be without it on this basis alone.

The ARRL Handbook runs to more than 600 fully illustrated pages of text, contains much tabular matter relating to valve and transistor types, is fully indexed, and includes a catalogue section covering most of the current commercial amateur-band equipment available in America.

It is an interesting fact that the ARRL Handbook has now sold more than four million copies, all over the world, since the 1st edition (copy of which we still possess) appeared in November, 1926—and that it is now ranked 17th in the list of non-fiction best sellers in the United States.

Editorial Note: The ARRL Radio Amateur's Handbook, 45th Edition (1968), is available at 50s. in strong paper cover, or 60s. bound buckram hard cover, post free, from stock, of the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TOP BAND IN AUSTRALIA

The VK's are, of course, licensed for the 160-metre band but it may not be generally known that the frequency area allocated to them is 1800-1860 kc, with PA inputs up to 150 watts. Our information is that Top Band is not much used in Australia. Because of their much greater point-to-point distances, most contacts are what we would regard as DX. There are some outstanding 160m. VK operators—notably VK5KO (Fulham, S. Aust.) who tries for the real inter-Continental DX. He has been heard and worked from the U.K.—see p.163, May issue.
**THE MOBILE SCENE**

**RALLY NOTES AND NEWS—MOBILE LICENCE FACTS AND FIGURES—**

**REMARKABLE /M-DX ON TOP BAND**

With seven Rally events having already taken place, and no less than 16 yet to be played off—two additional meetings are entered in the Calendar herewith—this is undoubtedly the busiest Rally season yet in the 13 years of mobile activity in the U.K.

According to the latest Post Office figures, as at April 30 last there were 2,522 British amateurs licensed /M—this being out of 13,657 U.K. licences in issue at the same date, in the A+B categories. Thus, the proportion of mobiles continues to show a healthy increase—actually 131 in eight months, there having been 554 new A+B U.K. licences issued in the same period. Put in another way, it means that nearly 19% of all British amateurs now hold the additional facility of a mobile licence.

Not so encouraging is the recent report of the Amateur Radio Mobile Society—said to represent the mobile interest in the U.K.—which shows not only a decrease in membership but also that, of the 2,522 licensed U.K. mobiles, only about 375 are members of A.R.M.S.! Not surprisingly, the committee of the Mobile Society expresses itself disappointed.

* * *

The North Midlands Mobile Rally at Drayton Manor Park, near Tamworth, Staffs., on April 28, in fine weather, was again a great success. The organisers were the Midlands and Stoke-on-Trent Amateur Radio Societies, acting jointly, with G3KPT in charge of organisation and G5PP acting as chairman. The estimated attendance of actual mobiles was something like 500—about 450 /M’s actually signed in—and by mid-afternoon they must have had some 2,500 people in the grounds. The most distant visitor was G3NJA (Torbay A.R.S.) and the prizes for mobile installations went to G3OOQ and G8FU. The event attracted a good range of trade stands, of varying degrees of radio interest, and the general impression is that good business was done and all present enjoyed a well-managed Rally in an attractive setting, with something for everyone to do.

* * *

A most interesting report from G3NXV/M (Birmingham) describes how—when stuck on the M5 with a flat tyre, at 0200z on April 16—he had a Top Band contact with ZC4RB, the mode being SSB/M. Though of course actually stationary, G3NXV/M was using his regular mobile rig. Such a QSO on 160m. is a great credit to both ends—the distance is a good two thousand miles!

**Mobile Rally Calendar, Season 1968**

**June 15:** (Saturday). Annual Air Day at Royal Naval Air Station, Lee-on-the-Solent, Hants., (H.M.S. Daedalus), with GB3RN of the R.N. Amateur Radio Society providing talk-on in 1910 kc, 70-26 mc and 145-3 mc. Ample car parking facilities, and attractions include a static exhibition of Fleet Air Arm equipment, also a flying display by some of the latest aircraft operating with the Royal Navy. Information and details: C/R/S M. J. Matthews, R.N., G3JFF, Amateur Radio Society, H.M.S. Mercury, Leydene, Petersfield, Hants.

**June 16:** Hunstanton Annual Rally (on the Norfolk coast).

**June 30:** Amateur Radio Mobile Society’s Annual Rally, being held this year on the U.S.A.F. Base at R.A.F. Mildenhall, Suffolk. It is one of the largest American Air Force bases in the U.K. Take the A11 Newmarket—Thetford and look out for the 5-way roundabout at Barton Mills. The “bull” is one of the best stopping places in the area and was much frequented by 3 Group bomber crews during Hitler’s War. On this A.R.M.S. occasion, entry to the Rally will be on the basis of the purchase of raffle tickets at the gate. There will be the usual A.R.M.S. rally attractions, with Sylvia as mistress of ceremonies.

**June 30:** Annual Mobile Rally at Longleat Park, Warminster, Wilts, organised by Bristol Group assisted by the Bristol Amateur Radio Club.

**June 30:** Pembroke Radio Club Rally at Regency Hall, Saundersfoot, near Tenby, West Wales, with talk-in on 1876 kc and 144-35 mc—R. J. Wilcox, GW3TSH, 33 Treawen Road, Pembroke Dock, Pembs.

**July 7:** South Shields Mobile Rally, the ninth in their series, put on by the South Shields & District Amateur Radio Club.—Organiser, Derek Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

**July 6-7:** Cheltenham Festival Rally, arranged by Cheltenham Amateur Radio Society and local RSGB group members, covering a wide range of tastes and interests, to coincide with the Cheltenham Festival of Music, which for years has been one of England’s intellectual occasions. As regards arrangements for radio amateur visitors, there will be a dinner on Saturday evening, July 6 (price 25s.) at the Lilleybrook Hotel, Charlton Kings (just outside Cheltenham, on the Cotswolds side) bookings to be made with G3LDA, G3MOE, QTHR, 14 days in advance, numbers limited to 80 persons. Overnight accommodation can be booked direct with the Hotel, Cheltenham 25861, at 14 days’ notice as the Festival imposes a heavy load on the local tourist accommodation, Caravan and camping facilities, at 5s. per night, on Cheltenham Racecourse, a fine site for VHF or /P operation, can be arranged at three days’
July 14: Annual mobile picnic organised by the Cornish Amateur Radio Club’s annual event. Notice with G3MOE, QT1HR. Rally talk-in stations will be: GSBK, 1925 kc, AM; G3MOE, 3725 kc, SSB; G3OLN, 70-26 mc, AM; and G3ML, 144-4 mc, AM. Cheltenham is a lovely town, and whether you go there by car or caravan, to stay for the day, a weekend, or the full week of the Festival, you can be sure of an enjoyable visit. Full details as to the programme, charges, and accommodation arrangements from: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham, Glos. (Tel.: Cheltenham 24217, or STD 0242-24217.)

July 14: Mobile Rally to be arranged by the Colchester Group at Colchester Zoo—with “ new faces in front and behind the bars!” Talk-in will be by GB3ZOO on the 2-4-160m. bands. Information: V. Levitt, Park Street, Stoke-by-Nayland, Suffolk.

July 14: Second Mobile Rally put on by the Worcester & District Amateur Radio Club, at the Hill County Secondary School, Upton-on-Severn. One mile west of the town, with adequate local sign-posting. There will be trade stands, an amateur TV demonstration, model aircraft display, raffles and competitions, with ample cover in case of bad weather. Talk-in will be given on 2-4-160m., and the Rally will start at 2.0 p.m. Details from: R. L. Avery, G3TQD, 24 Alexander Road, Droitwich, Wores.

July 21: Cornish Amateur Radio Club’s annual Rally at Pentire Headland, Newquay, Cornwall, with talk-in on 4-80-160m. Hon. Secretary: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

July 28: Saltash & District Amateur Radio Club annual Mobile Rally, to be held this year at Saltash Grammar School, Wearde Hill, Saltash, Cornwall, with the facilities and attractions of recent years.—Hon. Secretary, J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.

August 18: Torbay Amateur Radio Society Mobile Rally, at Dartmouth, South Devon.

August 18: Derby & District Amateur Radio Society eleventh annual Mobile Rally at Rykneld Schools, Derby, as in previous years.—T. Darn, G3FGY, Chairman and Hon. Rally Organiser, 1 Sandham Lane, Ripley, Derbys. DE5-3HE.


September 2: Peterborough Mobile Rally, with boat trips on the river and an exhibition stand of antique wireless apparatus. Talk-in station G3DQW will be operating on 1980 kc from 1.0 p.m. Rally enclosure is the river bank car park near the swimming pool, with plenty of free parking space. Ideal for a picnic in a sylvan setting. Information and details from: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.

Closing date for reports and information to appear in the July issue: Monday, June 10, addressed “Mobile Scene,” SHORT WAVE MAGAZINE, BUCKINGHAM.

YOU CAN NOW SIGN AT 20’s

A particularly frustrating and incomprehensible ruling by the G.P.O.—that when working CW, operators in the U.K. should sign over at not more than 12 words per minute—has now been ameliorated and brought more into line with current practice. The maximum sign-over speed (that is, when making the usual procedure calls at the beginning and end of a CW transmission) is now 20 words per minute. It does not matter how fast (or how slow) you go during the actual message exchanges, provided you do not exceed 20’s on signing over.

As a sidelight on this, it is probably fair to say that the G.P.O. may now have reached a stage where they are hard put to it to find competent telegraphists capable of giving the amateur Morse Test! The reason for this, of course, that whereas at one time every local post office had staff telegraphists to operate the normal telegram service, which was all by hand-sent Morse, that is something long in the past. It is now done by telephone or teleprinter. Forty years ago, when taking your Test for an amateur licence, it was always by appointment at your local head post office—where some kindly official operator (who could probably send and receive at 40’s with either hand and copy straight on to a typewriter) would give you an hour or so’s practice before putting you through the 12 w.p.m. Test!

On p.115 of the April issue of “Short Wave Magazine,” the retirement was announced of Arthur Edwards, G6XJ, after 40 years’ service under the Eddystone banner. Though closely concerned over all that time with the manufacture and marketing of amateur-band receivers and short-wave components, this is one of the few photographs of him—taken on his retirement as director of Eddystone Radio, Ltd.—that has ever been published.
COMMUNICATION and DX NEWS

ONE would hardly think—at this stage in the development of Amateur Radio—that the AM versus-SSB argument would still be a serious factor in Top Band operation. But it seems there are SSB operators who avoid 160 metres for local QSO's, because of the number of snide remarks from confirmed AM users who say they just cannot resolve the stuff at close range.

Your scribe has never experienced such a problem, although the number of SSB users locally is quite high—but then his Eddystone 888 has the positions of the BFO marked for upper and lower sideband, and also the correct position to bring the audio filter right on the nose of the IF selectivity when the latter is peaked. However, when doing some tests with a mobile receiver recently this inability to resolve big SSB signals was encountered. It was realised to be due to the receiver design, in that the first RF stage was not tied either to the AGC line or the manual gain control. Lifting the bottom of the cathode bias resistor from earth and connecting it to the RF gain control line turned out to be the complete solution.

Time taken: Just as long as the iron needed to warm up, plus three minutes and the time to slip the Rx back in its cabinet. With the amount of SSB on 160 metres these days, such a mod, becomes more or less essential anyway.

Reverting from things technical to things topical, the biggest source of QRM during the period under review seems to have been not the steamroller signals on the bands but rather the mower roller on the lawn! However, let us take things as they come, starting with the Ten-metre clip.

SIX-BAND DX TABLE

(All-Time Post War)

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Note: Placings this month are based on the "21 mc" Column.

Ten Metres

G3WDW first, from Leeds, who mentions doing some tests with G3UFB, who was walking away from him with a transistor receiver; in between the test contacts, using a K.W. Vanguard on the QRP position (so as to avoid TVI) into the Top Band wire, John managed QSO's with PY1AEQ, ZS4KC, LU5XE and 9Q5QA, getting AM reports between RS-57 and 59. This is the sort of thing that makes Ten so fascinating, especially when it happens on an apparently dead band.

Your conductor gained the impression that not only had 10m. passed its seasonal peak, but that the standard overall has remained poorer than last year—an impression rather confirmed by the letter from G3NOF (Yeovil). Don mentions an almost complete absence of W's, apart from a few W4's around 1800, although the Central and South Americans have been better during the afternoon and evenings. Contacts—all SSB—were recorded with ET3REL, FS7RT, HC1PC, KV4AD, LU's, VP2GLE, VPS's, VQ9DH, W5, W6, ZC4RB, DZ7DI, ZS's, 5Z4LG and 9Y4VS, while EA0AH fell off the hook.

G2HKU (Isle of Sheppey) has hard words to say about these newly-fangled prefixes, which he avers must be taken from an American "Toob" manual! This time it is the 4A's, who are XE's in disguise, of course. ZE1WPC—of whom, more anon—was found one day booming in, with nobody else around, and Ted also took in ZC4RB and ET3FMA, the latter pair on SSB.

As far as G3LZQ (Brough) was concerned, ten metres was erratic and no contacts are specifically mentioned, except one which we read as being 28 mc, when John was trying out a QRP rig. After coming on specially for the Saturday night in the USSR contest, in the hope of working Zone 23, he had the Tx working on 8 watts when JTIKAA...
appeared at 599. No option but to call him, with the low-power machinery hooked to the beam—and back he came first time with a 579 report. So G3LZQ goes to 40 Zones in the Table.

All the QSOs mentioned by G3NYQ (Oxley) were, except for a /M one on Top Band, made on SSB. The basic rig accounted for PY's, ZS's, ZC4's, CR7IC, ZE1CS, CX7AP, VP8, LU's, 5Z4LG, ET3REI, OD5's, 5LZ2RL (Liberia), Y9QJW, VU2KK, 9G1KT, EA0TU, TI1AL, VK, ZL and JA, while the mobile rig gave contacts with 9J2BK, ZC4's, SV6, ET3, W's, VE, VU2KK, W6, 9H1, ZS, OX3CJ and VQ9DH. So ten metres has been alive!

Fifteen-Metre Reports

At the top of the pile a photostat of one of the jumbo-sized cards from GB5QM, the Queen Mary when on her voyage to her last resting-place in California, sent in by G2YX (Aldridge), who worked GB5QM /MM on 21 mc. G2YX was also pleased to receive a copy of a local newspaper showing a map of the voyage with a few of the QSL's superimposed, in which his and G3MOE's are visible.

G3DO (Four Oaks) managed to add one to his score for the 15m. band with 9N1MM, and in addition contrived to hook 457PB, HS3TM, and MP4MAY, with a gotaway in the form of DU7RZ.

"A great band, this," says G3NYQ, who managed ZD3F, VP2AA, CR4BC, VK's, ZL's, 9H1's, 9J2BK, KV4FC, most W districts, 5H1SL, 7X0AH, 9X5AA, DU1FH, MP4MBC and MP4TCE, using the fixed gear; on the mobile side there was VK/ZL, V59MB, 9M2NF, ZD3F, VP2AA, 9H1R, PX1PA, VK9WD, CR6's, LU, ZS, MP4's and a gotaway in KX6EJ.

Last month G3LZQ was away, which explains his absence from this space—and since he has been back he has found fifteen metres rather like the curate's egg. CW accounted for DJ5J/KT3, and all USSR call areas, while SSB yielded MP4MBC, MP4BGE, 5W1AS, 6Y5GB, OX3MT, PK1SH, KR6RL and KX6GJ.

Rather a similar sentiment seems to lie in the lines from G2HKU, who did not work a lot, although XW8BP on CW gladden his heart by producing the 40th Zone after twenty years of trying; XE1AX was also a good signal.

G3NOF reports several morning openings around 1000 to the Pacific, and KW6EJ and K00L1/KG6 have often been heard over the short path, with JA's coming in short-path at the same time, in quantity. As for contacts, JA's, KW6EJ, VP2MK, VU2BK and W6's were booked in, but the bait laid was not sufficiently alluring to trap XW8AX or YJ8BW, although the latter was audible from 1000 until 1242. A rather interesting point is that YJ8BW, during the period he was audible, was working North Europeans and some G's, all of whom were north of the line London-Gloucester. This just goes to show how "selective" the skip conditions can be between.

G3AAQ found the most interesting way of getting at the VK's was at the local cricket match—as his letter is dated May 12 and written from Kidderminster one does not need to guess which match!—and rushed back to send his report in with only 15 minutes to spare to catch the post. During the month 21 mc CW gave contacts with XW8BP, CO2BB, and JA6CHR, plus SSB for SV0WB—all new ones, while the gotaway list included VU2ADW, VU2LN. (both CW) YV1AD, 9Q5, CR6DI and CX1AAU, the last four being SSB. This little lot, mark you, all with the /M rig!

Old Faithful—Twenty

Here we kick off with G3NOF, who found VK's in the mornings, together with good signals from the West Indies, Central and South America, plus, on a few mornings, the West Coast U.S. stations. SSB gave contacts with EA6ITU, I0ART, I26KBD (Ponza Is.), KH6GDO, OY7ML, U18LC, UW0H in Zone 19, VK's including VKZOO/M, VP1PV, VP9GJ, W4ATPU/AM over the North Atlantic, W5VBQ (New Mexico), W6's, WA7FIG (Arizona), XW8AX, ZC4RAF, ZD8Z, ZE1WPC, 4AIFFA and 9V1LK. A couple of contacts would probably both emanating from the same piece of wire were "Q7A," giving QTH as "Gunda Island" or "Gano Is." to various stations, also "ZA1AST," asking for QSL's via Box 10, Tirana—are also mentioned by Don.

G2HKU is temporarily off his regular sked with ZL2KP, who lost his beam in the same gale that drove the ferry Wahine into trouble in Wellington Harbour, as reported in the papers recently. ZL2KP has an exposed QTH right above the spot where the ship struck, and afterwards found his tower levered three feet from the vertical by the wind, and the tubing of the beam a tangled mess, involving a major reconstruction job. G2HKU worked W3KAK/MM, XE1CE, T16H0, HC1RR (who said he had been a priest in South America for 25 years) and, for a new one, HC5DR.

One rather gets the impression that G3LZQ has recently given Twenty SSB a good going-over, to judge by the length of his list. Taking the short CW one first, there are HK3RQ, J1TKAA, and all USSR call areas, while SSB gave 8P6, VP1, VP2, VP7, VP8, VP9, 6Y5, 9Y4, assorted 4A1's and XE's, several CPI's, HP, HR2BO, TG9, YS1ACS, YN2RAC, TI6, PA1B, PY0BLR, OA4, ZF1GC, FP8CS, FG7XL, ZP5JB, a large assortment of CE, LU, HK, and HC stations, various KL7's, KL7DNS (Umnak Is.) and G3ODO /KL7, KH6's, VE6 and VE7, T2UAX, EP2MR, SV0WS, YK1AA, G3WMZ/5A on AM, a crop of VK's and ZL's, plus "one startled W3 who called QO on 14115 mc for a major reconstruction job."

A definition—given by G3NYQ—would describe Twenty as the "hard grind band," which is indisputable. But it has also to be admitted that this is also the pay-dirt area, as an inspection of the six-band table scores would reveal. John did
manage to take hold of 5Z4KL, ZC4MO and SV1CE, albeit the R.A.F. ARS net on 14200 kc, controlled by MP4BBA each Sunday at 1500z; escaped him; after the R.A.F. ARS net itself closes the members work non-members who call them. Turning to G3NYQ's fixed-station score, we find J92BK, KH6, HK0BKW, CT2AA, CP5AD, HV3SJ, JX6RL, KR6, VP8, MP4BBA and MP4TCE gracing the log.

Most of the operations of G3SVK/A were in "another place," as devotees of Top Band will be aware, but he did spend a little time pondering over the difference between "GM" and "G" in terms of making the blighters come back before he put his fingers into the pie and pulled out CE3HLV, HI3JWP, PY1MIT, VE8RCS and ZP3AL. Heard but not raised were YN1, 8R1S, 6Y5, VP2V, 9G1GF and YV.

Sad story indeed from G3WJS (Dorchester) who says "rig blew up one morning, soldering iron blew up the same afternoon; G3WJS reduced to tears and Top Band!" No further comment is appropriate, just sympathy.

G3UDO (Croydon) refers back to the correspondence here last month, and explains that what he is griping about particularly are the chaps who have perfectly good QRO (or indeed QRP) rigs, and then cause the things to vomi all over the band (or indeed QRP) rigs, and then cause the things to vomit all over the band. These types not only suffer from the things to vomit all over the band rigs, and then cause the things to vomit all over the band. These types not only suffer from just because they over-drive them. The things to vomit all over the band (or indeed QRP) rigs, and then cause the things to vomit all over the band. These types not only suffer from just because they over-drive them.

G3OLS, owner of G3WJS, is owned and operated by Leslie Standaloff, at 7 Whaddon Road, Newton Longville, Bletchley, Bucks., who was licensed in September '46. With an abiding interest in radio since 1922, he went through the "hard and well-disciplined Telegraph School" before becoming an operator at various of the Post Office Coast Stations, working ships. It was from Fishguard Radio, on 600 metres, that he made the last contact (on October 5, 1939) with the disastrous airship R.101, which crashed that night at Beauvais, France. After war-time service as a signals officer in the Royal Artillery, an HRO was acquired—and from this came his progress in Amateur Radio.

Naturally, the main operating interest at G3OLS is CW, though Phone is also worked. At present, the gear consists of a TA-12 driving an 813 PA to 120 watts, the aerial being a 45ft. metal mast, base-loaded for all bands. The 160-metre rig is separate, for Phone/CW working with the locals. Now retired from the Post Office at the age of 60, G3OLS is contemplating a rebuild with some new gear.

...
from his annual haunts. Bob is going to be signing /W2 at Trenton, N.J. from July 8 to July 20, and going to be signing /W2 at Trenton, from his annual haunts.

The well-known Wirral Group propose to mount a weekend trip to Trawsfynydd, Merionethshire, working Top Band as GW3NWR/P and the HF bands under GW2AMV/P and GW2FOS/P. Balloons will (it is hoped!) hold up the aerials for 1.8 and 3.5 mc, with beams, dipoles or long-wires as necessary for the HF bands. Information from G3PXX, 16 Collingham Green, Little Sutton, Wirral.

Anyone wanting Scottish counties should get in touch with G3VGU; he and G3VYGT will be in GM from July 27 to August 10, and will be on 160-10 metres certain, albeit most operation will be Top Band. Modes will be CW and SSB.

Fourteen Scottish counties are on the Top Band itinerary of G3VAG and G3U/QL, between June 28 and July 14. All contacts will be individually QSL'd, and so will useful SWL reports. For details of the programme, send an s.a.e. to G3VAG, who will also be glad to deal with any requests for skeds.

Results of DX-Peditions

Quite a lot to report here, too, and we lead off with the EI8BT/M event, in which G6SU (Ryton, Co. Durham) and fellow-conspirators G3MEA and G6CY participated. Using a KW-2000A, a total of 50 countries and all continents were worked, including YS, XV, WE, VE, FP8, ET3, CN8, ZS6, CR6, 9G1, ZG4, ZD8, VK, ZL, OA, PY, JA, XW8 and most of Europe. Quite a nice time out!

G3SVK reports on his Huntingdon trip, which resulted in 340 contacts in 9 countries, the cards for which have now been despatched. A trip to GC is in stow, during July 27 to August 10, giving four days on Alderney and Sark, and three on Jersey and Guernsey, but the details are yet to be finalised. Fred has a few pertinent comments to make on the operation of this sort of an expedition as seen from the “sharp end”—tuning up on the channel (and taking an un consequential time over it, your scribe would add) is unnecessary and ill-mannered, apart from the fact that two or three characters doing this make it virtually impossible to read the others calling and so holds the whole show up. Others call in to exchange names, dates, QTH’s, “the rig,” colour of the XYL’s eyes and other irrelevancies, at great length, and have to be dealt with to get them off the channel. So, for G3SVK/A, one QSO from each location will be the form, and one item of information each way namely, the report. This is all that is needed beyond callsigns. And when you’ve got your report, QSY well off the channel to let the others get at him.

A real DX-pedition was that of W3DWG/VR6 for whom all the QSL’s, other than for the U.S., were handled by G3DO; over five thousand QSO’s in 140 countries were made from Pitcairn in four months. G3DO has a copy of all the logs from July 22 to October 27, 1967, and can oblige with a card for any outstanding ones, provided an s.a.e. or IRC is enclosed, with a request addressed to his QTH as per any current Callbook. Incidentally, Doug mentions that VR6TC is back in business; he was heard recently at 0645z, on his favourite 140 countries and all continents.

Results of CQ World-Wide Phone Contest for 1967 are to hand. Don Miller, operating as VK2ADY/9, won the Single-Operator All-Band trophy with a score in excess of five million! However, possibly more worthy was the effort of G3HDA in placing fourth in the same category, and taking the trophy for Top European, without any advantage of a DX callsign—a fine effort, indeed. Another to be congratulated this year is G3AA/4, for making the top spot in the Single-Band category on 14 mc. So two of those trophies are where they belong—in the U.K.! As always, the rest of the Midlands group were strongly evident in the results. The leading G’s on 28 and 21 mc were, respectively, G2BOZ and G3FKM. In the Multi-Operator Single Transmitter classification one notes G3WYX as leading G, followed closely by G6LF, G3VYG/A, and G3IAR. In the Multi-Transmitter category there was the GB2SM effort, which turned in a score of

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(Failure to report for three months entails removal from this Table. Claims may be made at any time.)
almost two million. To all of these, and indeed to all who have figured in the final results, our congratulations—this is not a tea-party, but a great man-sized contest, one of the toughest in the Amateur Radio calendar.

The CW results are not yet to hand, but should be available for next time, all being well. Thanks to W1WY of CQ for advance information on the Phone results.

Here and There

G3IDG has his big axe out, and is grinding it ready for action—the cause being the stations he works who, having failed to get his hame, QTH or RST, still end up the over with the words pse QSL. After all, to send a confirmation, one has to have something to confirm! Allan suffered this sort of thing from a G, an ON and a W, all on different bands. Your scribe could add to it that 7 mc stations are particularly prone to this sort of flabby operating. Incidentally, Allan recently received his sheepskin from the YLRL for coming out Top CW G in the YL-OM test—well, that was something! From VE7BHN/WO, a long and interesting letter comparing things in the U.K. and the States. In his last letter, it may be remembered, Tom mentioned the super-station with which he has to compete, and in particular W0HTH on Castle Rock. It seems they finally met, and tried the super-rig out on 7 mc into the two-element Quad, which gave 579 from G3TLX—incidentally where is G3TLX lately—a couple of hours before sunset in Colorado. VE7BHN/WO had a bit of a shock when ex-VQ8CC appeared under his other guise as GM3MBS/WO about 940. Tom was using the 3C prefix at the time, and the resulting muddle was quite comic for a while. The big signal was explained by the presence of GM3MBS on Lowry A.F.B.—all of a quarter-mile away! By now, Tom will have completed at W0 and be back in Vancouver, where he has to grapple with the aerial problem.

The LF Bands

The comments from VE7BHN noted above constitute just about the only remark on Forty in this month’s mail, apart from G2HKU who has been chasing cantons in the H22 contest and finds the HB signals in general to be of extremely fine quality, well operated.

As for Eighty, G2HKU says “not much worked” and someone else “conditions poor,” while the rest assess it by default! A pity, in that both bands have DX possibilities far beyond what they are usually credited with, and suffer far less from the TVI bogey.

However, on to Top Band, and a relatively small pile this month; the main news is somewhat negative, in that we hear from G3SVK that although he and G3TZZ heard VK5KO when sitting in the G3TZZ shack, the full contact in fact did not materialise. It seems that G3SVK had a sked up in Rutland which he could not keep, and at the time he was sitting with G3TZZ listening out. The VK was heard, called, and a reply heard and a report—but alas, it was a report for someone else misread in the excitement.

Several people mention ZC4RB and his courteous and competent operating during his recent period on Top Band. It does not seem to be generally known that ZC4RB worked three of his counties with a /M at the G end of the QSO. The first one was G3NYQ, CW at 0034 on April 7, but the following weekend G3NXV/M worked him in two counties, and on SSB at that! We have no details on the G3NXV gear, but that at G3NYQ/M was a KW-2000A plus DC PSU and the FIF whip.

G3VPS (Wartling) was encouraged by ZC4RB and GM3PPJ for a new county and a new country, plus a G, G3SVK/A in Rutland and OK/Ol, on late evening forays which usually end up with the G3VPS machinery being shifted on to Twenty, after TV hours.

With his Table entry a query from G3WJS, who wants to know whether his forthcoming move to pastures new—complete with half-wave garden for Top Band—means his descent to the bottom of the Table again. The rule here, made many years ago, is that if the move is within the same district (North London, Birmingham, Crewe, for
example) the score stands, but if the move is right out of the area, such as from London to Birmingham, the thing to do is to start again. A reasonable rule, for reasonable people, and that rule will stand.

John, as mentioned elsewhere, was confined to 160 metres, and found G3SVK in Rutland and Huntingdon, GW's, GM3OXX, GM3EOJ, GM3PPJ, GM3TMK in Ross-shire, GM3OUU, GD3N5S, GD3XJR, G13F8F/P, OE3WG, EI9J, DJ7SW, OK's and a couple of G's in wanted counties.

Richard of G3UGF is yet another one with a bouquet for ZC4RB, this time for a prompt QSL direct—quite a pleasant change from the usual routine. G3TKN is at the moment in the throes of building a filter-transmitter for Top Band SSB and, having got as far as the driver stage, became impatient and tried it out with a link wound round the driver anode coil. Output was no more than 700 milliwatts, which worked from Wirral right down to the South Coast, and even raised G3SVK in Huntingdon through the pack; so G3TKN is probably wondering whether to bother with a PA.

Nice to hear from Dave, G3PQF (Farnborough) who is on Top Band in the evenings occasionally and finds things very much more interesting after midnight; Dave remarks that, like your scribe, he did not click with ZC4RB (and your E.P.E. would add that G3PQF has fallen off his hook twice of late when he was a very good signal).

GW3WNN (Neath) sends in a note with Table entries, and says he is not very active, but was gratified to land EI2BG on Phone for a new one, and GM3TMK in Ross during the little time he had. Similarly GW3WUD, tin-bashing and wiring for his new SSB Tx, which found a PA and ZB2AY, and also got 58 on AM from Frankfurt, just to satisfy himself the aerial had not fallen down!

Continually digging more copper into the garden is the hobby of G3WQQ (Brighton), who is now going further and adding large quantities of copper sulphate to the ground, in the hope that eventually his earth connection will short out to the English Channel—and then look for fireworks!

A rise for GI3WSS (Holywood, Co. Down) was forecast, and so it turned out to be, with five new counties in two days, thanks to G3SVK in Hunt. and Rutland, GI3F8F for Fermanagh, GM3TSL/P for Selkirk, and GW3L5L/A for Caernarvon. All this is reflected in Cyril's standing in the Tables.

Back to G2HK; Ted found 160 metres quite good in spite of the static at times. CW was the mode for him, and QSO's were made with OL2AIO, G13F8F/P, G13CVH, GM3TSL/P, G3SVK/P, GW4NZ, GW3XP/G/A in Merioneth, and OZ2JG.

**Deadline**

And that about wraps things up for this month. The deadline for the next time is first post on Monday, June 10, addressed to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. In the meantime, may the DX come easily and your score prosper. 73.

Deadline for CDXN in the next few issues will be June 10, July 8 and August 12—for July, August and September SHORT WAVE MAGAZINE respectively.

**RECOGNITION FOR GM3BST**

It will be remembered by many of our readers that John Tuke, GM3BST, contributed to SHORT WAVE MAGAZINE in January 1964 and October 1966 some entirely original work on the construction of amateur Facsimile Receivers, adaptable for the reception of weather charts from the Wx satellites now regularly circling the earth. He was able to show some remarkable results, quite unique in the amateur context. These were later widely published in the U.S. and came to the notice of the firm of G.E. International, U.S.A., who are the designers of the American weather satellites and contractors to the U.S. Govt.

The upshot was that they invited John Tuke, GM3BST, and his wife, to visit the States on a free tour at the Company's expense, to include seeing the launch of weather satellite *Nimbus III* from Cape Kennedy. We are very glad to know that John Tuke's work, as processed for original publication in SHORT WAVE MAGAZINE, has had for him this very agreeable outcome. (In the event, *Nimbus III* failed on take-off on May 17, and had to be destroyed.)

**TNX TO AN UNKNOWN BENEFACCTOR**

From various comments we have seen and heard recently, there is a kind and generous "Mr. X" who has been making very acceptable gifts, anonymously, to certain of our juniors who—in the last few months—have been mentioned in one way or another in SHORT WAVE MAGAZINE. This shows an appreciation of our radio amateur youth, who are making a contribution to their own generation far different from the futilities of "rioting students." We have no idea who this anonymous benefactor may be, but in his quiet way he is helping those who really do deserve encouragement.
A NOTHER dreadful month as far as conditions on the VHF bands are concerned. No really decent openings to record with the exception of a couple of minor lifts on Four, one of them coinciding fortunately with the Four-Metre Contest during April 20-21. Even here though, it was only on the Saturday that anything like DX was coming through, and by Sunday morning both range and activity seemed to have dropped off considerably. Continental activity on Two and 70 cm. has been conspicuous by its absence, and even during the Coupe du REF over the weekend of May 4-5, it was very hard going, at least from the South, to scratch up a few contacts in spite of the large number of French stations who must have been operating during that time. And this with a pair of 4CX250's to twenty-four elements at 600 feet!

Poor results were also the order of the day during the 70 cm. Contest over the same weekend. During some twelve hours of listening only seven stations were heard at G3DAH, of which six were worked, the best DX being with G3NN/P near Wantage, Berks. Now, this is not the best of local conditions in that, unless there is a Continental opening, operators do not tend to turn their beams to the South-East since activity is low in the area, but with 75 watts to a 14-element beam at 55 feet and an FET Converter, things could have been better to say the least. Best result heard to date is that of G8AMU/P located at Kethurst Hill near Worthing, who had 61 contacts during 16 hours of operation. His own best DX was G8AKE (Leicester).

There was some evidence of Sporadic-E on Four, particularly on May 2/3rd, when ZB2VHF was heard at RS-59 in the early evenings. G4IB (Pembrey) working G3EBF (Harold Hill, Essex) was advised of heavy QRM on the frequency which was quickly identified, to the mutual surprise of both operators, as the ZB2. The signal was peaking to 30 dB over 9, and was also heard in Nottingham by G3FDW at about the same time and strength. QRM from Madrid TV and from the Voice of America FM station gave timely indications of an opening.

Pressure charts for the month show, rather surprisingly, that the 1,000 millibar level has been exceeded for most of the time. During the first week of April the reading was as high as 1,045 mB, falling off to a steady 1,020 mB until April 21, when a drop to 1,010 mB was observed. Thereafter, pressures of that order have been maintained. The high reading at the beginning of the month was not accompanied by a startling rise in propagation, and this can probably be attributed to the fact that the atmosphere was too dry at that time. It is the humidity of the atmosphere in combination with a good pressure and temperature differential which produces the results we are all waiting for and which are well overdue.

There was a bit of lift on Two over May 13-14, when G13GXP was worked from Herne Bay at 5 and 6, and G3MPS (Bridgewater, Somerset) at 5 and 9 both ways. French stations were also coming in at good strength on the 14th, as was the Swansea beacon.

Reverting to 70 cm. for a moment, the activity on that band seems to have dropped to a very low level since Two became available to the G8/3's. Apart from some very strong third harmonics from two-metre transmitters, and G3BGC, only a few of the regulars have been heard, and this is not altogether due to poor conditions. It would appear that an activity period might be a good thing—something on the lines of the SSB Monday night get-togethers. The difficulty is finding the right night, but as a suggestion, how about Saturdays between 8 and 10 p.m., to replace the Cumulative Activity Contests which have now come to a temporary halt. Let us not forget that if it can be shown that 432 mc is not being fully used, there could quite well be a successful demand from other agencies, who have for long been casting envious eyes on all those megacycles in a very useful portion of the radio spectrum. A reduction in our allotment, particularly from the /T point of view, would be disastrous.

A new and undesirable feature on two metres these days is the amount of out of Zone operation in the CW portion of the band. How many times does one find a weak carrier at the bottom end only to resolve it finally into a G8/3 testing on Two and using the old 70 cm. driver with the old crystal which brought them into the correct Zone on 432 mc?

VHFCC A wards

Claims for the Short Wave Magazine VHFCC Award are beginning to come in. Special Certificates are being designed and printed and this all takes time, so Awards are not going to be made next week, but receipt of arrival of claims is confirmed to G8AAZ, G3UFS, G3UUT, G3VPI, G3AGN, G8AEJ, G8ADP, G3JMV, G3ILO, G3EAJ and G3OZP.

To lend added interest to this Award scheme it would be appreciated if claimants would send in details of their station and operating conditions, on the lines of the information given on p.232 by G8AAZ, so that these can be published in due course.
It is emphasised that it is not necessary to send any cards with the initial claim. You must of course have the 100 QSL cards in your possession so that, when asked, you can send any for verification purposes, but hang on to them for the time being.

The first Award was to a G8/3 for 70 cm. goes to G8AAZ, Lawrence Woolf, of Wimbledon, London, S.W.19. First licensed for TV operation in 1962 as G3RAX/T, he subsequently became G6RAX/T and then, in 1964 was issued with the present call. It took him about fifteen months to work the 100 stations on Seventy and nearly four years to get the 100 QSL's! Not a very high return rate when all stations were sent cards immediately after the QSO! Altogether he has made about 350 contacts on that band running 35 watts to a QQVO6-40A driven by a QQVO3-10 via a BAY96 varactor tripler. Antenna can be an eight-over-eight or 14-element Yagi. On the receiving side G8AAZ uses a transistor converter with a B180 front-end into an AR88. G8/3 is now active on Two with 15 watts to a QQVO3-10 and a four-element beam. Score to date is 110 worked in 35 counties and 7 countries. Let's hope for his sake that the QSL rate is a little better than it was on 430 mc.

Annual Tables

The Annual Table is being published this month for the first time under the new arrangements. So send in those claims—see p.233.

London VHF Convention

The Winning Post Hotel at Twickenham was the scene of the Fourteenth International VHF/UHF Convention and dinner on April 27. Once again the organiser are to be congratulated on an entertaining and instructive event.

The afternoon lecture session was opened by Tom Douglas, G3BA, who reiterated his forceful arguments for VFO control and more SSB on two metres and concluded his talk with block circuit diagrams to show how easy it is to achieve both. Readers who are interested are referred to his article which appeared in the January, 1968 issue of Short Wave Magazine. Tom was awarded the Thorogood Trophy in recognition of his outstanding work on VHF. There followed a presentation by Arnold Mynott, G3HBW, who introduced a subject new to many in his audience —VHF phase locking and LF synthesis—which offers great possibilities for stable operation on the higher frequency bands. The 1962 VHF Committee Cup for home constructed apparatus went to him for his transistor receiver.

Peter Blair, G3LTF, the U.K. end of the recent successful 1296 mc E-M-E contact between the United States and this country (reported in this space last month) reviewed the state of the art and progress to date. His slides showed some of the antenna dishes constructed by amateurs for this work which were extremely impressive in their size and complexity—hardly the thing for a small garden, however. It is most likely therefore that in future E-M-E working will be concentrated on 1296 mc.

Hans Lauber, HB9RG, who also made a successful E-M-E contact on 1296 mc with W2NFA in April, followed G3LTF with an account of related work going on in Switzerland and Germany. Incidentally, Hans brought over with him the new Swiss QRA Locator Map which consists of four sheets and a key and covers a much greater area than the Belgian maps.

After a short break, members of the South Coast VHF Group, led by Don Hayter, G3JHM, and Mike Walters, G3JVL, reported on the construction, operation and reception of ZB2VHF, the Gibraltar four-metre beacon, Don, who is now professionally engaged in radio propagation studies, outlined the Sporadic-E results, and as readers may recall, successfully received the beacon for the first time this year in March. Vic Hartopp of J-Beams, Ltd., reviewed the design of antenna using slot or folded dipole feed, and Derek Bradford, G3LCK, had some interesting and amusing things to say about JXK converters and noise figures. Time did not permit him to play over the full range of tape recordings he had brought with him to illustrate the points which he made, but those who wished to hear them were able to do so later, and very conclusive they were. Of particular interest was the recording of solar noise.

Dain Evans, G3RPE, who recently made the first cross-channel contact on 13 centimetres with F2FO, brought us up-to-date with the latest news on that band and also demonstrated a simple but stable transmitter.

This concluded the formal part of the proceedings, and after a short break for the raffle, visitors sat down to an enjoyable dinner.

1296 mc Moonbounce

The success of G3LTF (Chelmsford) in the recent 1296 mc E-M-E trials with the Crawford Hill VHF Club has already been recorded, but further information from the American end has now been received. QSO's were completed with G3LTF, HB9RG and WB6IOM on April 13, and with G3LTF and WB6IOM on April 14. Signal strengths at Chelmsford were RST-229 on the 13th and RST-339 on the 14th; Peter got 449 and 349 respectively on those dates. Other G participants were G6XM and G3GWL, but no contacts either way were reported. The Chelmsford report represented +10 dB above noise in a 100-cycle bandwidth using a paramp. The antenna system was a 15ft. dish with crossed dipole feed, and the transmitter ran 150 watts from a pair of 7289A in 180° hybrid coupling arrangement.

Certain unforeseen snags enlivened the proceedings, the first being the unintelligibility of the received signals until it was realised that W2NFA had the FSK phase reversed, mark being on the space frequency, and vice versa. A power supply regulator breakdown at that end also
held up things for a few hours on the 14th and this brought in its train some spurious transmissions which were a bit puzzling, and sounded most odd on the tape, as they were spaced from the operating frequency by about 1 kc. There were certain sources of error in the feed lines and relays at Crawford Hill and this led to the estimate that only some 70 watts of RF energy was getting into the antenna at times. It also meant that the system noise temperature could have been as high as 1.000° Kelvin. 

Due to the moon angle on the second night, the G3LTF beam looked as if it would foul the garage roof, so in the small hours it became necessary to hack pieces off the supports to obtain the requisite clearance. What with this, and erecting a 14-mc dipole in the middle of the night, there was never a dull moment it seems.

W2NFA will continue to schedule E-M-E tests on 1296 mc exclusively, the next series being in October/November. Since most of the activity is confined to the Northern hemisphere, every effort will be made to arrange the tests over a weekend when there is a positive moon declination and no new moon phase. Anyone wishing to participate in these tests should send two self-addressed envelopes, with IRC8s, to: R. Turrin, W2IMJ, Box 45 RR2, Colt's Neck, N.J. 07722. Two bulletins will be issued, one well in advance and the second within a week of the tests.

Modulation

The number of stations using inadequate modulating power on the VHF bands seems to be increasing, and it is difficult to sort out always why. Certainly, there are many cases where the transmitter output power has been increased, perhaps by substituting a larger PA valve, without any related change in the modulator, but this does not seem to account for all those S7 carriers with S3 modulation that one hears. Inadequate gain in preamplifiers and bad matching must bear their share of the blame, too. The modulator output power requirement of half the carrier power, which must be rigorously applied on the DC bands, is not applicable on VHF. Something more like the same power is required, i.e., 80-90 watts of audio for a 100-watt carrier. It is not suggested that this amount should be used in all cases, but it should be available, since losses at these frequencies can be high.

When discussing modulation one often hears the term "decrement modulation" mentioned, usually in the context of a downward swing noticed on a receiver S-meter, but this is really a misnomer since the term should be more properly applied to a modulation system which varies the carrier amplitude between its steady value and zero. Not very efficient, but it does have its uses. A much better system for getting more power on to the carrier is the "ultra modulation system" which restricts the negative-going peaks of modulation so that the carrier is not interrupted, but allows the positive peaks to swing the carrier level up to 200% or so of its resting value.

The usual 'scope pattern given in the text books for sine wave modulation shows the carrier varying between twice the resting value and zero for 100% modulation. All well and good. The carrier is not cut on negative cycles and so no splash and other unwanted harmonics. Assuming a 100-watt carrier and 50 watts of audio, the output power consists of 100 watts in the carrier and 25 watts in each of the two sidebands. But note that the power varies as the square of either the current or the voltage, so at the peak of the modulation upswing, the instantaneous power is four times the unmodulated carrier power. Suppose it can be arranged that the positive half-cycles increase the carrier amplitude by a factor of four. Then the peak envelope power is sixteen times the carrier power. In the example considered, sine wave modulation has been assumed. Ordinary speech waveforms have about half as much average power as a sine wave of the same peak amplitude. So for the same modulation percentage, the sideband power with ordinary speech will average only about half the power with sine wave modulation, since it is the peak envelope amplitude, and not the average power, that determines the percentage of modulation.

This desirable increase in modulated output can be achieved by careful adjustment of the DC screen volts on the PA and the application of the correct level of audio volts to the screen. Taking the familiar QV06-40A as an example, the makers recommend that the AF voltage on the screen should be 185 volts peak-to-peak and the DC voltage 250 volts. Screen current will then be of the order of 10 mA. Unless one is very
lucky, the usual series dropper from the modulated HT supply will not meet both these criteria. A circuit which overcomes these difficulties is the familiar cathode follower. By taking the PA screen connection to the cathode load resistor and by applying to the grid of the cathode follower independently variable DC and AF potentials, a suitable balance can be arrived at which will give an increase in the amplitude of the positive half-cycles of the modulation with the negative half-cycles still just meeting the carrier zero level. It is not recommended that this adjustment be made without an oscilloscope to view the final waveform.

The effect of this process can be enhanced by applying a small amount of the modulated HT to the screen of the driver valve. A resistor of some 10K connected between the screen of the PA and the screen of the driver will usually produce about the right amount of audio.

It is necessary also that the amount of drive applied to the final should be correct. Too much drive will shorten valve life and not enough will frequently produce the effect known as “downward mod.” So let’s have some 5 and 5 signals rather than all those 3 and 7 apologies.

**DX-Peditions**

G8APX had to alter his holiday arrangements after the publication of the proposed sked dates and this apparently caused some alarm and despondency. He was unable to visit the Newcastle area as he had hoped. He called CQ on numerous occasions, and eventually raised G8AFN who was /A at Longframlington. Signals were 5 and 9 both ways. Contacts were also made with G8AZY, G2BDQ and G4LX. On April 19 at Spinningdale, on the A9 just south of Golspie on the northern side of the Moray Firth, he had to call on two metres instead of 70 cm., but was heard by GM3ODP (Black Isle), who alerted GM8AGU and GM3WML on the south side of the Firth, and GM3JFG (Invergordon). Good QSO’s resulted all round, but an attempt to work GM3JFG whilst mobile ended less than a mile from Spinningdale as soon as height was lost. G8AGU and 3WML, plus GM8AZS (Elgin) also worked GM8APX/M on both two metres and seventy-cm’s while he was at Hopeman on the cliffs top. On the 23rd GM8AGU kept in QSO while GM8APX/M got as far south as Grantown, 22 miles away, the interesting point being that the Dava Moor mountains were in between them.

Another Highlands expedition, this time with G3UQL and G3VAG (Wivenhoe, Essex) at the helm. They plan to tour GM with two-metre gear during the period June 28 to July 14, operating from fourteen of the least populated Scottish Counties, one evening in each. Enquiries for details of sites, dates, frequencies, etc., to G3VAG, QTHR. Firm skeds are offered.

Jersey again this year! Good news from Peter Martinez, G3PLX (Portsmouth) that an expedition sets out on June 8 returning June 21, with gear for Four, Two and 70 cm. Hotted-up converters will be taken, all with noise figures better than 4 dB, and some pretty hotted-up operators too, including G3OPF, G3OHH, G3PMJ and G3TEY. Frequencies are 70-41 mc, and as near as possible to 144-100 mc. The 70 cm. frequency will be three times the two-metre frequency. Skeds welcomed on any band and can be arranged through G3PLX at Flat 6, Purbrook Gardens, Purbrook, Portsmouth, Hants. Latecomers can contact Peter at Waterlooville 51372 (STD 07014).

Perhaps not strictly a DX-pedition, but Sandy Morton, of the British Amateur Radio Telegraphy Group, advises that he now has the call GM8BJI and is hoping to promote some activity from the rather rare county of Buteshire in the near future. The QTH is about 25 feet above sea level and 25 yards or so from the water’s edge. No trouble getting a good earth—just throw out the anchor! Portable and mobile activity is going to be possible at a site 400 feet a.s.l. with a perfectly clear take-off to the South—nothing for miles and miles. He is looking for a TW Communicator or something similar, and also circuits for SSB on Two. Any offers? The address, for those who may be able to help, is: 4 Mount Stuart Street, Millport, Isle of Cumbrae, Bute-shire.

Further gen on the G3VPK trip to Northern Ireland. Dates and locations are now as follows:—July 14, Antrim; 15th, Londonderry; 16th, Tyrone; 17th, Fermangh; 18th, Armagh; and 19th, Down.

Operation will be during 1900 till 0100 BST with sked times between 2100 and 0030 BST—convenient for those who suffer with Ch.5 TVI! A sked list will be circulated during the last week of June, so the final date for fixing them up is June 21, by s.a.e. to G3VPK, QTHR.

More news also on the G3UBI/ G3UFG expedition to GI. Firm sites and dates are now as follows:—Armagh, July 29-31; Londonderry, August 1-3; Fermangh, August 4-6; Tyrone, August 7-9; Down or Antrim, August 10.

Operation on Two from 1800 to 2100 local time, mostly on CW but A3 if conditions permit. Frequencies will be 145-7, 145-8 and somewhere in the CW portion of two metres, depending on the crystal which has yet to be obtained. There is a chance that there will be some operation on 70 cm and 70 mc also. Skeds can be arranged via G3UBI at Monks Cottage, Burton End, Stansted, Essex, but they would prefer to freelance. Gear will be 15 watts on Two with a possible increase to 50 watts. Antennae are 14-element J-Beam or 8-element Yagi.

G3PUO advises that another expedition to Andorra is being planned for June 15 to 30th. Operation will be on 70-125 and 70-26 mc, SSB, AM and CW, and on 145-41 mc SSB only. No skeds are being arranged so it is a question of monitoring those channels for a contact. It is very much to be hoped that this effort will succeed where so many others have failed.
**General News**

Good to hear from Johnny Hayden, G3BLP (Caterham, Surrey). Last contact with him was about 20 years ago. For the newcomers, John puts out an impeccable signal on Two, both AM and CW, and has done most of the things worth doing on that band. He has an outstanding DX record made without the use of SSB, of which he is a something rather less than fanatic supporter. He makes an interesting observation about the allotment of specific sections of the two-metre band for specific functions, pointing out that the CW end of Two is now cluttered with both strong and weak signals which makes working with DX a bit difficult at times and rather negatives the raison d'etre of the Band Plan. He has a point there.

G3XMZ (Horley, Surrey) after five years as SWL is at last licensed. He was a modified B.44 on Four and is looking for contacts. The Ainsdale Radio Club is once again organising the annual local regional VHF contest. Date is August 4, operation in the four and two-metre and the 70 cm bands. Location is Westmorland. Full rules from G2CUZ. QTHR.

A loss to the VHF bands with the departure of GM3DIQ (Midlothian) to VE-land in the near future. The loss may be only temporary as, to quote "... and I will make some attempts on VHF to cross the pond at some future date, even if this must be by E-M-E to Peter Blair." Best of luck in the new appointment.

The South East VHF/UHF Group's last meeting heard with interest a talk by Peter Jones, G2JT, on "Aerial Power Tactics" illustrated with practical demonstrations of radiation on centimetric frequencies. The next meeting is at Rutherford College, University of Kent, Canterbury on June 21 at 7.30 p.m. when the speaker will be Arnold Mynett, on transistors at VHF/UHF. All interested are welcome.

G3TLE and other local Luton amateurs are trying out a good scheme to increase traffic with EI. The idea is to arrange activity via a 7 mc link for a specific period on a local net frequency of 144-874 mc. Net members then listen for EI signals, reporting any results on the net frequency. These are then coordinated and passed back to E15BH. Knowing who is on and at what time should lead to quite a few contacts which might otherwise be missed.

**Specially on the Air**

Further entries for this space—see p.112 April issue SHORT WAVE MAGAZINE for details—should reach Editor, Short Wave Magazine, Buckingham by Monday, June 10, for the July issue.

**GB3RHE, May 31-June 3:** Organised by South Shields & District Amateur Radio Club for the Rotary Club Hobbies Exhibition at Gosforth Park Race Course, Newcastle, over the Bank Holiday weekend, Friday, May 31 to Monday, June 3 (excluding Sunday). Activity will be AM/SSB on all bands 10-160m.—D. Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

**G3VGG, June 3:** Exhibition station put on by Bromsgrove & District Amateur Radio Club for the local Rovers’ Fête, operating on the 20-40-80-160m. bands.—J. Dufane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.

**GB3LRS, June 5-8:** For the "Leisure 68" Exhibition at Granby Halls, Leicester, at which some 36 clubs and societies in the neighbourhood will be represented. At the last such event, in 1966, a total of 18,000 people visited the show. It is hoped to operate GB3LRS, of the Leicester Radio Society, as a typical AT-station.—N. Tomlinson, hon. secretary, Leicester Radio Society, 33 Merton Avenue, Leicester. LE3-6BF.

**GB2LO, July 8-20:** Organised by the Radio Society of Great Britain in connection with the City of London Festival, using equipment (loaned by K.W. Electronics, Ltd.) to operate SSB only on the 10-80m. bands.—Syliva Margolis, p.r.o. RSGB, 95 Collinwood Gardens, Clayhall, Ilford, Essex.

**GB2LAD, July 13:** For the Air Day at R.N. Air Station, Lossiemouth, provided by the Moray Firth Amateur Radio Society and operating on 20 and 80m., CW and SSB. Visitors welcomed to the flying display and the static exhibition.—C. Hollins, 66 Lossiemouth Road, Bishopmill, Elgin, Moray, Scotland.

**GB3NEW, August 5-10:** To be provided by the local College of Further Education Radio Society for the Welsh National Eisteddfod, to be held this year at Barry, South Wales. This is the first time Amateur Radio will be represented at this internationally known event. Further details later.—D. H. Adams, GW3VBP, College of Further Education, Colcote Road, Barry, Glam., South Wales.

**NATIONAL SOCIETY MEMBERSHIPS**

It may be regarded by some as rather astonishing that—on the latest available figures—only 60% of U.K. amateurs are members of the Radio Society of Great Britain. In fact, the ratio of RSGB transmitter membership to the total of British licences in issue has been showing something of a decline during the last few years. However, the RSGB position is proportionately a good deal better than that of the American Radio Relay League (ARRL), the U.S. national society. Of the 293,000 licensed American amateurs, only 81,000 belong to the ARRL—less than 37%, and even this is said to "show an increase in ARRL membership for the year 1967."
THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for July Issue: June 7)

(Please address all reports for this feature to "Club Secretary," Editorial Dept., SHORT WAVE MAGAZINE, Buckingham.)

ONE of the fashionable ploys lately for a club activity is the "Club Constructional Project." This ranges from group building of a converter to the really ambitious lads who completed a Side-band Tx. Your scribe was talking to a friend a few days ago who has recently returned from a longish trip to the United States, and the discussion turned to this matter of projects, and how our W opposite numbers view them. It seemed the local group to which he had belonged over there set out to build a flea-power rig on one of the VHF bands for each licensed member; the crystals were all set up so that all were listening and transmitting on the same frequency, and each rig was fitted with a squelch circuit. Thus, whenever one went in the shack, one turned on the tiny rig at the same moment as one turned on the light, and then forgot the shack, one turned on the light, and then forgot the presence of the rig. The squelch is the key to the whole thing, as every station would use this so that only the locals would open the thing and so no other signals or receiver noise would appear in the speaker. Such a scheme, in this country, would appear to be a natural for the 70 mc band, or even 28 mc at times of low sunspot activity. Circuitry and costs could be simple, and the project would not only help the programme of the Club, but almost certainly result in a more united group.

But enough—the reports, once again in regional groupings, since this way seems to be quite popular.

Scotland and the North

Last month we mentioned Halifax and their being outside the Halifax area—and promptly received the expected riposte from G3MDW on behalf of the Northern Heights lads, who claim that every self-respecting amateur within fifty miles of Halifax is a member of Northern Heights anyway! "Club Secretary" has no intention of refereeing, but confines himself to the safe statements that Northern Heights and Halifax are both good and lively groups, and giving their programme. For Halifax, June 14 is the AGM, with kick-off at 8 p.m.; for the summer there are no formal meetings but events will be more along the lines of demonstration stations and similar activities. For Northern Heights, the matter is a little more complicated, with June 5 booked for a visit to the Manchester Radio Club, and on the 15th a station to be operated at the Halifax Charity Gala, while at the meeting of the 19th G3TPW will be talking about a transistorised transmitter. July 3 will be set aside for a talk on Colour Television by a member of the staff of the Baird TV people.

Rotherham next, and here we are to say that they get together every Monday evening at the Victoria Club, Victoria Hall, Masbro', Rotherham. On June 30, the lads are having a picnic afternoon, with transmitters going on Top Band and 144 mc, from 2 p.m. until about 6, using the Club callsign G3OAM.

On to Bradford, who have recently had a "Surplus Equipment Sale," which was very successful, and for June can look forward to an informal meeting on the 4th, a nice weekend out on June 8/9 at NFD, with an inquest on what went wrong to follow up on June 18; finally, on June 25, a visit to the Airport at Yeadon should prove of interest.

A New One—Cleveland A.R.S.—has been formed, with its Hq. at the RAF Association Club, Newcomen Terrace, Redcar, where they are in session each week on the Tuesday evening, with the start time for 7 p.m. The Hon Sec.—see Panel for his address—would like to hear from other Secretaries about the activities they lay on, so that he can get a feel for the sort of things that will go down well. So—write to him, chaps!

Hull always seem to have a programme as long as your arm, and this time is no exception, with NFD preparation and G3PQY on Oscillators, both slated for June 7, NFD itself G3OHT on Colour Television on June 14 and G3AGX talking about Radio Control on June 28. All that leaves a gap—June 23, when they try to be serious for a while, and discuss their future outdoor activities. Hq. is about the only thing we have not yet mentioned, and that is at 592 Hessle Road, Hull.

A private room at the George Hotel is the venue at which the Bury and Rossendale chaps foregather on the second Tuesday of each month; which gives June 11 as the date this time, and the WIBB tape-and-slide lecture is the attraction.

Not very often that we hear from the Scottish groups, and so more of a pleasure; albeit Lothians make up for the others by being one of our most regular reporters. June 13 should be noted in the
diary as the date for a Giant Surplus Sale, and the all-important AGM occurs on the 27th.

Some groups only appear in these columns at MCC-time, or about a year, but we know of their existence and health from other directions. In this category comes Moray Firth, who have an Hon. Sec. who says he will only report when he has gems of news or nothing better to do! HQ is at 42 East Church Street, Buckie, where they are to be found each Monday evening. Currently, the programmes put on each evening are aimed at assisting the younger element, several of whom are actively preparing for an attack on the R.A.E. The Club station is off the air at the moment thanks to a weird fault that has so far remained elusive, so if a new member or visitor wants instant popularity, he knows what to do. Looking forward a little, to July, they will be assisting at the display at R.A.F. Lossiemouth, by way of a station signing G3PTB on the HF bands; July 13 is the date for this one.

Pudsey seem to be doing fine with their new Club; membership is now up as high as 56, with a good programme arranged, so for all the dope, all you have to do is to contact the Hon. Sec. at the address in the Panel.

That warning to visitors to bring their own paintbrushes is not now needed at Culcheth, where the decorating is at last over in favour of lectures and activities. June 14 is the day, and the subject Transistor Fundamentals, to be dealt with by G3XDM.

Wales, Midlands and the East

Quite a large and ill-defined area, this, but having advantages in that it enables your poor old scribe to avoid revealing his lack of geography!

Right at the top of the clip, we have a letter from the Welsh Radio Club who have no meetings organised formally for May-June owing to a small change-around in the organisation, but nonetheless they are ready and active to welcome potential new members in the area of Newport, Mon.

Norfolk Challenge is as much of a pleasure this time as ever; from it we find in June that the normal date on the 3rd is passed owing to the Bank Holiday, and G3PTB is pressed into service to give a talk on Inductors on June 17; the month is nicely round out by a Radio Panel Game on the 24th. Meetings are held at Brickmakers Public House, Sproston Road, Norwich.

Sad to say, the Hon. Sec. of the East Worcester-shire group gave us the May programme in error; but it tells us well enough that the venue is the Old People's Centre in Park Road, Redditch, on the second Thursday in each month, and we can add to that a rider that with the wealth of talent that exists in the area the group can hardly fail to be first-class.

The third Tuesday in each month is the normal date for the Midland (M.A.R.S.) boys, but there is so much in the way of extra-mural activities going on that it would be well to check the latest state of things with the Hon. Sec. before going to the Midland Institute, Margaret Street, Birmingham 3.

Conveniently, Coventry have dates on June 7, 14, 21 and 28, at their temporary HQ, with the City of Coventry Scout Headquarters, 121 St. Nicholas' Street, Radford, Coventry. Obviously, the June 7 date is for Field Day preparation, but on the 14th they are in for a real treat—the lecture to be given by Mr. H. G. Miles on Satellites and Space Probes. June 21 is going to be used to give the Club rig an airing, while on the 28th it is the fresh-air treatment for them, when they go out Direction-Finding.

The Rhyl lads get together on the second Tuesday of each month at their Clubroom, which is off Windsor Street, Rhyl. For all the latest information, a line to the Hon. Sec. is probably the best ploy—see Panel.

Pressing on with the business, it will be recalled that last time South Birmingham were missing—but they have come back to date, so that your scribe has the pleasure of two copies of QSP to read. From them, we glean the details of the June business. A Junk and Surplus Equipment Sale, on June 5, at the Scouts Hut, St. Stephen's Parish Hall, Pershore Road, Birmingham 29.

Not a hundred miles away from the South Birmingham area is Sutton Coldfield, who have June 10 as the formal meeting and June 24 as the natter-session; but the difficulties of finding lecturers at this time of year leaves the topic very much "in the melting-pot."
Help!

Various mentions of Peterborough in these columns of late months have all been in connection with old radio equipment—and now for another one. Has anyone got any of the square section wire used for receiver wiring in the 1920's, with which they can properly rewire some vintage models, ready for their exhibition entitled “Wireless in the 1920's” which commences on September 2. The need is urgent, and so far none has been found, so if anyone can help, please contact the Hon. Sec.—see Panel below.

The first and third Wednesday in each month is a routine which is adhered to by the Wirral lads for their meetings; and for June this means one session getting things sorted out for NFD, and t'other deciding what went wrong and who forgot the receiver. No hard feelings though—there is a DX-pedition lined up for them on June 22/23!

Thursdays are the days the Salop lads look out for; two of them are set aside for outings, and on June 13 the trip is to the R.A.F. station Cosford, arriving there at 7.30 p.m. As for the other one, it is to the Midland Electricity Board Control Room, Ditherington, with arrival again timed as 7.30. To fill in the remaining weeks in the month, the Old Post Office Hotel, Milk Street, Shrewsbury, is the spot for a good old ragchew.

Near the middle again, to Mid-Warwickshire, who are at 28 Hamilton Place, Leamington Spa, Monday, June 10, is the date for a Grand Junk Sale, with visitors specially welcome. The other Monday evenings will be used for general rag-

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BRIGHTON (Technical College): R. A. Bravery, G3XKI, 7 Copse Hill, Brighton BN1-3GA (50648), Sussex.
BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
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CROMER: C. F. J. Gill, G3SQK, 33 Carlsway Close, Cromer, Norfolk.
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MID-HERTS: I. Gurton, G8ASP, 28 Bloomfield Road, Harpenden (3770).

MIDLAND: C. J. Haycock, G3JDI, 29a Wellington Road, Nuneaton, Warwick.
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NORTH KENT: P. T. Baker, 64 Latham Road, Bedseyheath, Kent. (01-203-8653.)
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (44279).
NUNEaton: J. Roughton, 42 Severn Road, Bulkington, Nr. Nuneaton, Warwks.
PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
PURLEY: A. Frost, G3PTQ, 62 Gonville Road, Thornton Heath, Surrey, CR4-6DB.
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SALOP: W. J. Smith, G3WNI, 27 Kingswood Crescent, Copthorne, Shrewsbury.
SOUTH BIRMINGHAM: W. V. Shepard, 174 Gristhorpe Road, Selly Oak, Birmingham, 29.
SOUTH DOWNS: L. E. Tagliaferro, 9 Tugwell Road, Hampden Park, Eastbourne (54244), Sussex.
SOUTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (01-203-8653.)
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SUTTON & CHEAM: P. Ball, G3HQT, 55 Maycross Road, Sutton, Wirral, Cheshire.
SUTTON COLDFIELD: A. W. Ferneyhough, G4VHY, 114 High Wynd Road, Kingstanding, Birmingham, 22C.
VERULAM: J. Thomas, G3RXA, 9 Highland Drive, Hemel Hempstead, Herts.
WELSH: S. R. Cole, 61 Elenezere Drive, Rotherham, Rotherham.
WIMBLEDON: A. Alexander, 26 Pepys Road, West Wimbledon, London, SW.20.
WIRRAL: J. Phillips, G3PXX, 16 Collingham Green, Little Sutton, Wirral, Cheshire.

June, 1968
chewing and taking advantage of the fine facilities we understand they have in their QTH.

The problems of a change of Hq. are tying up the Hereford lads a little as they were, at the time of writing, negotiating with a Council that always takes its time about making decisions. In the meantime they are using the Darby and Joan Club Room, Trinity Hall, Whitecross Road, Hereford, for a Junk Sale on June 7. A check with the Hon. Sec. would be a good thing, though, as there could be a late change of venue.

**Continuity**

Prior to the inaugural meeting of the Rugby and District group, which took place recently, G3NDM looked up some old newspaper files, and was able to tell the meeting that a Club had been formed there as far back as August 1920, and read a description of that far-off meeting. Imagine the surprise when a Mr. A. Franklin, who had been taking a part in the discussions, rose to say that he was a founder member of both Clubs. Forty-eight years is quite a long time! For the details of the venue and the programme, contact the Hon. Sec. at the address in the Panel for all the up-to-date information—we understand there is a fine Hq. under negotiation.

Not far away is Nuneaton, and the Nuneaton club have an Hq. at the Anchor Inn, Hartshill, near Nuneaton, where they have a club callsign, G3XJU, which is shortly to be exercised. Alternate Thursdays is the routine, which looks rather like 13 and 27 June, although the Hon. Sec. is not quite specific. Judging from recent history, this crowd have something of interest to look forward to each time, with a nice balance between the practical and the theoretical.

Melton Mowbray next, where they have taken the chance of G3SVK/A being in the county to nail him for a talk, which unfortunately is dated for the next day before we hit the bookstalls. June 6 is the next date on the calendar, when they are off to the Crown Inn, Sproxton, for the annual dinner.

On to Cambridge, where we have managed to sort out a long-established error in the name of the Hon. Sec. and his address for the Panel. The first two evenings, on June 7 and 14, are, respectively,

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**SECRETARIES—PSE NOTE!**

We must have, with each report every month the name, QTH and c/s (if any) of the Hon. Secretary. Reports should be concise and complete for the period under consideration, i.e., it should not be left to us to pick up information from previous reports.

The correct address for this feature is: "Club Secretary," Short Wave Magazine, Buckingham. Closing dates for the next few months are, first post Fridays: June 7, July 5 and August 9, for the issues dated July, August and September respectively.

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devoted to G3EDD summing up the results of their /M VHF contest, and a trip to see a Synchrotron—wonder what they feed it on?—at the University, with G3TAG doing the talking. This leaves June 21 and 28 over for informals at Hq. in Victoria Road, Cambridge.

**The Extra-Territorial Set**

This heading, as usual, comprises the groups who have no district affiliations, and which indeed are in some cases international. Such a one is A.R.M.S., catering for the needs of the /M fraternity, as well as producing the Mobile News publication. The latter is quite good this month, with a very useful piece on the measurement of low resistance—important to the mobile operator wishing to
put out a big signal.

Another is RAIBC, who cater so well for the needs and interests of the blind and disabled element in Amateur Radio; membership is in two categories, for the disabled and the supporters who do so much to keep them going on the air. There is a monthly newsletter, *Radial*, which is always a pleasure to read, and regular nets are run on 3·7 mc, on Tuesdays at 10 a.m. and Wednesdays at 2 p.m. Additionally, the Cheshire Homes net comes up on the same frequency at 2 p.m. every Thursday.

**British Rail** exists for the railwaymen interested in our hobby, either as SWL’s or licensed amateurs; at the time of writing there is a proposal to organise a net regularly, which would be a fine thing. All the information on the group can be obtained from the Hon. Sec. at the address in the Panel.

Someone reads this piece each month! This is the surprising part of the note from Civil Service, who say they have recruited more members through *Short Wave Magazine* than in any other way. This crowd, which your old scribe has met personally, are very active and have a fine Hq. at the Civil Service Sports Centre, where they can be found in Room 66 on the second Tuesday in each month. The Centre is located in Monck Street, which runs between Horseferry Road and Great Peter Street, close to the Horticultural Halls, which are known to most readers as the venue for many years of the Amateur Radio exhibition.

**The London Area**

Here our first port of call is Cheshunt, who have Hq. in the Methodist Church Hall, where they are to be found on the first Friday of every month. G3TZZ and G8ASE are joint speakers for June, and their topic will be “Oscilloscopes.”

Sutton and Cheam have so much news in their sheet this time that there wasn’t room to put in the June doings, so we have to commend you to the Hon. Sec.—see Panel—and just guess that the date for the June meeting will probably be the 18th.

We are even more up against it when we come to Surrey, because here we were aware that the Hon. Sec. was to stand down at the AGM, but we don’t know who is taking his place—so, for the moment, G3KGA remains in his accustomed seat in the Panel, to be contacted by potential members or visitors. Hq. is at the “Blue Anchor” in South Croydon.

Really quite surprising—dredging through two copies of the Southgate Newsletter we can find the topic for June—a lecture by Trinity House—and the venue, which is Parkwood Girls School, just in rear of Wood Green Town Hall, in Bounds Green Road. But we don’t know the date! Luckily, a little spot of intelligent guesswork suggests June 13 for what should be a fascinating talk.

Crystal Palace seem to have resolved their problems of Hq. after the Civil Defence shut-down, by a move to Emmanuel Congregational Church Hall, in Barry Road, East Dulwich, where June 15 will be a Junk Sale. However, at the time of writing it was not confirmed for certain from the Church side, and so a check should be made with the Hon. Sec. beforehand—see Panel for details.

At the next meeting of the Acton, Brentford and Chiswick crowd, they will be studying the international scene; DL2AA will be the speaker, taking as his theme the German Amateur Radio Society, DARC. This most interesting effort will be, as usual at Hq., 66 High Road, Chiswick.

Echelford have the last Thursday in each month, at the Hall, St. Martins Court, Kingston Crescent. Woodthorpe Road, Ashford, Middx, which makes it June 27, when they are to hear one of the Tape lectures on Transmitter Design and TVI. In addition, it is understood there is an outing being organised, yet to be finalised, but which is dated for June 30.

Cray Valley publish a newsletter called *QUA*, which usually contains something of interest; this time they have printed a letter from the GPO to their Hon. Sec., setting out in detail the duties and responsibilities of the holder of the Club call, and the other folk named on the list as operators. One feels this letter should be nailed to every Club station door! As for the programme, that is easy: June 6, at the Congregational Church Hall, Court Road, Eltham, for the formal meeting at which Mr. I. Lever will discuss “Commercial Oscilloscopes.” An informal is also run each month at the All Saints Church Hall, Bereta Road, New Eltham; this time it comes up on June 20.

The new cover of *QRK* symbolises the fact that it now serves the interests of both South London Mobile and Wimbledon, who are now, for a time, one and the same. June for them means, on June 7, the Annual Junk Sale, and June 28 for an informal before the camp weekend, which latter takes place in early July. Hq. for the meetings is St. John Ambulance Hall, 124 Kingston Road, South Wimbledon, London, S.W.19.

Yet another group to move home is Edgware, who had a fine turn-out for the first evening at the new place, 51 Flower Lane, Mill Hill, to hear G2UV give his talk on the “Sounds of the Twenties,” for which the sound of spark transmitters had been recreated and recorded. For June, the start of the month is on the 10th, conveniently just after Field Day, which will, no doubt, turn from an informal into a post mortem. VHF Frequency Measurements and Power Measurement at VHF are the twin subjects to be taken care of by G3MNO on June 24.

First and third Fridays in each month—but never the fifth! This opening to Purley’s newsletter suggests someone got his dates mixed. Final arrangements for NFD are to be dealt with on June 7, and the AGM, in the Large Hall, is set for June 21, with all members eager no doubt to volunteer for a job! Purley in the Railwaymen’s Hall, 58 Whytecliffe Road, Purley.
The Southerners

Once again a rather vague sort of area. The first one on the clip is High Wycombe, who send us results of their recent Club contest; G3RXO, G3JJP and G3SBA took the first three places in the Non-Club category. On the question of where and how they got together, we have no current information, as the Hon. Sec. has things in the pot for June and later—so you’ll have to contact him at the address in the Panel.

June 5, at the George and Dragon, Cromwell Road, Redhill, sees the Reigate gang in session, the lecturer being, if all’s well, G4AR talking about his activities as ST2AR.

On now to Mid-Herts, who say their next get-together is at Welwyn Civic Centre on June 13, when there will be a VHF/UHF Brains Trust. As for the Newsletter, it must be said that the present compiler knows exactly what to say, and says it very bluntly indeed, which is all to the good.

A few miles up the road is Stevenage, where the incumbent live-wire Hon. Sec. reports he has had to give up due to a posting overseas, and so there will soon be a new name on the file. June’s programme is greatly bound up with NFD, the two evenings “Last Details” (June 6) and the following “Post Mortem” (June 20). Both are at the Hawker Siddeley Dynamics canteen, Gunnels Wood Road, Stevenage, which is a very nice HQ indeed.

Right away on the opposite corner of the area is Cornish; in spite of the scattered district this group covers, attendances at the main meetings at the SWEB Clubroom, Pool, Camborne, have averaged fifty, no less. On June 6, G3NKE discusses the correct procedure for QSL’ing, followed by G3BHIC on Aerials. The VHF group, at the Barley Sheaf in Truro on June 20, have VHF Transverters as their topic, and G3OCB to guide them through the problems. Also at the Barley Sheaf are the SSB section, although we have no details of their recent Club contest; G3RXO, at Welwyn Civic Centre on June 13, will there be a combined D/F event and barbecue, for which the arrangements for non-entrants to the D/F part of things may obtained from the Hon. Sec.; and the Chippenham “At Home” Carnival event on June 29 will be graced by a demonstration station using the Club callsign G3VRE.

A change of venue for the Southdown lads, who seem to have gone from strength to strength since forming a year ago; the first Annual General Meeting comes up on June 10, at the “Parkfield,” Lindfield Road, Hampden Park, Sussex.

A most amusing piece in the Verulam sheet this time, giving twenty different—and valid—reasons why a 100 per cent return on QSL cards is just not reasonably to be expected; in fact it is remarkable how well the returns do come in! Cavalier Hall, St. Albans is the venue, on June 19, when G3RPE, of G.E.C. will talk about 13 cm., and no doubt stimulate thoughts of activity on that band.

Rodling Boys next—science and Amateur Radio—where G3JIX and G3TAJ are the leaders, and provide interests and assistance for any boy with a radio bent or scientific interest—and very good work they do, too. The HQ. is Monkhouse Youth Centre, Monkhouse Road, Walthamstow, and they are on the look-out for any one prepared to give them a talk on radio or allied subjects—any volunteers?

Crawley are covered by the description “just south of London,” as the lads foregather at Trinity Congregational Church Hall, Ifield, Crawley, where this month they will hear Mike Dransfield talking about SWLing in Thailand. This one is on Wednesday, June 26, but the informal precedes it by a fortnight, being on June 12; for details make contact with the Hon. Sec.

A Donkey Derby on June 3 takes place at Farnborough, and the lads are putting on a station in connection with the affair, signing G3XCH/A on 80 and 2 metres. A lecture on Communications by Mr. A. L. Stretton occupies June 11, and on the 25th the annual club Construction Contest is played off. All “home games” are at the Model Railway Enthusiasts’ Club, 310 Farnborough Road, Farnborough, Hants.

Forthnightly on Fridays, with the proceedings starting promptly at seven-thirty, but after Field Day the West Kent group take a rest until June 14; on that evening the entertainment will be by way of picnic and dummy run for VHF field activity, with wives and girl-friends invited, while on the 23rd an evening of experimental Top Band aerial rigging is planned, to try and find a contest aerial which does its stuff properly; the month is rounded off by a Question and Answer affair on June 30. Just in case the weather turns rough, the HQ. at Portchester Community Centre will be open as usual if necessary. Visitors and prospective members are always welcomed.

Every Tuesday evening the Chippenham chaps foregather at the Chippenham High School for Boys, Hardenhuish Lane, where visitors, they like to see, and special arrangements are in force to make sure this is done. Apart from NFD, on June 25 there will be a combined D/F event and barbecue, for which the arrangements for non-entrants to the D/F part of things may obtained from the Hon. Sec.; and the Chippenham “At Home” Carnival event on June 29 will be graced by a demonstration station using the Club callsign G3VRE.
a tape lecture; on the 28th G3SSE-G6SSE/T will be down to earth with his demonstration and description of his home-brew SSB transceiver.

From West Kent to North Kent, who are at the Congregational Church Hall, adjacent to the Clock Tower, Bexleyheath, on June 13 and 27, the former being the inevitable NFD inquest, and the latter being down for a Junk Sale.

Bishops Stortford have the use of a room at the British Legion Club, Windhill, Bishops Stortford, which is on the road out of the town towards Much Hadam; there they get together on the third Monday in each month; the programme is now set up until February next year, with something to interest everyone.

A new group calling itself the Dunstable Downs Radio Club has been formed, the inaugural meeting having been held at the Star and Garter in Dunstable. Thirty-odd members attended the first evening, including an SWL of forty years standing who had never before met a real live amateur—Cool!—but your scribe is ready to lay a small bet the chaps will rectify that situation in very short order! For further details, contact the Hon. Sec., at the address in the Panel.

The regular routine of fortnightly Tuesday evenings continues at Reading, with a Constructional Competition on June 4, followed by G3TEB on Video Recording on June 18, both at St Paul's Hall, Whitley Wood, Reading, where new faces are always sure of a welcome.

An Annual General Meeting is set up for June 7 by the Hemel Hempstead crowd, at Rucklers Lane Hall, Kings Langley, with another evening at the same venue slated for June 21. It is understood that during the summer the club call, G3WIH, will be active on all bands DC to UHF.

Over at Maidenhead, the lads will be sitting down to a most interesting evening on June 3, when Kenneth Alford, G2DX—one of our distinguished old timers—will be giving a talk on 'Early Days in Amateur Radio' and illustrating it with bits-and-pieces, which should shake some of the youngsters. The informal evening on Tuesday, June 18, will see the G3WKX 144 mc machinery on the air and looking for QSO's.

A visit to the Chelmsford Hq. is planned by the Colchester crowd for June 4, to take part in a Quiz with them at the Marconi College, Arbour Lane, Chelmsford. The Science of Colour is the subject of a lecture in the lecture theatre, Sheepen Road, Colchester, on June 12, and on June 19 they go all Practical in Room 40. The references to rooms becomes clearer when it is realised their full title is 'North East Essex Technical College and Colchester School of Art Radio Society'—Wow!

Club reports were also received—but too late for coverage in this piece—from Spen Valley and Harrow, together with more up-to-date items from RAIBC, Crystal Palace, Surrey Radio Contact and Midland, already in with reports that were late for last month!

**Deadline**

And there it is for another month; as always, a most interesting piece to put together. The news for the next one should be of doings for July, and should be sent to arrive by first post Friday, June 7, addressed to "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, keep smiling, and keep trying—the members do appreciate the Hon. Sec., even if they don't often say so!
NEW QTH'S

G2DQI, G. A. Lambourne, 41 Pevensey Road, Worthing, Sussex. (re-issue.)
G3ENE, J. B. Wadham, Loders, St. Saviour's Hill, Polruan-by-Fowey, Cornwall. (re-issue.) (Tel. Polruan 307.)
G3WZY, W. Johnson, 14 Tay Close, Manor House Estate, Farnborough, Hants.
G3XFA, R. T. Wilkins, 68 New Park Street, Devizes, Wilts.
G3XFA, R. R. T. Wilkins, 68 New Street, Worthing, Sussex. (Tel. Broadstone 4846.)
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THE SHORT WAVE MAGAZINE

June, 1968

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**WANTED:** Eddyphone S-750, S-640 or 680X receiver. Selling: Lafayette HE-30, as new, with a Joystick, price £30, or offers. — Gray, 25 Milbank Road, Darlington (5391). Co. Durham.

**FOR SALE:** K.W. Vanguard coverage 10 to 160m. bands, price £30. Genoa, G209 receiver, £30. Carriage extra.—Marshall, G8KTH, 17 Sadler Street, Wells, Somerset.

**SELLING:** T.W.2 Station: Converter, 4-6 mc. IF running 10 watts, with matching PSU. Price £20, carriage extra. (Hertfordshire). — Box No. 4655, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** T.W. two-metre Communicator, or similar commercial equipment in good condition. — Details and price, please.—George, G8BD, 1 Fountain Road, Birmingham, 17.

**WANTED:** Two-metre converter, for IF 26-30 mc; price to include postage/packing. Selling: Nombrex Signal Generator No. 27, in good condition, price £6. — Clark, 62 Waltham Road, Woodford Bridge, Essex. (Tel. 01-504 4864, after 7.0 p.m.).

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