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Volume XXVII

The Short Wave Magazine

Let's fill a page with means this month. I'm in a real snoring mood. Mainly because some London snoop outfit robbed them. Their advertising manager, a variegated lot, first quality managers only and the makers full guarantee. Fair enough, I think, in my simplicity and I commend some people. But I should be 4 errors with 4 bits of wire, whereas these are stamped (G.E.C.)... Very interesting. One which claims 2.4 kc/s. selectivity and one which says 2.4 kc/s. at -6 dB. constitutes a mechanical filter, we know the difference between a spec and how they can be distorted, but what about the poor chap who laps it again, readers again, the laws of libel stop me from blowing my stack, but honestly, the opinion of us chaps who read this stuff is so low that he thinks we advertisers who claim perfection for things which are very, very far from being really so. As much as that may sound like sour grapes, I can't help it. I haven't the intelligence to see through it. And that gets me mad. Once more, the laws of libel stop me from blowing my stack. Why, last month, I was brought up to know there were 4 bits of wire, whereas these are stamped (G.E.C.).

I was brought up to know... But there must be some people who think, in my simplicity, that it is easier to show how a false impression can be given than to explain why they are mistaken. The only thing I've seen against it is that it uses the PA pi net as the Rx side. Just one of those little things the spec. sheet never mentions. It is one hell of a good rig for the money.

I include it in this guff it will likely be sold long before publica-
tion- I will be driven mad after a few months, and I don't know why. It is one hell of a good rig, and for the money. Anyone who DO NOT do it—they use proper r.f. antenna coils for the Rx side, just one of those little things I flog Sommerkamp and not some other brand. I. However, in spite of this, the National 200 is value for money, and that's my point. I honestly think that the above stuff is too real for them to service seconds none. Also of course, it is all ex stock at the time of writing.

Anyway, so much for the new expensive stuff. In the second-hand line I have a very good selection of good quality stuff. The snag is that by the time this advertising appeared in front of your bloodshot eyes, my stock current will have changed. I don't know what to do—have some good stuff and if I include it in this guff it will likely be sold long before publica-
tion and I will be driven mad after a few months, and I don't know why. It is one hell of a good rig, and for the money. Anyone who DO NOT do it—they use proper r.f. antenna coils for the Rx side, just one of those little things I flog Sommerkamp and not some other brand. I. However, in spite of this, the National 200 is value for money, and that's my point. I honestly think that the above stuff is too real for them to service seconds none. Also of course, it is all ex stock at the time of writing.

Maybe things you can do to get some business are the following:

1. Be honest and tell the truth about your merchandise.
2. Be fair in your prices.
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4. Be willing to help customers in finding the right product for their needs.
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Of course, just one of those little reasons I flog Sommerkamp and not some other brand. I. However, in spite of this, the National 200 is value for money, and that's my point. I honestly think that the above stuff is too real for them to service seconds none. Also of course, it is all ex stock at the time of writing.

The Star 700 series also represents excellent value for money. SR-700 10 at £11.50 and ST-700 10 at £13.50.

Also good buy is the Nato GU-7000 at £14.50 less p.p. I just can't sell these and I don't know why. It is one hell of a rig for the money. It is a pity, of course, that the same Galactic as the Sommerkamp transceivers—but it's nowhere near the price. Neither the SR-700 nor ST-700 are.

The only thing I've seen against it is that it uses the PA pi net as the Rx input stage. Now, the PA-7000 has a 50 ohm r.f. input impedance, to say nothing of conflicting Q requirements so it isn't really any good. I've only seen against it is that it uses the PA pi net as the Rx input stage. Now, the PA-7000 has a 50 ohm r.f. input impedance, to say nothing of conflicting Q requirements so it isn't really any good.

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AMATEUR ELECTRONICS G3FIK

TRIO COMMUNICATIONS EQUIPMENT FROM STOCK. Not a particularly original opening no doubt under normal circumstances but in the light of current events one which is highly significant. By this we refer to the already obvious difficulties which are appearing in the maintenance of supplies of imported equipment due to the recently introduced import controls. Fortunately, however, for the prospective purchaser of TRIO equipment these restrictions despite their severity have not deterred the importers from their policy of meeting the ever-growing demand for TRIO gear, a demand which is the inevitable consequence of marketing quality equipment at sensible prices. Please note we cannot sell TRIO when it comes to new equipment despite the fact that we are a completely independent Company with obligations to no one. May we also take this opportunity of stating that we never sell TAI and, as so-called ‘special’ prices, our policy being to give our customers careful and detailed attention to orders and enquiries and a first-class and conscientious after sales service. Please don’t take our word for this however, ask those who have dealt with us for their opinion.

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<td>EDDYSTONE 940</td>
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<td>EDDYSTONE 770R</td>
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<td>EDDYSTONE 990R</td>
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<td>COLLINS, 7758B</td>
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<td>SWAN 400, complete with 220XC and 410FO</td>
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THE SHORT WAVE MAGAZINE

April, 1969

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SHORT WAVE
MAGAZINE

(GB3SWM)

Vol. XXVII APRIL, 1969 No. 306

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<td>WAVEMETER</td>
<td>£12 10 0</td>
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POWER UNITS ZA44661 No. 12, 12 volts D.C. for C44 Tw/Rx, £5, carriage £12 10 0.
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RACAL RA17. Aerial trimmer capacitors 220pf, 5/-, post paid.
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Terms: Cash with order. Early closing Wednesday.

40-42 PORTLAND ROAD, WORTHING, SUSSEX

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"CLARRY"
An Appreciation

The passing, on March 7 last, of an old friend of Amateur Radio and for many years one of its most devoted servants, came as a sad shock to a very large number of people.

John Clarricoats died in his 72nd year, after a long and full life spent first as a junior in industry, then as General Secretary of the Radio Society of Great Britain—a post he held for nearly 40 years—and latterly, after retirement from the RSGB, as a leader in local public affairs. He threw himself heart and soul into everything he undertook and literally died in harness—at the time of his passing he was Mayor of the London Borough of Enfield, in its way one of the most important of the mayoral offices in the GLC area.

But it will be for his work for the RSGB that "Clarry" will be best remembered in our world of Amateur Radio. Not only was he General Secretary and Editor of the *RSGB Bulletin* but he was directly responsible for building up the Society in the pre-war period, during which time he had almost unfettered control. When the War came in 1939, because of the danger of total loss through bombing and in order to save the Society much expense, it was his idea to take the RSGB archives to the comparative safety of his home in North London. From there, with the assistance only of Miss May Gadsden, he kept the Society going and published an attenuated *Bulletin*.

With the resumption of amateur activity in 1946 and the move to the Ruskin House office, membership began

Alderman John Clarricoats, O.B.E., J.P., (G6CL), Mayor of the London Borough of Enfield.
(Died March 7, 1969, in his 72nd year)
to increase rapidly and the RSGB became a much bigger job than ever it had been. It was during these early post-war years that John Claricoats started to become so closely identified with the international aspects of Amateur Radio, travelling to many parts of the world to attend conferences—and, more particularly, to reinforce the efforts of those concerned with keeping the amateurs’ share of the spectrum.

By 1958, he had been elected honorary secretary of the Region I bureau of the International Amateur Radio Union, which covers the whole European area. His knowledge of Amateur Radio and his vast administrative experience, gathered during his years in the key executive job with the RSGB, gave him a standing of unquestioned authority in all these matters—allied to which he knew, and was known to, practically everyone of any consequence on the official side at the many Radio Conferences he attended.

As such a strong personality with so much enthusiasm for getting matters round to his own way of thinking in RSGB affairs, he did not always endear himself to all his colleagues. There came the time, in December 1963, when he retired from the service of the Society, at the age of 65.

But this retirement in no way inhibited his activities in the sphere of Amateur Radio politics and administration—he carried on as Secretary of Region I of the I.A.R.U. and, apart from the committee work, compiled and edited its own regular Bulletin.

* * *

Even while with the RSGB, Jack (as he was always known to his more intimate friends) had been taking an active interest in the politics of his local borough of Southgate, becoming its mayor for the year 1955-'56. It was during this period that he was gazetted O.B.E., in recognition of his public work. On retirement, and with the formation of the Greater London Council, he became more involved in local affairs and eventually was elected Mayor of Enfield.

His interests did not end with town-hall politics. He was very keen on sport, was a member of the M.C.C. and of the Middlesex and Surrey County Cricket Clubs. He was deeply interested in the realities of Further Education, and as a governor of the Enfield and Southgate Technical Colleges, played an important part in their affairs. As a Freemason he held L.G.R. and as the founder of Lodge No. 8040, he was its first master and latterly its secretary, a responsibility to which he devoted himself with all his customary ability and enthusiasm. He was also honorary secretary of the Radio Amateur Old Timers’ Association, a fraternal body which now has a membership of 230.

In the realm of authorship, he produced World at Their Fingertips, a history of Amateur Radio in the U.K., taken from the earliest days to the present time—and he was, of course, the author of much original material in his various administrative capacities in the radio amateur context.

Though he had held his callsign G6CL since the mid-1920’s, he was neither highly technical in the strict sense nor ever very active on the air after becoming the RSGB’s first full-time official. His forte was administration and his interest the development of the Society as an organisation standing on its own feet.

* * *

A memorial service was held for John Claricoats at his own church—Christ Church, Southgate—on March 14. It was attended by a large and representative gathering, reflecting not only his importance as a local man of public affairs and many interests, but his wide-ranging Amateur Radio activities as well. Many of these friends came considerable distances to pay their last respects to one who in his own way had made such a significant individual contribution to the well-being of Amateur Radio.

A.J.F.
TEST EQUIPMENT FOR A LINEAR AMPLIFIER

TWO-TONE OSCILLATOR AND OSCILLOSCOPE—BASICALLY SIMPLE DESIGN FOR PRACTICAL WORK

A. H. DORMER, M.I.E.R.E. (G3DAH)

The operation of a linear amplifier at G3DAH called for the acquisition of additional items of test equipment for setting-up purposes, notably a two-tone oscillator and a small monitor oscilloscope. The station 'scope, a large double beam job, was not only too bulky to mount conveniently close to the linear, but was also required for other purposes, so it was decided to start from scratch and build something compact which could be left in situ near the amplifier to provide continuous monitoring facilities. Since the oscilloscope was in any case going to need a mains power supply, it was decided that both units should be valved and should be constructed from components available in the junk box. A search revealed a VCR-139A CRT and several EF50's, and from there on the rest was straightforward.

Two-Tone Oscillator

For single-frequency working in the audio range, the phase shift oscillator is a natural; few parts are required and several volts of distortionless sine wave output are readily available. The circuit used is shown in Fig. 1, p.78. VI and V2 operate as amplifiers with phase-shifting networks connected in a feedback loop between their anodes and grids. In order to maintain oscillation, the phase shift required in the CR networks is 180°, since there is already an inherent 180° shift between grid and anode within the valve and the feedback is then in phase with the input at a frequency determined by the CR values. The amplification of the stage must be greater than unity for oscillations to be started and maintained.

A 90° phase shift cannot be obtained from a single CR network, and three or more are required. In this case, the constants are chosen so that the required result is achieved with three sections only, each providing 60% of phase shift, and the oscillators produce frequencies of approximately 1.2 kc and 2.0 kc. Although these are not critical, they should not be harmonically related and should provide a difference-frequency within the audio passband of the SSB filters. For those who wish to use other frequencies, the formula for calculating the output from a three-element network is:

$$f = \frac{6}{2 \pi RC}$$

and the required amplification is 5.

With four meshes,

$$f = \frac{10}{2 \pi RC}$$

and the required gain is 18.2.

The cumulative build-up of oscillation is limited by the valve amplification, and occurs at one frequency only. Harmonic output is small, since multiples of f are only phase shifted by a small amount and suffer little attenuation in passing through the CR network, so that the feedback at harmonic frequencies becomes negative and output, other than at the fundamental, is reduced.

Turning to Fig. 1, the outputs from the two oscillators are fed via 47 µµF capacitors C7, C8, to the top end of R8, and a check with a VTVM or 'scope on the anode side of these capacitors enables the two outputs to be set to identical levels by adjustment of VR1. Four volts of audio are available at the junction of these capacitors and R8, and one volt at the top of VR2, the output control. Final setting-up should be performed by observing the output on a 'scope and adjusting VR1 to give an undistorted sine wave output at the operating frequency. Frequencies can be varied over small limits by making R3 or R13 variable. Voltages at various points in the circuit are shown on the diagram.

Construction is quite straightforward and follows normal audio practice. The chassis measures 6in. x 4in. x 2½in. deep, and Figs. 2 and 3 show the general layout. Screened cable should be used between the two oscillators and the output control.

Monitor Oscilloscope

First thoughts on the design of this piece of test equipment were directed towards simplicity and
Above, Fig. 1, circuit of the two-tone oscillator. Below, Figs. 2 and 3, layout of the oscillator, and tag-board arrangement.

Table of Values

Fig. 1. Circuit of Two-Tone Oscillator

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2</td>
<td>1,000 µF, 350v, wkng.</td>
</tr>
<tr>
<td>C3, C13</td>
<td>8 µF, 350v, wkng.</td>
</tr>
<tr>
<td>C14, C15</td>
<td>100 µF, 15v, wkng.</td>
</tr>
<tr>
<td>C4, C12</td>
<td>47 µF, ceramic</td>
</tr>
<tr>
<td>C5, C10</td>
<td>0.01 µF, 15v, wkng.</td>
</tr>
<tr>
<td>C6, C11</td>
<td>22,000 ohms, lw.</td>
</tr>
<tr>
<td>R1, R2,</td>
<td>270,000 ohms lw.</td>
</tr>
<tr>
<td>R3</td>
<td>39,000 ohms, lw.</td>
</tr>
<tr>
<td>R4, R11</td>
<td>39,000 ohms, lw.</td>
</tr>
<tr>
<td>R5, R6</td>
<td>470 ohms, lw.</td>
</tr>
<tr>
<td>R7, R10</td>
<td>330,000 ohms, lw.</td>
</tr>
<tr>
<td>R9, R10</td>
<td>39,000 ohms, lw.</td>
</tr>
<tr>
<td>R12</td>
<td>1,800 ohms, lw.</td>
</tr>
<tr>
<td>VR1, VR2</td>
<td>500 ohms, lw.</td>
</tr>
</tbody>
</table>
| V1, V2   | EF50, 78
compactness and so the mock-up model used the mains voltage to provide the horizontal sweep. Although sufficient timebase amplitude could be obtained by this method, there were several disadvantages inherent in the system. First, there was an obvious flyback trace which made the interpretation of the displayed pattern difficult; secondly, there was no control over the speed of the timebase and, thirdly, synchronisation at frequencies other than 50 c.p.s., and multiples thereof, could not be achieved. These considerations led to the conclusion that a separate timebase was required even though this added to the size and complexity of the final product, albeit in very small degree.

A fairly obvious starter was the Miller Transitron timebase, and the EF50 lends itself admirably to this application. The circuit is shown in Fig. 4. A detailed explanation of its functioning is rather cumbersome and may be found in the technical literature. Suffice it to say that a linear sawtooth waveform is available at the anode of V2 and a square wave at the screen grid. The timebase can be either self-running or triggered. With the values chosen the timebase will free-run between 40 c.p.s. and just over 1000 c.p.s., which is adequate for the display of speech, tone and output waveforms. The synchronised range is slightly less than this. At the highest timebase speeds, the flyback trace was still visible, and so the square wave at G2 was used to provide trace bright-up during the forward stroke, after limiting by diode V1 to produce a clean top of correct amplitude. If this is not done it will be found that the trace brightness is uneven and/or the brightness control range is incorrect. External synchronisation may be applied to G3, the suppressor grid, for example from the two-tone oscillator, but with RF from the transmitter applied directly to the Y plate this may

Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, C3</td>
<td>25 µF, 1,000v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>C4</td>
<td>1 µF, 1,000v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>C5, C6</td>
<td>16 µF, 450v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>C7</td>
<td>1 µF, 1,000v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>C8</td>
<td>0.5 µF, 350v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>C9, C11</td>
<td>0.1 µF, 350v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>C10</td>
<td>0.05 µF, 350v.</td>
<td>wkng.</td>
</tr>
<tr>
<td>R1</td>
<td>10,000 ohms, ½w.</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>50,000 ohms, 1w.</td>
<td></td>
</tr>
<tr>
<td>R3, R7, R8, R12</td>
<td>100,000 ohms, 1w.</td>
<td></td>
</tr>
<tr>
<td>R4, R5</td>
<td>1 mehohm, ½w.</td>
<td></td>
</tr>
<tr>
<td>R6, R9</td>
<td>47,000 ohms, 1w.</td>
<td></td>
</tr>
<tr>
<td>R10, R11</td>
<td>500,000 ohms, ½w.</td>
<td></td>
</tr>
<tr>
<td>VR2</td>
<td>100,000 ohms, wkng.</td>
<td></td>
</tr>
<tr>
<td>VR3</td>
<td>5 meohm, Lin.</td>
<td></td>
</tr>
<tr>
<td>VR4</td>
<td>1 meohm, Lin.</td>
<td></td>
</tr>
<tr>
<td>VR2, VR3, VR4</td>
<td>10 Hz, 20mA</td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>100,000 ohms, ½w.</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>50 mA</td>
<td></td>
</tr>
<tr>
<td>F1, F2</td>
<td>1 amp.</td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>20 mA</td>
<td></td>
</tr>
<tr>
<td>VCR1</td>
<td>VCR-139A</td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>EA50</td>
<td></td>
</tr>
<tr>
<td>V2</td>
<td>EF50</td>
<td></td>
</tr>
</tbody>
</table>
not be found necessary. An alternative is to connect the Y plate directly to the top of the sync. control potentiometer, although this will reduce the amplitude of the display. It was not found necessary to include horizontal and vertical shift controls to centre the display.

The common HT supply for this valve and for the two-tone oscillator follows standard practice. In view of the close spacing within the CRT of the heater and cathode, these two electrodes are sometimes seen connected together. If this is done the 4v. heater winding on the mains transformer must be insulated from the frame and other windings to the full value of the EHT voltage (in this case some 700 volts) or a separate transformer employed. The CRT used in this design has adequate cathode/heater insulation and special precautions are not therefore required, enabling a standard mains transformer to be used, but consideration should be given to this aspect if other types are substituted.

Voltage for the CRT electrodes is obtained from a conventional voltage doubler circuit across half the transformer secondary. BY-100's were used here since they were available, but any 800 volt p.i.v. diodes would serve. It would have been possible to use the whole of the secondary winding and a single half-wave rectifier, but this would have called for more smoothing and decoupling, and higher voltage diodes. The Brightness and Focus controls are at high potential above ground and should be adequately insulated and protected from the unwary finger. It should be possible to use the 3BP1 CRT in this design, although it is a little less sensitive and the EHT chain values might need some modification.

No constructional details are given since these can be varied to suit the requirement of the user. Points to watch are that a mumetal screen round the CRT is a must, and that it may be advantageous to have a separate power supply chassis. If this is not done, the mains transformer and smoothing choke must be placed to the rear of the CRT and screened from it in order that the field from them shall not affect the display. Operating voltages are shown on the circuit diagram.

**Operation**

Operation of the equipment described is simplicity itself. The oscillator is connected to the microphone input of the SSB prime mover, taking care to avoid overload of the mic, input circuits, and the Y plate of the oscilloscope to a single turn link near the output circuit of the linear amplifier. If preferred, capacity coupling can be used by winding a few turns of insulated wire round the spigot of the transmitter output socket and connecting this to a separate coaxial receptacle. The linear amplifier drive, loading and tuning controls are then adjusted to give the maximum undistorted output under correct operating potentials. Although the two-tone test cannot provide a quantitative measure of the amount of distortion present in the output of the linear, it can give a visual indication of incorrect operating conditions, notably grid bias and loading, and as such, is a *sine qua non* as far as the writer is concerned, who does not believe that it is possible to set up a linear correctly without an oscillator and oscilloscope.

It should be remembered that the linear amplifier must never be driven to full output under these conditions, but only to the limits specified by the manufacturers of the valve type used. If these are not available, a rough guide is to limit the anode current with a two-tone input to 70% of the maximum permitted for single-tone operation.

The applicability of this simple test apparatus to checks on modulators and amplifiers used in AM transmissions is obvious. The addition of a single-valve amplifier operating at the Rx IF will also enable the waveforms of incoming signals to be observed.

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**Specially on the Air**

Organisers wishing for appearance in this space (which is free) should send in their notice—on a separate sheet, please, headed “Specially on the Air”—set out in the form shown below. Please *do not* run these requests in with letters on other subjects, or reports for regular features. Insertions proposed for “Specially on The Air”—and we must have the name/QT of the responsible contact man—should be addressed: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM.

**GB2BVC, April 27:** Talk-in station, on 160m. and two metres, in conjunction with the Northern Radio Societies Association annual convention at Belle Vue, Manchester. R. M. Clarke, G8AYD, QTHR.

**GB3NS, May 2-3:** For the Newark & Nottinghamshire Agricultural Show, one of the largest of its kind in the country, when it is hoped to be operating AM/CW/SSB on all bands 10 to 160 metres. R. Wallwork, G3PAW, Magnus Grammar School, Newark-on-Trent, Notts. The station is being put on by the School, at the invitation of the County Education Authority.

**GB3BEK, May 3-4:** For the 700th anniversary celebrations of the Beaconsfield Charter Fair, organised by the local group, to work AM/SSB on the 10-160m. bands, and AM on 4 metres. D. C. Chapman, G3NGK, 64 Heath Road, Holtspur, Beaconsfield, Bucks.

**GB3YMCA, June 1:** At the “Y” Sports Centre, Melrose Close, Loose, Maidstone in connection with their Mobile Rally on that day, and as part of the YMCA Anniversary Celebration. QSL’s via W. E. Kent, G3YCN, 72 Bower Mount Road, Maidstone, Kent.

**GB3FC, June 5-7:** Station to be provided by staff members in connection with the Forestry Commission exhibition in Bush Estate, Edinburgh, for the 15-20-80-160m. bands. A special QSL card will be issued for all contacts and reports. **Organiser:** W. A. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
LOOKING AT THE HEATHKIT SB-310

REVIEW OF A SPECIALISED RECEIVER OF CONSIDERABLE SWL INTEREST

THIS receiver may be described as the BC and SWL version of the Heath SB-Line series of equipments. It covers nine 500 kc segments, including amateur bands at 3.5, 7 and 14 mc, plus bands starting at 5-7, 9-5, 11-5, 15, 17-5 and 26-9 mc, the latter taking in the U.S. Citizens' Band. This ensures coverage of the most popular broadcast bands, and also the standard-frequency transmissions at 10 and 15 mc.

The receiver is supplied complete with a mains lead having the receiver-end connector moulded to it, a copy of the World Radio-TV Handbook and, of course, the excellent construction manual. As the sample receiver was supplied ready built, tested and aligned, attention was first given to this manual in an attempt to assess the difficulty or otherwise of home-constructing a kit receiver and aligning it. The conclusion reached after a close study was that such a kit would be no bother at all, provided the instructions were followed to the letter; the total time to completion should be in the neighbourhood of 40 hours or so.

Because of the circuitry used, alignment would be expected to be relatively simple, and indeed quite a lot easier than the alignment of a conventional tunable first oscillator type of receiver, such as the HRO. A valve voltmeter of 11-megohm input impedance is required to tune up the crystal oscillator on each band, as a first step. This having been done for all bands, the RF and IF alignment can be carried out using only the 100 kc calibrator in the receiver—although instructions are given for an alternative method by aid of a signal generator, in the conventional way. The calibrator itself can be checked against the WWV signal at 15 mc.

Performance Specification

Pretty good, and pretty well met. Stability is very good; if the receiver has been on a few minutes and a signal drifts, you can be sure it is the other chap! Incidentally, the drift during the warm-up period fell within the limits quoted for normal after-warm-up conditions.

AGC performance is extremely good. The receiver was used in conjunction with a K.W. Vespa transmitter on 40-metre CW, with no arrangements for muting whatever other than the aerial switching from "transmit" to "receive." On fast AGC, the result was just that the S-meter banged over to S9 + 60 dB, but the signal coming out of the headphones when transmitting was crisp and clear with no signs of blocking, while the return to receiving sensitivity was quicker than any normal CW operator would need. The AGC-slow position gave a similar result, although recovery was considerably slower. With the AGC off, the receiver could not be truly said to be blocked, although the outgoing signal was rendered
Fig. 1. Block schematic of the Heathkit SB-310 receiver, showing only basic function switching. Valve line-up is: VI, 6BZ6; V2, V3, V8, 6A17; V4, 6AB9; V5, for LMO stage, 6CB6; V6, V7, 6BA6; V9, 6AV11, triple triode; and V10, 6HF8. Only the 6AV11 is likely to be a spares problem in the foreseeable future and this will, of course, be available from Daystrom, Ltd. In the case of failure of V5, it would need to be replaced by one of similar manufacture.

mushy and clicky; one could still read one's own Morse. On the other hand, tuning around for a really weak signal with AGC off, and then switching in the AGC did not result in any loss of the signals on CW or SSB, demonstrating that the AGC does not have that irritating habit of being unusable on SSB or CW, so common in older receivers with IF-derived AGC.

The noise-limiter was found to be quite good for such a simple circuit, although it did tend to cause a little distortion on strong signals, just as the handbook said it would—but since the noise limiter is not really needed on strong signals anyway, what matter? In any case, the better the selectivity of a receiver the more one feels the need for a separate IF strip of wide bandwidth so as not to distort and lengthen the noise pulses and nullify the usefulness of a conventional limiter—and the selectivity of this receiver is first-class.

The model tested and illustrated here was fitted with the normal AM filter, having a nose bandwidth of 5 kc, and 15 kc maximum at 60 dB down, plus the accessory SSB and CW filters. There are two SSB filters available, both being 2:1 kc at the nose, but the 60 dB bandwidth of the standard one was 7 kc, while the de luxe version is only 5 kc wide at the same reduction. As for the CW filter, this is only 400 cycles wide at the nose, and 2 kc max at 60 dB down, centred on a beat note of 1000 cycles. As we have remarked, the receiver tested had AM, SSB and CW filters fitted, although only the AM unit comes as standard, the others being accessories. With the SSB filter comes the extra crystal to enable sideband switching, and the wiring of the function switch varies depending on which options are taken in the way of these filters. An adjustment by means of a varicap diode enables the sealed Linear Master Oscillator unit (which provides the tunable oscillator function) to be adjusted as sidebands are switched so that if one is zero-beat to a carrier frequency one stays there when changing to the opposite sideband.

The crystal filter used on AM signals proved to be quite a revelation, the signals appearing to leap up out of the mush, and disappear as cleanly when one tuned the band. SSB performance was as good, or better, and the CW filter, coupled with the fine stability was a revelation; your reviewer can honestly say that he has never come across such a receiver for CW operation. The 400 cycles at the nose is enough to ensure that a bit of drift at the other end does not result in complete loss of the QSO, while the steep sides made tuning across such a crowded band as, say, Forty in the evening, just a matter of stopping and reading the wanted signal with little or no trouble from QRM. It was really quite a surprise to be able to work stuff on Forty and feel the band was not overcrowded!

For comic relief one could tune to the highest range and, if the 27-28 mc region was open, listen to the antics on the Citizens' Band in the States—and to be thankful the Post Office have not seen fit to allow it in this country!
Sensitivity on all ranges was up to specification, and the cross-modulation performance seemed excellent, although no actual measurements were taken. Thus, reception of broadcast stations on their bands was extremely good, the selectivity being a great help in sorting them out. With the SSB filter in one has the possibility of taking them like a sideband signal, in “exalted carrier” fashion, and then trying each sideband in turn to see which was less plastered in QRM if the going got difficult.

Circuitry

A simplified block diagram is given in Fig. 1, and being shorn of such complications as bandswitching is easily seen to be quite conventional in most respects. Examination of the circuit diagram in detail confirms this, and indeed about the only unorthodox thing about it is the AGC/Muting arrangements, which are shown in Fig. 2, on p.84.

In any receiver using a crystal-controlled front-end, the stability is primarily a function of the tunable local oscillator; and this stage in the Heathkit SB-310 is the sealed-box-of-tricks (supplied as a completed unit) which is called an LMO, or Linear Master Oscillator. Breaking the seal on this is the way to repudiate the warranty! But inside it there is a quite conventional and simple single-wave oscillator which is trimmed to exact frequency by means of a varicap diode and a potentiometer—the pot being outside the box so there is no excuse for wanting to break the seal anyway! Calibration of the dial against the 100 kc marker pips is carried out in the usual way by moving the cursor on the fixed part of the dial assembly.

Mechanical Points

It has already been mentioned that assembly should be easy by following the instructions. However, to that should be added that the mechanical design is, in its own way, a classic. The underside in particular is a fine example to a budding engineer of how to make a piece of gear which has not only fine performance, but also a layout facilitating rapid servicing and maintenance. Further, the finish, metal surface coating and such details are of a very high order—excepting that in our case one of the filters had quite clearly been added to the receiver after kicking around on the shelf for some time; but equally obviously, it goes without saying that Daystrom would not supply a filter in this condition as part of a kit.

Appearance

While it is true to say that if one wants the absolute minimum of operator error in controlling a piece of radio gear one must have a complete lack of symmetry and no two knobs the same shape, it is equally true to say such a layout would be unutterably offensive to the eye. The SB-310 is nicely balanced with the essential controls well-grouped around the dial, a nice big tuning knob, and that quiet air of breeding about it which only a few mechanical designers of impeccable taste seem to be able to achieve. Few wives could cavil at this receiver in their living-room.

Handling on the Air

Delightful! A smooth and positive drive, and operating experience was well up to what one would expect in a receiver in this price-range. After an hour or so, the receiver felt as though it had been in the shack for years.

A point here is that it is well to remember that generally CW operation will be found best with AGC
Fig. 2. AGC/ANL circuitry, SB-310. Table of values opposite.

Under-chassis view of the Heathkit SB-310 receiver, as factory wired.
Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C102</td>
<td>-001 µF</td>
</tr>
<tr>
<td>C109</td>
<td>4.700 ohms</td>
</tr>
<tr>
<td>C111</td>
<td>5.5 me</td>
</tr>
<tr>
<td>C112</td>
<td>20,000 ohms</td>
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<tr>
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<td>20,000 ohms</td>
</tr>
<tr>
<td>R111</td>
<td>1,000 ohms</td>
</tr>
</tbody>
</table>

Note: The values quoted here are taken from the manual accompanying the SB-310 and are given for information only.

Criticisms

Not many, but your reviewer is old enough and sufficiently of a realist to believe that even a Rolls-Royce can be improved upon—for instance, by fitting /M gear! Though the Heathkit SB-310 is in the very top class of commercial products, there are a couple of minor points that are worth looking into. First, it is fitted with an American standard two-way mains lead—no earth wire—and this could well be changed to a three-pin arrangement. Secondly, and because of the first one important, is that earthing the receiver is by the braid of the coax cable connecting the aerial to the receiver. Not really a safety hazard but when (as in the writer’s case) everything in the station is grounded to the mains earth and the RF earth only to the ATU, this could be annoying. Also, the various outputs at the back—to the hi-fi, muting when used, speaker, and so on—are all “p’iono” plugs grouped too near to the aerial socket. One could easily mistake the plugs if the set is placed in the usual state of receivers, namely with its back to the wall.

Summing Up

The SB-310 is a first-class job within its specification—which is that of a highly specialised BC/SWL general coverage receiver, and it is within those limits that it is discussed here. It caused no TVI, it looked good in the shack, and it is a fair specimen of the Heathkit SB-Line. For any SWL interested in the bands it covers it is about the best there is obtainable. What more can one say?

TOP BAND WITH THE TRIO JR-500S

DISCUSSING A POSSIBLE MODIFICATION—AND USING A Q-MULTIPLIER

E. JOHNSON (G2HR)

In the December 1968 issue of Short Wave Magazine mention was made briefly of the modifications necessary for conversion of the WWV range for Top Band reception. As a number of enquiries have been received, it is proposed to give the information in detail. It is thought it would also be helpful to advise on factors necessary to obtain the best performance in conjunction with a Q-Multiplier.

Choice of Crystals

It was explained previously that the 19-1 mc crystal in the original circuit serves a dual function. The receiver 1st IF runs from 8-9-9-5 mc, thus the additive frequency is 28 mc-28-6 mc, coming up on the first segment of the 10-metre band on the black scale.

Switching to the WWV range gives the difference frequency, which is 10-2-9-6 mc. A quick calculation will show that WWV or MSF (whichever is audible) will appear at 300° on the red scale, as indeed one will find the gauge mark.

It will be apparent that if the existing crystal is disconnected from position 6 in the circuit, position 1 will be available, and another crystal can be installed with an extra holder and associated coils. The crystals shown in the Table may be used, that for 11 mc possibly being more popular as this is obtainable from Lowe Electronics.

TVI Factor

As was previously pointed out, the 4th harmonic of the crystal falls near Channel 1, and can cause mild patterninging—more so if a television receiver has a set-top aerial in close proximity. For that reason, the writer (although this has not been proven) would avoid a crystal higher than 11 mc, as the harmonic would fall nearer the vision frequency.

Discussion has taken place on the unusual choice of a receiver circuit for harmonic suppression across the crystal itself. Reasons were given in the December article. Suffice it to say that this device works, no doubt because crystal vibration in itself is...
not purely sinusoidal. The adjustment of the trap is quite critical, and it is suggested that this be done side by side with the television receiver.

**Detailed Modifications**

Apart from the crystal and additional holder, a 1.8 mc, or so-called “shipping band” oscillator coil is necessary. A type must be obtained with the two windings side by side, with sufficient separation to cut the coil in half, such as Repanco. An additional dust core is also necessary. The mechanical work is shown in the diagram opposite.

The preliminary lining-up should be done by adjusting the cores at 1.9 mc with the aid of a GDO. Final adjustment may be made by feeding in a signal from a crystal calibrator and peaking up on the S-meter. Here one should emphasise that the crystal frequency must be accurate. Any error in calibration can only be corrected by adjusting the 2nd solid-state oscillator, and as this is common to all bands, interference with this could upset calibration on the other bands.

Usually, peaking of the front-end with the pre-selector will occur around the segments marked 3.5 and 14 mc. When this is established, the Top Band sweep can be marked on the dial perimeter with Indian ink.

**Q-Multiplier**

In the December Magazine article, the necessity for a Q-multiplier was emphasised to give enhanced selectivity for CW, the Codar RQ-10X being chosen. For the best performance, adjustments to this accessory should be carefully done. The instructions supplied are very complete, but the tuning-out of the reactance of the co-axial lead with L1, marked on the base of the instrument, is very flat, and it is important that the IF stage be brought precisely into re-alignment.

Two approaches are possible: One can tune in the beat from the crystal calibrator and adjust for maximum S-meter reading. The meter is very small, and it is difficult to determine the peak. Alternatively, one can switch in the BFO after carefully tuning in “on the nose,” and adjust for maximum reading on an output meter.

The writer has chosen what he considers is a better method. There is a crystal BFO, offset by 1.5 kc. Ensure again that the signal is accurately tuned in, with the Q-Multiplier passband dial set to zero, and switched to the “out” position. Advance the Peak control until the IF stage goes into oscillation. Then adjust L1 until the frequency is the same as the BFO. Carefully done, you will probably obtain a slow beat which is accurate enough. An oscilloscope can, of course, be used instead for frequency comparison, but there seems little need to go that far.

If these adjustments are done with care, a signal should be at its maximum with the Q-Multiplier at “Out” or “Peak,” without any alteration being necessary to receiver tuning or the passband dial. Appreciation is due to G3VCJ for his co-operation in this conversion, which can be done in about one hour.

**NEW QTH—G.P.O. RADIO BRANCH**

We are asked to say that the address for all matters affecting AT-station licence matters is now: The Radio & Broadcasting Dept., Amateur Licensing Division, Waterloo Bridge House, Waterloo Bridge Road, London, S.E.1.

**IMPORTANT EXHIBITION**

The 21st of the series sponsored by the Radio & Electronic Component Manufacturers’ Federation, their next Exhibition—to be known as the “International London Electronic Component Show”—is being held during May 20-23, at Olympia, London. It will be the biggest exhibition of its kind yet, with 436 firms represented, 75 of them from outside the U.K. This is also the first time that the Exhibition has been opened to foreign manufacturers, so should be of exceptional interest.

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**Table**

<table>
<thead>
<tr>
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<th>RECEIVER COVERAGE</th>
<th>TOP BAND READING ON RED SCALE</th>
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<td>11.0 mc</td>
<td>1.5—2.1 mc</td>
<td>200°—400°</td>
</tr>
<tr>
<td>11.1 mc</td>
<td>1.6—2.2 mc</td>
<td>300°—500°</td>
</tr>
</tbody>
</table>

*Receiver reading erroneously stated as 200°—300° in December issue. Whilst any crystal between the above limits could be used, any other frequency would make it impossible to read direct off the tuning dial.*
DESIGN FOR A CW TRANSCEIVER
FOR THE HF BANDS—PRACTICAL CONSIDERATIONS AND CHOICE OF CIRCUITRY
Part I
T. HARRISON (GM3NHQ)

DURING the winter of 1966-67 it finally became obvious to the author that something would have to be done about the HF-band equipment in use at GM3NHQ. At that time activity was on the 14 mc and 21 mc bands, mainly in the CW areas, with a 75-watt transmitter, while the receiver consisted of an 80m. "Command" Rx with a crystal controlled converter for 20-15 metres. This combination had performed more or less satisfactorily for a number of years, but the transmitter was beginning to bring in the odd T8 report and a noticeable "chirp" had developed on the 21 mc band. The receiving equipment was also beginning to show signs of wear and consequently it was decided to replace the entire HF station with something (a) Newer, (b) Better, and (c) More compact. But the question was — "replace with what?"

Like most other amateurs in this situation, the author started by leafing through the advertisements but a glance at the figures after the £ signs soon convinced the author—and more importantly, the author's XYL—that the answer did not lie there. The only way out was to build, but build what? A further search through the literature brought forth a number of likely designs for all-band transmitters and receivers. It was also plain, however, that GM3NHQ had neither the time nor the resources to undertake the construction of some of these exotic creations. Thought was then given to what was in fact really required in the way of transmitting and receiving equipment, as distinct from what was ideally wanted—two quite different things.

The first fact to emerge from a study of the station log was that about 60% of the author's operating time was spent on the CW section of the 21 mc band, the remaining 40% being spent mostly on 14 mc CW. It also showed that the author had only about a dozen QSO's on any other band throughout the year. Obviously it was a waste of time building an all-band transmitter and receiver when primarily only two of the bands would be used. Single band, or at most two-band, equipment would meet the requirement and this greatly simplified the problem. The new equipment would have to be compact, preferably in one cabinet. "One cabinet" means "transceiver," and so the basic requirements were set out: The project was to be a single band CW transceiver for either the 14 mc or 21 mc band.

Design Considerations

The literature was once again brought out but needless to say no design was found for a CW transceiver. There were SSB designs in plenty but CW seemed to have gone out of fashion. However, the SSB designs incorporated a number of good ideas, in particular the use of heterodyning to change frequency. In all transmitting equipment previously built by the author the VFO had always been at some low frequency (in the interest of stability and purity of note) and this demanded a number of frequency multiplying stages to get up to the desired HF band, inevitably giving rise to drifting, chirping and TVI. The heterodyne technique seemed the ideal way out of all these problems, since a low-frequency VFO could be heterodyned with a high-channel crystal oscillator to give the required operating frequency directly. This would eliminate the frequency multipliers, with consequent improvement of the TVI situation, and if the crystal oscillator was keyed instead of the VFO as previously, there should be little or no chirp. In addition, it was obvious that by the heterodyne technique the same VFO could be used for both the

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Fig. 1. Block diagram for the HF CW Transceiver.
transmitter and receiver sections, simplifying the design of a transceiver even further. Having accepted the heterodyne principle and a common VFO for transmitter and receiver a number of other points became apparent.

If one has a transmitter/receiver combination with only one VFO, say in the receiver, by using the heterodyne technique for the transmitter oscillator and by choosing the correct frequency for the crystal-controlled component of the transmitter mixer, it is possible to arrange that the transmitter will continuously track the receiver as one tunes round the band, thus giving single knob control of station frequency and avoiding the need to "net" the transmitter to the receiver for every QSO. Consider the argument following in which a double-conversion receiver is assumed, with a crystal-controlled front end and a tunable first IF. Suppose $F_l$ is the received frequency and $F_r$ is the receiver crystal frequency, then the tunable first IF, $F_I$, is $F_l - F_r$. Now, if the receiver second IF is $F_2$, then the required VFO frequency is $F_I + F_2$ if the VFO is on the high side of the first IF. Assuming the VFO frequency is $F_I - F_2$, then to heterodyne this to the required transmitting frequency, which is the same as the receiver frequency $F_l$, we require on transmitter crystal frequency, $F_t = F_l - F_0$

\[ F_t = F_l - (F_I - F_2) = F_l - F_I + F_r - F_2 = F_I - F_r + F_2 \]

Applying this to, say, a 21 mc transceiver, $F_l = 21$ mc and if $F_r$ is made 17-25 mc (because surplus crystals are available for this), then $F_I$ becomes 3-75 mc.

Now, if standard components are used for the second IF at, say, 470 kc, then the VFO frequency is 3-75-47 mc, i.e., 3-28 mc, and there should be no difficulty in providing a stable, pure VFO at this sort of frequency. Thus, the transmitter mixer requires a crystal-controlled component at (21-3-28) mc, i.e., 17-72 mc to produce a signal on 21 mc from this VFO (and again crystals for this are available on the surplus market). Note that almost any combination of frequencies can be chosen for the crystals and the IF's, the only requirement being that the frequency difference between the two crystals equals that chosen for the second IF. However the frequencies selected should result in the VFO operating at a fairly low frequency for good stability and note, the second IF should be low for reasonable Rx selectivity and, especially in the author's case, the crystals should be readily obtainable. The crystal oscillator frequencies mentioned in the foregoing are in fact those required for the 21 mc transceiver which is described in detail in this article, and are obtained from surplus FT-243 crystals of 5750 kc (for the receiver) and 5059-6 kc (for the transmitter) by using overtone oscillators.

Receiver Tuning

The great advantage of the system as described is that the transmitter and receiver are on the same frequency at all times, the result being that the transmitter is automatically "net"ing" on each received signal as the receiver tunes over the band. So far so good. But what happens if the transceiver operator calls "CQ"? He "tunes around the band for any possible call"—and in so doing shifts his transmitted signal off its original frequency, thereby causing some concern to the station replying to the CQ and is looking for a reply on the original frequency. Unless the call and reply are on the same frequency, the chances are the QSO will not take place, especially in conditions of QRM. It appears that our tracking system is of doubtful advantage since in fact it is desirable to have the receiver tuning independently from the transmitter. What we in fact require, however, is the ability to tune the receiver a few kc only on either side of the transmitter frequency—"Receiver Incremental Tuning," to use the commercial transceiver terminology. This can be achieved in the present instance in three ways:

1. By altering $F_r$, the receiver crystal frequency,
2. By altering the VFO during receive periods,
3. By altering the second IF.

In the 21 mc design described here $F_r$ is obtained from an overtone oscillator, whose frequency cannot be altered, although had a fundamental crystal of 17-25 mc been used, a VXO could have been adopted here.
The VFO can be varied during receive periods either by simply returning to the original transmit setting at every "over," or by arranging varicap diodes which changed over with the transmit/receive relay. This latter system is in fact used by at least one of the commercial transceivers but was rejected in this case since no relays or switches are used for transmit/receive changeover—apart from the Morse key, that is!

The solution adopted at GM3NHQ is simply to vary the second IF—and this does not mean simultaneously tuning two or three pairs of IF transformers. It simply means varying the BFO frequency since it is the BFO that finally determines the exact operating frequency at which zero beat occurs in a CW receiver.

Consider again the previous argument: If $F_1$ is the initial received frequency and $F_r$ and the VFO frequency are kept constant, the second IF is $F_1-F_2-FVFO$ and zero beat occurs when the BFO is set to this frequency. Now suppose the BFO is set to $F_2 + 5 \text{ kc}$, the high frequency which gives this as a second IF is $(IF_2 + 5 \text{ kc}) + FVFO + Fr$, i.e. $(F_1-Fr-FVFO + 5 \text{ kc}) + Fr$, which is $F_1 + 5 \text{ kc}$—in other words, the new received frequency for zero beat is $5 \text{ kc}$ higher than before and the HF band has been tuned over $5 \text{ kc}$ simply by altering the BFO frequency by $5 \text{ kc}$. Now, using this technique with a highly selective 2nd IF strip would result in a marked loss in sensitivity when the BFO was "tuned off," since the new HF signal would be outside the receiver's second IF passband—remember that the actual frequency to which the second IF's are tuned has not been altered, only the BFO setting. If, however, the receiver passband is deliberately made, say $10 \text{ kc}$ wide, there will be no noticeable loss in sensitivity over a $\pm 5 \text{ kc}$ BFO swing. The resulting receiver system is not too selective, but for CW operation this can be rectified by having a selective AF section.

The important point to note is that although the received HF signal has been tuned by altering the BFO setting, the transmitted frequency has not been upset since neither the VFO nor the transmitter crystal frequencies have been altered. Thus we have a system which arranges that the transmitter is constantly netted on to the receiver frequency, yet allows the receiver to be "tuned around" slightly without upsetting the transmitter frequency. This arrangement has been in use in the author's equipment for the last two years and has
proved entirely satisfactory.

So much for frequency control considerations. However, before leaving the problem of crystal oscillators, it is worth mentioning that the heterodyne principle greatly facilitates full break-in working in a CW rig, since only the crystal controlled component of the VFO need be keyed, the variable frequency component being left running continuously, thus making it much easier to obtain a stable, chirp-free signal under full BK conditions.

Considering now the practical transceiver design as developed: The equipment as used on the 21 mc band is described here although the author has built a similar unit for 14 mc, and both 28 mc and 70 mc units are at present under construction. (Crystal frequencies and other details for these are given at the end of this article.)

Circuit Configuration

The block diagram for the 21 mc unit is given in Fig. 1. This shows a transceiver having a double-conversion superhet receiver with a crystal-controlled front end and tunable first IF, the CW transmitter having a heterodyne-type VFO and straight-through amplification at 21 mc to a 6146 PA stage. Full break-in keying is provided and a T/R switch prevents overloading of the receiver front end while the transmitter is on. AM operation requires only the addition of a suitable modulator.

Considering first the receiver section, V1 is an EF183 RF amp. feeding into V2, an ECF80, which is the first mixer, the triode section of the ECF80 operating as an overtone oscillator at 17-25 mc. These two valves form in effect a crystal controlled converter as the front end of a single-conversion superhet, tuning from 3-75 mc to 3-9 mc to cover the CW section of the 15-metre band. The converter output of 3-75-3-9 mc is converted to about 470 kc by V3, an ECF80 mixer, the triode section of which operates as a VFO covering 3-28-3-43 mc. One stage of 470 kc IF amplification is provided by V4, an EF183, before demodulation by CR1, CR2, two OA71's arranged as a product detector. V5, an ECL80 gives sufficient AF amplification for headphone operation (as preferred by most CW operators). The tunable BFO is obtained from one half of V6, a 12AT7, the other half of which arranges receiver muting during transmission periods. The transmitter mixer, V7, is another ECF80 in which the VFO output of 3-28-3-43 mc is mixed with the CO output at 17-72 mc to give 21 mc drive at the same frequency as the received signal. One EF183, V8, provides sufficient 21 mc amplification for V9, the 6146 PA stage, to run an input in the region of 50-60 watts. V10 is the T/R switch, using a 12AT7, to prevent receiver front-end overflowing while allowing receiver and transmitter to use the same aerial. Grid-block keying is applied to the PA, driver, and transmitter crystal oscillator stages, while V7b, the keying valve, applies a muting bias to the first two stages of the receiver when the key is closed.

(To be continued)

IT MAY SURPRISE

Those who realise, these days, that when trusting anything to the post one must get the address right is that on occasion we receive (eventually) missives directed to “S.W.L., S.W.M., Bucks.” While it is a tribute to the Post Office that in the end they find our slot, it is scarcely giving them a chance when things like this have to go through many sorting offices. The four words you must use in full when writing to the Editorial Dept.—and they are the only four words needed—are SHORT WAVE MAGAZINE, BUCKINGHAM.

On p.763 of the February issue, we showed the radio room of the R.M.S. "Queen Elizabeth II." On the left is one of her eight transmitters, rated one kilowatt, remote controlled from the operating position. These transmitters, which feed into notch aerials in the ship's funnel, give a wide selection of spot frequencies and ensure communication all round the world by proper use of the seven marine bands in the HF spectrum.
THE well-known transmitter pi-output tank configuration allows the PA anode circuit to be tuned to resonance, and to match into a wide range of output impedances. Various pi-tanks have been used while attempting to get the best RF output, for a given PA DC input, and it is felt that information on these should be of help.

Fig. 1 is the usual circuit. The PA DC input is $I \times V$, where $I$ is anode current shown by $M_1$, and $V$ is anode voltage. One way of measuring RF output is by the RF meter $M_2$, with non-inductive load resistor $Z$. Output is $I^2 \times Z$. Efficiency (as a percentage) is Output/Input x 100. The following is a quite typical example:

**Input:** 100 mA at 500v. = $0.1 \times 500 = 50$ watts.

**Output:** 0.8A through 50 ohms = $0.8 \times 0.8 \times 50 = 32$ watts.

**Efficiency:** $32/50 \times 100 = 64\%$.

For absolute results, anode voltage, $Z$, $M_1$ and $M_2$ have to be checked, and the proper correction factors applied to $Z$ and $M_2$ as frequency is raised. But for comparisons, it is only necessary to employ the same PA input each time, and look for a rise or fall on $M_2$.

$C_1$ is to by-pass stray RF. $L_1$ is the tank coil. $V_{C1}$ is the PA tuning or input capacitor, and $V_{C2}$ the output (or "loading") condenser. $C_2$ is the pi-tank coupling capacitor.

The minimum voltage rating of $V_{C1}$ should equal the HT voltage; or be twice this for AM. Typical spacing is 0.07in. for 3 kV, 0.05in. for 2 kV, 0.03in. for 1 kV, and the use of non-miniature receiver type capacitors for 500/600v. maximum. $V_{C2}$ can have receiver type spacing for any normal purpose (e.g., 150w. maximum). $C_2$ absolute minimum rating should be twice the HT voltage (this also applies to $C_1$). Higher ratings, for a safety factor, are wise. $RFC_2$ is an added precaution, to keep HT from a feeder or directly connected aerial if $C_2$ leaks or fails. $RFC_2$ may be 2.5 mH, 100 mA.

All values can, of course, be calculated for any particular set of working conditions, but it is not proposed to repeat the formulae here because they can always be used by anyone who favours this approach. One possibility is that there may be difficulty in providing enough capacity for $V_{C1}$ and $V_{C2}$ at low frequencies, or in easily having sufficiently low values at $V_{C1}$ for high frequencies.

The table on p.92 shows typical round values for a PA of about 2500-3000 ohms anode impedance, loaded circuit Q of 12, and 50 ohm and 75 ohm outputs.

The important points are that we normally expect both $V_{C1}$ and $V_{C2}$ to be well open for the HF bands, while $V_{C1}$ may be near zero capacitance on 10m. These values include stray circuit capacitance—usually at least 10 µF across $V_{C1}$, which might itself have a minimum capacitance of 10 µF. So we never expect each band to tune nicely around the middle swing of $V_{C1}/V_{C2}$.
Fig. 3. Tapped tank coil for five bands—see text.

Switching Capacitances

Fig. 2 is a typical 5-band tank circuit, with L1 tapped for 40m. and higher frequencies. VC1 is often about 200 µµF, and VC2 generally a 2-gang 500 µµF capacitor, giving 1000 µµF in all. A 3-gang condenser bank would provide 9015 µF.

From the table, 900 µµF or even 1500 µµF may be marginal. When this causes tuning difficulty, the unrequired contact of S1 could bring in Cx, in parallel with VC2, on 80 metres only. Cx is high quality mica, generally around 470 µµF to 001 µF, according to the size of VC2.

Where VC1 is of insufficient capacity, an extra switch section S2 can introduce Cy, again for 80m. only. Cy is high voltage mica, often about 75 µµF. Employing a smaller component at VC1 is actually of advantage for the HF bands.

In some commercial equipment both VC1 and VC2 are of relatively small value, and extra fixed capacitors (like Cx and Cy) are switched in for each band. This simplifies manual tuning into a limited range of impedances.

In some circuits, VC1 is a ganged type. One section is employed for the HF bands, and S2 places two or more sections in parallel for the LF bands. This allows values to be appropriate for each band.

Table

<table>
<thead>
<tr>
<th>BAND</th>
<th>Value VC1</th>
<th>Value L1</th>
<th>VC2 (for 50 ohms)</th>
<th>VC2 (for 75 ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80m.</td>
<td>200 µµF</td>
<td>11 µH</td>
<td>-0.015 µF</td>
<td>900 µµF</td>
</tr>
<tr>
<td>40m.</td>
<td>100 µµF</td>
<td>5-5 µH</td>
<td>750 µµF</td>
<td>450 µµF</td>
</tr>
<tr>
<td>20m.</td>
<td>50 µµF</td>
<td>2-8 µH</td>
<td>370 µµF</td>
<td>250 µµF</td>
</tr>
<tr>
<td>15m.</td>
<td>33 µµF</td>
<td>1-9 µH</td>
<td>230 µµF</td>
<td>180 µµF</td>
</tr>
<tr>
<td>10m.</td>
<td>24 µµF</td>
<td>1-4 µH</td>
<td>180 µµF</td>
<td>125 µµF</td>
</tr>
</tbody>
</table>

Note: Values for VC2 refer to assumed output impedances at the PA tank. Under practical conditions, when feeding into these loads, values for VC2 could be between these limits. The point here is always to set up the condition to give maximum RF output into whatever low-impedance load is presented by the aerial. If the limits of the aerial loading are known, the values for VC1, L1, VC2 hold good.

Switching Efficiency

In Fig. 2, L1 has a number of turns shorted by S1, for all bands except 80m. This is a common method in commercial equipment. When looking for maximum efficiency, it may be felt that the shorted turns cause important losses on the HF bands. However, if the RF output is measured on 10, 15, 20 and 40m. with L1 as in Fig. 2, and then L1 and S1 are removed and the right coil fitted for any one band only, no practical improvement need be expected. Energy absorbed inductively by the unused section of L1 is either very small, or is returned inductively to the operative part of the coil. Actual losses depend on the design of L1 and other factors. Measurements on switched coils showed that losses from switching and shorted turns need have no significant effect under practical conditions.

S1 should be heavy duty or have doubled contacts, for all but low power. Some commercial designs favour a switch with progressively shorting contacts, so that all tags are shorted. Though theoretically this is a good thing to do, measurements comparing results against those with a switch as in Fig. 2 showed no detectable change in RF output—and it is with RF output that we are concerned.

Two-Band Tanks

A special case is raised by the 10-watt type of transmitter covering both 160m. and 80m. An unswitched circuit, like Fig. 1, is sometimes used. Then VC1 may be 500 µµF, and will be nearly fully closed for 160m., but well near minimum capacity for 80m.

Efficiency measurements show that this need not cause any practical loss of output on either band. However, the range of impedances into which the tank will operate is different for each band, and reduced. With unfamiliar equipment, the wrong anode current dip may be tuned, e.g., with the PA acting as doubler. There may also be a reduction in harmonic suppression, and a measurable increase in sub-harmonic radiation. (By the latter is meant the presence of a 160m. signal when operating on
80m., a phenomenon not unknown!)

The two-band unswitched tank would thus seem most suitable when it is certain a correct type of aerial will be used, or an appropriate tuner or coupler.

**Five-Band Tanks**

Fig. 3 is a 5-band tank on a common former. Sections are marked L1 to L5 for ready identification. For 10m., L1 only will be in circuit. On 15m., L1 and L2 are used together in series. In the same way, L3 and L4 are added for the 20m. and 40m. bands, and all windings L1 to L5 are in use on Eighty.

A threaded ceramic or other low-loss ribbed former is most convenient, but no measurable difference in RF output could be detected when using a smooth, polished paxolin tube instead. Turns can more easily be regularly spaced on a threaded former.

A quite compact tank for a 6146 or similar PA, for about 60w. input, can be wound on a 1½ in. dia. former, using 18g. for L1, L2 and L3, and 20g. for L4 and L5. L1 is 6 turns at 8 turns per inch. L2 is 2 turns at 8 t.p.i. L3 has 4 turns, spaced by wire diameter. L4 is 6 turns at 16 t.p.i., and L5 is 12 turns at 16 t.p.i. A space of ½ in. is allowed between each winding. This gives 6 turns for 10m., 8 for 15m., 12 for 20m., 18 for 40m., and 30 for 80m. If stray capacities are a little high, the 10m. tap will have to be moved one turn towards VC1, giving 5 turns for this band.

All associated switch and other wiring should be extremely stout and short. VC1 may be 200 µµF, and VC2 0.001 µF. L4 should be 8 turns, and L5 16 turns.

With the object of improving efficiency on 10m., a separate coil is sometimes used, as in Fig. 4. This may be self-supporting, 14g. wire, or copper strip, and will usually require about 5 turns, ½ in. in diameter. If there is much stray capacity, e.g., when using 6146's in parallel, 4½ or 4 turns may have to be adopted. The inductance can be modified by spacing turns more widely. L2 to L5 are at right angles and completely out of use on 10m.

L2 will add 2 turns or 3 turns, according to L1, etc., for 15m. L3 adds about 4 turns, for 20m. L4 and L5 may have numbers of turns as for Fig. 3. L2 to L5 will thus be 30 turns in all. If wound with 18g. or 16g. throughout, this will do for 100-125 watts, employing a ribbed ceramic former.

With ready-made pi-tank units (coil with switch) it may be necessary to use alternative 10m. and 15m. tappings, in particular, to suit stray capacitances. Similar adjustments could be needed with Figs. 3 and 4, according to the PA valve or valves fitted, the minimum value of VC1 and other factors.

**LF Band Tanks**

A PA coil suitable for the usual type of 10-15 watt 160/80m. transmitter can have 68 turns of 22g. enamelled wire, occupying a 2in. length on a 1in. diameter paxolin tube. It is centre-tapped for 80m. Sixty turns (also centre tapped) on a 1½ in. dia. former will be similar.

Instead of using an on/off type switch for 80/160 metre change-over, it can be convenient to have a 3-way or 4-way switch, providing an alternative winding for each band. This allows easier loading, with some aerials. As an example, the two-band coil can have the option of 30 and 40 turns for 80m., and about 60 and 75 turns for 160m.

**Single-Band Tanks**

These can be permanent or plug-in, according to the usage expected. They can be wound from the inductance values listed in the Table, or can have turns according to the number which would be in circuit in Fig. 3. As more space will generally be available, 16 of 14g. wire can be used for all HF bands. If the plug-in type of coil has spare pins, these can be used to bring into circuit one or two sections of VC1, or capacitors such as Cy and Cx (see Fig. 2) to suit the band.

This photograph shows the mechanical layout and construction of a multi-band tank circuit of the type discussed in the adjoining article. It is actually a five-band PA with an 813 in the final, and was built by G3FWV (Scarborough). The tapped main inductance, ten-metre coil and band change switch above the tuning and loading condensers can be clearly seen.
**STATION CHANGE-OVER SYSTEM**

**CIRCUIT FOR QUIET OPERATION**

B. D. SIMPSON (G3PEK) and C. BIRKETT (G3SMI)

Over the years, the writers have used a variety of change-over systems of various combinations of switches and relays but they have all suffered from the same disadvantage—crashes and bangs on either changing over to "transmit" or back to "receive," or both.

It was realised that what was needed was a system of sequence switching so that the receiver was muted and aerial changed over before the transmitter switched on and, conversely, the transmitter switched off before the receiver came back on.

At both stations, negative bias is used for muting the receiver and transmitter, although this circuit is equally applicable to other methods.

The sequence of operation is as follows:

When SI is closed, RLA changes over the aerial immediately and a contact on RLB opens at the same time, removing a short from the negative muting bias and muting the receiver. A second contact on RLB closes, completing the circuit for RLC, which then operates and shorts the transmitter muting line to earth. C2 is also discharged.

When SI is opened, the earth return for RLC is broken and this opens immediately, thus muting the transmitter. The relays RLA and RLB are held over, however, until C2 has fully charged through their coils and thus the return to "receive" is delayed. The time taken to return to the receive state can be altered by varying C2, a value of 50 µF providing a reasonably quick return although perfectly silent.

Power for the unit is provided by T1 and although only half-wave rectification is employed (by diode D1), adequate smoothing is given by C1. Diode D2 is necessary to isolate RLC from the delay capacitor C2.

The unit is constructed on a 6in. x 3in. chassis with the transformer mounted on top and the co-axial relay at one end. The other relays and components are all fitted underneath. At both G3PEK and G3SMI, SI consists of several switches in parallel; on the unit itself, on the transmitter and a foot switch (an old Morse key) for rapid change over while leaving both hands free.

Values and parts for the circuit herewith are as follows: C1, 2000 µF, 50v.; C2, 50 µF, 50v. (see text); D1, D2, BY-100 or similar; SI, SPST toggle; RLA, 24v., co-ax aerial relay; RLB, relay 24v., with one "make" and contact for Rx muting; RLC, relay, 24v., with one "make" and/or contacts for Tx muting, as required; T1, transformer, 24v. 1 amp. (can be 12-0-12v. with centre-tap not used).

With regard to the components, all including the co-axial relay are currently obtainable from N.W. Electrics, 52 Gt. Ancoats Street, Manchester.

"...Always keep it short here..."
Strange Fault on Twenty
Problem of Drive, and Its Cure

At the time it was observed, this so-called "fault" was classified as rather unusual but one which did not materially affect transmission. Experiments were being carried out on the main transmitter, which is similar in design to the one illustrated on p.121 of Short Wave Magazine of May 1960—see Fig. 1 below for the schematic arrangement.

Pi-section inter-stage coupling is used between the 6CL6 and the 5763, and between the 5763 and the PA (a TT21) which operates at 150 watts input on all bands 3.5 to 28 mc. V1 and V2 are frequency multipliers, driving power being controlled by potentiometers fitted to each screen grid. This control is absolutely essential on all bands except 28 mc, in order to prevent over-driving, with all its attendant evils.

When making drive adjustments on 20 metres, it was observed that the meter M in the grid circuit of the TT21 behaved in a somewhat erratic manner. With the drive on, and the PA HT disconnected, the meter registered 8 mA approximately with the appropriate grid bias in use. The PA was then switched on and adjustments made to the PA anode tuning capacitor to the point of resonance. During these adjustments, which were made with reduced drive, the meter reading, instead of remaining relatively steady, varied greatly from a low reading of around 3 to 4 mA to a high reading of 14 mA or so, depending on whether the PA anode tuning capacitor was tuned to the high frequency or to the low frequency side of resonance. It was first thought that over or under neutralisation was the cause, but, as the transmitter behaved perfectly on all the other bands, this was ruled out.

Neutralising
Neutralisation tests can be carried out on a PA by the following procedure:

(I) Tune both grid and anode circuits to resonance,

(II) Observe the grid current of the PA and tune the PA anode circuit slightly to the HF side of resonance (i.e., use less capacity). If the grid current rises, more neutralisation is necessary. If the grid current decreases when tuning to HF, then less neutralisation is required.

Neutralising is just right for that frequency when the grid current peaks at the exact point of anode current dip. This procedure applies more to triodes than to tetrodes, but nevertheless, it is a useful guide.

Although not strictly necessary in this case, a slight amount of neutralisation had been carried out on this PA by feeding RF from the anode of the TT21 to the input side of the pi-coupling coil at the point marked "X" in Fig. 1, which could be the fixed plates of the tuning capacitor C2. This feedback can be effected by running a piece of insulated wire from "X" to the PA by the shortest route. The wire is joined to the circuit at "X," but at the PA end the wire is bent into an upright position for about one inch and fixed at a short distance from the outside of the bulb of the PA. This distance has to be found by experiment and may vary considerably from one transmitter to another, depending on the layout and the screening employed. Capacity coupling is achieved between the PA anode and the wire, and under no circumstances should connection be made direct to the anode. Such adjustment is best made on one of the HF bands, either 28 mc or 21 mc, and the adjustment will then hold good, more or less, on the other bands. In the writer's case neutralising was not really necessary as screening and decoupling had been carefully carried out.

So what was causing the erratic behaviour on 14 mc, and only on that band?

Another point was that the grid drive on 14 mc was

Fig. 1. Basic circuit discussed in text.
low when compared with the maximum possible on 21 mc. Although slight alterations to the PA grid coil—number of turns and size of loading capacitor—did improve matters very slightly, this was clearly not the answer to the problem and was not proceeded with.

Fig. 2 shows the approximate layout of the pi-coupling coils around the switch SW2. For a short time the transmitter was used on all bands including 14 mc, but as adjustment of the PA anode tuning was invariably a little "touchy" on 20 metres, it was decided to discover and cure this erratic behaviour once and for all.

Investigation

The particular transmitter unit was taken out of its cabinet. The filament current of the PA was left on, but the HT was disconnected, and, with the drive on, care was taken to run the grid current at a low figure and for relatively short periods only, to avoid over heating of the PA grid. The possibility of coupling between two or more of the coils was considered and a screen was placed between the most likely offender (the 7 mc coil) and the 14 mc tank winding, but to no avail. No change in drive was observed so the screen was positioned between the 3.5 mc winding and the 14 mc coil—and, lo, an immediate increase of grid current was obtained. Coupling was obviously taking place between the two coils, the 3.5 mc coil apparently "sucking out" energy from the other. The coil switch SW2 connects the various coils in circuit, but does not short out those not in circuit.

Fig. 3 shows the circuit of the 3.5 mc coil when disconnected.

The remedy was now clear, either to screen one coil from the other, or alter the characteristics of the 3.5 mc tank, and the latter alternative was adopted. Before the coil was altered, tests with a grid dip meter showed that, in a disconnected condition, the 3.5 mc coil was resonating at about 13.5 mc.

The winding on the 3.5 mc coil was decreased by about ten turns, thus reducing the inductance, and the loading capacitor was increased in value. This proved to be a complete cure, the maximum obtainable grid drive reading on 14 mc had now increased considerably and the transmitter operated exactly as it should, on all bands.

Some readers may wonder why the former alternative, i.e. screening, was not adopted. True, it would have been simple to have fitted a small screen and so avoided alterations to the 80m. coil. While screening is often essential, unless very carefully carried out as regards spacing, etc., the characteristics of a coil may very well be degraded by the too-close presence of a screen and so result in inefficient operation. A third alternative, indeed, was available; this being to move the 3.5 mc coil further away from the other coil, but, as a great deal of space was not available, this was not attempted.

As it turned out, the alterations to the 3.5 mc coil resulted in a slightly greater drive being available on that band, an increase which was not actually required.

THE FLOW OF QSL CARDS

On previous occasions we have commented on the heavy load nowadays imposed on the QSL Bureaux of the world. An interesting summary in the January issue of Radio ZS (journal of the South African Radio League) discloses that their Bureau alone handled nearly 105,000 cards during last year—and they only have a membership of 1,600! The report comments "some members are very active and receive and send stacks of cards, while others are quiet and give the bureau very little work."

"... Have a pretty good valve line-up ..."
COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

HOW often does one come on the air for a short spell and find oneself sitting in the middle of a raving great pile-up after some rare DX-station. Often when this happens during a QSO one cannot hear the DX, but only the people calling it, due to such factors as aerial directivity and so on. All one can reasonably do is to QSY as smartly as possible and hope that not too much damage has been done to someone else’s contact.

However, after this had happened to your scribe once, he sat down and thought for a while—and the theme of the thinking was somewhat along the lines of “How can it be avoided?” Of course, it cannot be completely avoided, however carefully one listens on the frequency before launching a call; on the other hand, it is equally obvious that a lot of the clottery is because some folk are just plain cloth-eared or unequipped with receivers, or even do it deliberately when the DX has failed to come back to them. However, much of this could be stopped if people would only try and time their calls more sensibly, avoid using different (or difficult) phonetics, and above all eschew long calls without breaks for listening. A quick three-times-three and a listen is far more effective, and productive of far less QRM than the long-winded bleating one so often hears going on long after the DX signal has gone away or worked several stations through it. Another thing is to listen for a while before launching a call on the DX, get his name—if you really want it—and his QSL data from earlier QSO’s, and then when the time comes, call him, swap reports and away to give the others a chance. Nothing is more maddening to others waiting than the chap who wants the whole rigmarole given on the last contacts repeated over again for his special benefit.

But if the DX station wants a ragchew, let him—after all it becomes a bit of a bind being in a rare spot and being unable to do more than exchange numbers with the whole wide world, when the operator is lonely and would like nothing better than a good chat; and it is only courteous to indulge him in this simple pleasure.

Ten-metre Doings

Naturally enough, at this time of the year one should expect somewhat of a lift in conditions, and so, by and large, has been the case. Things have also been improved a bit by the “spreading” effect on activity of the Five-Band DXCC, both on this and the low-frequency ranges—which is a very good thing!

When you get to the top of the lists, new countries are about as easy to find as hen’s teeth, and by this line of reasoning G3DO (Four Oaks) had a bumper month. HK0TU made an all-time new one on Twenty, and a new one on the band above, while the 28 mc score went up no less than four, by QSO’s with FO8BS—S9 the long way round—SV0WN, AP2MR and GC2LU in Jersey.

An indoor inverted-Vee is the G3XTJ (Palmers Green) aerial for his favourite 28 mc band, on which he managed to work all W call

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<th>21 mc</th>
<th>14 mc</th>
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Note: Placings this month are based on the “1.8 mc” Column.
areas, also VE4, TR8AG, 6W8XX, 6W/W4BDP, UM8AP, VU2GGB, V56CO, K4PBCL, KP4CL, 9J2RQA, HH9DL, WX8BDP, KG4DH, UL7, ZS, and others of lesser breed. Although Edwin has such a new call, he is by no means a novice at the game, and indeed your conductor recalls his interest in Top Band and VHF DX listening way back in 1956—which only goes to show yet again that the operator is more important by far than the gear or the aerials.

G2HKU (Sheppey) had a pleasant QSO when he found he was not the only amateur from Sheppey—VP2LX (St. Lucia) is the other! His SSB also connected with 9J2GA, MP4BBB, SV0WN, VP8H, and VP2GLE (Grenada), UD6KBO, ZC4TK, 4X4HJ; and the countries for this band went up by three—the 9J2 and the two VP2's.

Quite a short letter this time from G2DC (Ringwood), who has been kept out of his shack by the icy weather, but was around enough to note that 28 mc conditions were better at the beginning of the month than later. Jack, incidentally, comments on the HKO7TU expedition, and their superb operating and fairness in dishing out the QSO's. He in fact worked this one on all five bands—but no gain thereby, as G2DC had worked the last expedition to Malpelo on all five bands.

Peter, G3VPS (Wartling), who has managed to stay out of the arms of the law—see last month—and spent his spare afternoons on Ten, where 9H1BL and W's were worked on Sideband, and TA2E, VP2DAP, ZE1ID, UA9 and W's with the key.

G3SVW (Manchester) was particularly amused to read of G3VPS being "investigated," as a similar situation occurred about three years ago with him. Quite clearly G3SVW must have been in a contest, because he was getting very cross with a receiver that had gone "on the blink" and his language when the knock came on the shack door was quite strong. However, he opened it—and there was the cop! However, 0400 or not, he also satisfied the man, and having apologised for his language, the incident passed off as a joke. After a long period of inactivity, Ron now has a K.W. Vespa Mk. II which he uses mainly for CW on the HF bands and SSB on Top Band and Eighty.

Not much of what goes on escapes G3XYP (Navenby) but David was somewhat hampered by the fact that his beam was down for three weeks of the period. After the first rush of activity when the ticket arrived, G3XYP was reverting to the habits of his SWL days, listening much more, and looking out for the stations he made friends with as an SWL. Not surprisingly, this approach has produced more real DX than the first rush. Ten yielded QSO's with FH8CE, HS3DR, KZ5EK, T1JAU, VK9BB, VP8KD, VU2GGB, ZS3S and 5H3KJ, all on SSB.

G3NOF (Yeovil) has been licensed since 1959, but has, of course, been well-known as an SWL for far longer—way back in 1935 in fact he was sending out the cards. Don's letter this month tells more than usual, and in terms of 28 mc mentions openings on occasion to S.E. Asia around 1000, W's audible from 1130 to 2100, and South Americans during the evening towards the end of the period. Contact was made on 10m. with FG7XX, KG4DH, K7ERW, K9MKO (Colorado), VU2GGB, all W call districts, XE2WH, ZS's and 6W8DY. Among the gotaways were CE0AE, HK0TU and HS3DR.

Contests and Awards

Pudsey group have announced an award, for working Yorkshire stations. There are three classes to the award, for three categories of stations—U.K., Europe and DX. Class III requires respectively 10, 5, and three contacts; Class II, 20, 10 and 4; Class I 30, 15 and 5. Log data only—for cards—to G3WG, QTHR, with 5s., $1, or 8 IRC's. He will also be glad to explain details.

As far as Contests go it seems the last weekend in April and the first in May will be bedlam, with three events on the former and four the latter—someone blundered there, well and truly! Seriously, one wonders whether the organisers of some of these affairs ever stop to think about what else is or is not already on the ground for the proposed period. After all, most of them come into the Contest Calendar, even if the folk in the country of origin know it not.

Fifteen Metres

Last November PY9SP was on St. Peter and St. Paul Rocks, and W6AM (Long Beach, California) was after him. Reports were duly exchanged on Phone, 59 both ways—your conductor has never known Don to have a report of less than 59!—to give a Phone total for DXCC of 344 countries confirmed, no less.

Both G3NOF and your conductor have considerable trouble with TVI on 21 mc, and so neither of us is much active on the band. However, G3NOF managed to exchange reports with JA's, MP4TC and TU2AZ.

Another TVI victim is G3XTJ, who as a result has a completely "Nil" report to offer; owing to the BBC Channels being so low in frequency things are pretty poor, but it is to be hoped the longed-for alleviation really begins when BBC-1 goes on to UHF, and people then start to buy single-standard 625 receivers. But by then we will be sitting at the trough of the sunspot cycle!

From G3XYP we hear of TN8BK, VP2AA, 6W8DY and 9N2CF, all brought to book on SSB, although one would suspect that David is not enormously enamoured of the band.

G2DC, as already remarked, spent very little time in the shack, but out of his experience and the short time spent looking around, Jack was able to form the opinion that 15 metres was indeed as lively as expectations would have it in
relation to the sunspot number; and that opinion is pretty well shared by all correspondents this time.

Our real 21 mc specialist has been missing on occasion of late, but logged enough to make him feel it worth-while writing. GM3JDR (Golspie) is the man, and he found the band is open from 0700z right the way round to 2100z—but of course he himself has to QRT by 0855! Nevertheless, CW gave ZD3A, ZS3AW, KG5ARO, KR6NR, UM7CG, VP9BO, VK5SD, UK8CS, ZP5KA, LU7DNN, HM1DE, ZL2GS, JX2XJ, ZS6BT, 9H1BM, KZ5EK, CO2BM, VKJ3ZY, UA9GE, FR7AB, UWO1W, HM4FA, AU9CA, CO2BB, HH9DL, PY2DS, UW9YH, VK3ML, ZE1DL, ZS5WH, CR6AI, LU3EVG, UA9RA, VK2BNK, UAA9VX, UV9CO, VK2EO, UAA9PP, ZS2ED, ZS4AK, UL7BF, 3V8YA, EL2BE, UAA9ES, PY2OU, PY2DRP, CP3CN, YS1O, PY1CP, EA8FH, CR6LB, CR6KB, PY7VON, CR6EI, HK3AVK, YV4AQ, FL3MB, EL0A/MM, UL7BX, all W call areas, VE1-7 and JA1-O, the latter being taken not by the dozen but the gross! As contrast SSB produced all W and JA call areas, plus 9Q5GE. (Phew—and again phew!)

Maritime Mobiles

Three reports to consider this time, all of which are of interest in one way or another. Perhaps we should first take EL0A/MM, who signs GM300K when at home. Jake has had the EL permit since last August, but only started using it in earnest from December. Needless to say, the call has been pretty popular with the customers and as a result has drawn upon itself far more than the usual collection of Clots. Most of them seem to emanate from Europe, particularly the East, and no amount of sending "KN" or anything short of QRT could stop them. As Jake remarks, such an experience would tend to make one remain QRT. The prize of them all was the 4X4 who tried to break up several QSO's with Europeans, and then followed it up by sending CQ right on the frequency—using the EL0A call!!

G3UOF/MM set off from U.K. with his nice new KW-2800A and before he had covered enough distance to get out of European waters the ECF82 in the VFO decided to go u/s, and so put him off the air even as far as listening was concerned, until arrival at Capetown a couple of weeks later when the Company's helicopter service passed over a replacement. The battle for permission to have the /MM rig fully operational on the ship is still going on. As far as the listening watch is concerned, the note last time round has already resulted in a few enquiries, and those who are interested enough to drop him a line should end up with well-organised opportunities for finding how they get out to DX on Top Band. This trip more attention has been paid to the HF bands, and very little has been heard of 160 metres. Thus on February 22, G2CIW was 579 on 28 mc, from the area of CR7, and on the following day, off S.E. ZS-land, G3NYQ (58). G3NJK (57). G3PYG (57) and G3HIU at 59 using AM were heard around noon local time. March 3 saw the watch take a change of frequency to Forty, where G3FIM was logged calling G3TPE, 579 at 2050z from the Persian Gulf.

Still with the /MM story we have a letter from G3UOF, who is now 2nd RO, but has no permanent posting which makes it a trifle hard for him to get coverage from the GPO. However, the ship's own tackle was used to have a little listen round, after 2300z and when it was possible. Summarising, Richard found conditions poor in the main, and remarks that several stations would have been missed but for the fact that they were sending CQ very slowly. On the other hand, when in English waters it was found that some amateur signals were considerably stronger than the Coast stations! Richard, like G3UOF, would like to set up formal listening skeds—write to him, c/o m.v. Oregis, Houlder Lines, Ltd., 53 Leadenhall Street, London, E.C.3.

Old Faithful

And well might Twenty be so described, as a glance at the scores
in the Six-Band Table would reveal to the unbelieving. During the period under review 20m. seemed to be sitting up and taking a little nourishment after its poorer performances of late. However, there is still DX there getting no reply to calls. As an example, how about A2CAU—Jim is looking for U.K. contacts in the CW area during 1800-2000z, and at the time of his letter had only managed one QSO with England, G3US being the lucky one. Skeds could be arranged, no doubt, and the address is J. A. Large, A2CAU, Box 200, Francisco-town, Botswana.

Now to G2HKU, who mentions SSB contacts with ZL2KP, ZL3SE, ZL3JQ, ZL4KB, WA7ISH in Arizona and VK0KJ on Macquarie Island for a new country. G3VPS (Wartling) comes into the tale, and sounds quite pleased with his month’s pickings. Most of the stuff was hooked in the early evening after 1800z, giving SSB with ZL1AH, EA8AE, PZ1I, 9Y4, VK6XY, SV1, CN8, 9H1BL, PY’s and YV’s. CW resulted in JA, JH1 and HP1E. 9H1BL found time to look over most of the bands, and to keep up his little personal rivalry with G3VPS; Twenty was at times open to the States right through the night. While nothing spectacular was worked, the month was quite enjoyable both in terms of the short snappy contacts and the odd longer ragchew.

Even though the beam at G3XYP was down for most of the time, David still found opportunities to work the stuff on SSB, mainly mornings and evenings. In terms of results HK0TU, HS3RB, HK6’s, VS6AL, ZL1ANT, 3V8AC, 457AS, 5L2AK, 9K2BV, 9V1PC, plus loads of 5Z4’s and ZS’s in the evening periods.

Over to G3XTJ, who is quite terse about his activities on 20m., as follows “ LU, PY, and HV1SJ—i.e. Nil!”—but since his list is quite long for the other bands we have to conclude that his result arises from lack of operating time.

The analysis of the month by G3NOF finds things improved in the mornings, thanks to the earlier sunrise, with the band opening to the Pacific around 0700 after a spell of EU’s, followed by the VK/ZL signals over the long path, accompanied by the cacophony from Europe still strong as ever—the condition of early-morning DX with only very weak Europeans seems to have disappeared. Around 1200 and 2100 VK was occasionally heard over the short path, working into W, but no contacts were made. The S.E. Asian signals in the afternoon have been less evident than one would have expected, even though XW8AX was S9 frequently, around 1900. Contacts were made with HK0TU, PJ2CC, TA1IB, TF2W LJ, TN8BN, VK’s, VS6AL, WX8AX-ZC4AK, ZL’s, and 3V8AC. Gotaways included FK8AZ, FO8AB, FO8BS, FO8CG, all around 0800 and a frequency of 14125 kc; KC4USC, KJ6CD, KR8EA, VK0KJ, VQ8CS, W7ZFY/MM (en route to Heard Island), YK1AA, yet another “ZA” (this one calling himself “ZAI1ST”), 6W/W4BPD and 6Y5EM. Both G2DC and G3DO comment on the HK0TU expedition as the event-of-the-month as far as the bands were concerned. It was an excellent show on all bands, and no one need have gone without a QSO.

**DX-Peditions**

Whitsun first, and at this time there is the traditional trip by the EI lads to an island—Sherkin Island it is this year, about 6 miles off the Cork coast, and the operation will be on all HF bands Top to Ten, signing EI0SI, over the weekend May 31—June 2, running AM, SSB and CW. In addition, EI0SR will be coming up during the same period on 10-40m. signing /MM from the vessel Share Return (!)

Nearer in time is the Easter GM exercise by six operators of the Dial House Radio Society, all GPO chaps. This being primarily a two-metre foray, Top Band will be activated by G3WFW, late evenings only, in the 1875-1880 kc area. Their itinerary is April 3-5 in Wigtown; 7th and 8th on the Isle of Bute; Inverness-shire April 9-10; and Perth over 11-12th. Their callsign will be GB2GM, and G3WFW is QTHR.

Looking for GW counties? G5YC, the Imperial College group, go to Wales between April 9 and 16, although, as yet, we have no details as to just which parts of North Wales will be visited. As far as Top Band is concerned, the effort will be CW/SSB, times and frequencies are not stated. The G5YC call is, of course, QTHR.

Turning to another sort of DX-pedition, namely the W4BPD effort, latest news at the time of writing

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**TOP BAND COUNTRIES LADDER**

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<td>68</td>
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<tr>
<td>G3GD</td>
<td>25</td>
<td>54</td>
</tr>
</tbody>
</table>

**Phone only**

| G2NJ    | 98        | 98     |
| G3VGB   | 82        | 91     |
| G3WPO   | 69        | 76     |
| G3MDW   | 67        | 82     |
| G3PQF   | 55        | 77     |
| G3RFB   | 36        | 47     |

(For failure to report for three months entitles removal from this Table. Claims may be made at any time. Six months of "Nil" reports will also result in delection.)
is that Gus has been at ZD3A since early in March, with a visit to 5Z4ERR scheduled before going on to FR7 and VQ8. CW frequencies to monitor are 20 kc in from the LF band-edges, times GMT as follows: Eighty 0200, Forty 0100, Twenty 2200, Fifteen 1600 and Ten 1700. As for the SSB ones, we have 3795 kc at 0230, 7073 at 0130, 14195 at 2230, 21395 at 1630, 28495 kc at 1730. Cards, of course via W4ECI.

Eighty and Forty

Once again it is pleasing to find an increased emphasis on these bands. G2AYQ (St. Agnes, Cornwall) uses an NCX-3 on Eighty, and during the morning period between 0630 and 0800z worked VE2LT, VE3GTK, VE2EWY, WA2WMT, W1EFM, WA3KEC, VE8RCS, XE1KB, OX3WX, ZL2BG, a three-way with CO2DC and VE1ASL/M, TI2PAS, TI5WM, VE1KAW, VP7NH, VE1EA and ZL4CA. Best among the gotaways was ZL3ABJ/C, lost in the pile-up, Ted uses a doublet as aerial, NE/SW at 350 feet a.s.l.—and his report should do much to encourage those who say they have not the aerial or facilities to have a go at for LF-band DX working.

9H1BL considered 80m. was slowly dropping off to sleep, with even the East European signals well down in strength, albeit PJ2VD (Curacao) came as a pleasant surprise. Forty has been wide open to the East, with PJ2VD and a couple of hours earlier—all, of course buried under the off-putting stuff, and as his effort on 3.5 mc. As for the SSB ones, we have 9H1BL considered 80m. was slowly dropping off to sleep, with even the East European signals well down in strength, albeit PJ2VD (Curacao) came as a pleasant surprise. Forty has been wide open to the East, with PJ2VD and a couple of hours earlier—all, of course buried under the off-putting stuff, and as his effort on 3.5 mc.

A piece of “non-resonant wet string” is how G3XTJ describes his 7 mc aerial. In the ARRL Contest, Edwin worked W1, 2, 3, and 4 in short order, followed by VE3, which he found quite unbelievable—but was convinced the following weekend when he again went on and raised a W3 on SSB.

G2HKU used SSB for UR2NP—a new one for the band—EA4JL and HV3SJ, with W1LYQ hooked on CW, as his effort on 3-5 mc. For 7 mc, SSB only gave Europeans, although CW produced HK0TU, some W’s and VE2LI, an old friend of this piece.

160 Metres Doings

Here the news of the month is undoubtedly of W1BB. Last time out, we reported that both his home and the /1 stations were u/s. Putting the safety links back together was a fairly rapid job. However, although it was done in time for W1BB/1 to work HK0TU for his 100th post-War country on Top Band, the contact was not completed without some excitement. Seems that half-way through the QSO, W1BB suddenly found things kaput—SWR meter wrapped round the pin, no radiation and no reception! A quick check proved a short in the feeder. Up that tower to look at the joints, and as luck would have it he found the second joint showing short-circuit, and full of water. Down tower, into car, home, grab coil of coax, back to tower and up the thing, re-make connections and sling bottom end down, back down tower, pull the end into the shack, reconnect, and breathe sigh of relief at 1:1 SWR. Luckily he was able to hear HK0TU still on the frequency, gave him a shout and finished the QSO, to the great annoyance of some others still waiting. Total time for repairs, about thirty minutes, including the climbing up and down the tower—pretty good going at 65 years of age, on a windy night! Congratulations on that 100 countries and on your fortitude, Stew!

Comments last time out on pirates has disclosed information on a group of these pests on Merseyside, and another in North London, complete with names and addresses! Among the odd ones, G3JAA (Inverness) mentions a station signing “GM2YT” and calling himself “Frank” who is disowned by the real G2YT, and also another one who said he was G2ECE—there is only just one, 2E call, G2EC! That TF9AA’ call is now defined clearly enough, and we also have
information on the gink who came on the band signing "SP," to add to the dossier.

In a more civilised context, perhaps the most interesting of the domestic events was the appearance of GI5AHS and GI5AMS from Fermanagh. They seem to have caused quite a stir and to pretty effectively have removed Co. Fermanagh from the rare list. G16TK took the opportunity to present them with the WAGI certificate, and when there was a bit of TVI on the Lantern in the local pub the landlord with no more ado switched it off so as not to spoil the DX-pedition! Doubtless all this will have given GI5AHS and GI5AMS a happy recollection of Ireland—but it could also be remarked that many of our locally inspired DX-peditions would do well to look into the efficiency displayed by these Americans—who have, incidentally, by now returned home. Their cards were sent out literally by return of post to those who QSL'd direct.

G3XTL (Warsop) was unlucky enough just to miss the deadline last time, with his question about "SP6AYN"—sorry, Chas., but NG! With G2HKU the luck was a little better, in that Ted was able to snag G3HVX and so add Hereford to his tally; on the other hand CW was not successful in trying to raise GI2DHB in Londonderry, which remains on the "wanted at any price" list.

As early as 1730Z has seen 9H1BL snooping around Top Band; hordes of OK/OL stations were heard and quite a few G's, with G3PIT and G3VPS as about the strongest of the bunch. G3XTJ has had a bumper crop of contacts over the period, with GM3PJP, GW3UZS, G3UNC/A (Dorset) and GI5AHS/A as all-time new ones, not to mention GW3GWX, GM3VTB/A on CW, plus G3XCS for Cornwall, on the SSB side.

As far as G3KFE, for various reasons he only made a few QSO's on Top Band, after shifting the gear and shack into the garage, just to see that the aerials still worked but those few contacts were of considerable interest. First, came G3WDW up in Leeds in broad daylight, and after dark a net QSO which included Northumberland (G3WTA) and City of London, in the form of G3WWC/A.

Cyril of GI3WSS (Holywood, Co. Down) sent us most of the detailed news of the GI5AHS effort, as recounted earlier, and roused off for himself by hooking GM3WOJ (Wigtownshire) for a new one.

Here and There

Last month's preamble seems to have touched on a spot, as the majority of correspondents commented on it. G2HKU (Sheppey) makes quite a habit of asking people what they do for a living, what they like in the way of books, and what their interests are, remarking that it is quite surprising how the other chap warms to you when you happen to hit on a subject of mutual interest.

On the other hand G3XLO (Manchester) has already become somewhat disillusioned by AT-station QSO's because, as he says, he feels most operators are in the habit of "shutting" off all their other interests when they are on the air, and any comments about books, music, whatever was on the Lantern the evening before, and such, is immediately turned back into the radio channel. The impression is heightened by the somewhat idiotic use of Q-code on phone, and signal reporting between stations who live a couple of miles apart and have contacted each other dozens of times. True enough, most amateurs will tend to shy off a subject in which they do not feel they have any real opinions or strong feelings. One would feel the trick is to get the other chap to tell you what his major interest is, and then draw him out. Think of the buyer for a big store who parked his golf-clubs in a corner of the office one day; he saw about twenty assorted representatives, all after orders—and only one had the elementary nous to talk about golf! The buyer made his point when he commented that the chap who saw his golf-clubs for what they were was not only the rep. who went off with the order—but he was also the chap who consistently earned more than the others in the way of commission! (Nothing to do with Amateur Radio, but on the theme of making intelligent contact!)

Closing Comments

And so we come to the end of the tale for another month. By the time it sees print we should be sitting at the best time of year, with DX in the shack and the stirrings of Spring outside. Reports on it all will be welcomed, addressed to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM, to arrive by first post on April 7. Till then, Good DX and keep the gear activated.
A. H. DORMER (G3DAH)

AFTER a long spell of desperately poor propagation conditions it was very pleasing to hear the Continentals coming in so well over the period March 5-8; DJ/DL was pounding in to the Midlands on the night of the 5th, and contacts at around 200 miles were being made quite freely. It was remarkable also that on that evening, and the following one, considerable ducting was in evidence. In the South-East of the country, the long-haul DX was hardly audible, although stations in the Bucks. and Berks. areas were heard passing S9 reports. Conditions on both Two and 70 cms. were good East/West, the ON4HN on the higher frequency band giving many a G his first Belgian contact.

March 8, was a good day for the GC stations of whom seven were known to have been active. Best signal in the South-East came from GC8BNV in Guernsey, followed closely by GC8AZ/P in Jersey, who had 49 QSO's over the period. GC8BMO (Guernsey) was fading rather badly and GC2FZC and GC3KAV, also in Guernsey, were workable only with difficulty. By Sunday morning the opening had faded. Pressure throughout the period was stable at 1020 mB in the centre of the country, having climbed up from a dreaded low of 990 mB the previous week.

There were minor lifts into France on February 26 and March 2, and and G2JF was working OZ on March 4! A feature of this opening was that there appeared to be little extended tropo., although more might have been expected from an examination of the pressure charts. Propagation was remarkably good for the 70 cm. Activity Night, both G and Continental DX being audible and the level of activity high.

The good propagation on Two and 70 cm. extended also to the 23 cm. band. G8ARM (London) made it with G8AUE (Derby) just to show that the first contact between them was no fluke. G8AEJ (London) worked G3GWL (Bletchley) at RS-58 and 59 after several previous, and abortive, attempts. It was very unfortunate that both G8AEJ and G8ARM discovered after they had signed with FISA on 70 cm, that he was equipped and raring to go on 23 cm. also, as this contact probably would have been on. This brings to the fore once again the fact that it might be very useful for operators on that band to have some knowledge of who is QRV, and when, and with what. This Column is prepared to publish such information if readers will send it in.

As a start, the writer believes the following stations to be active on the 23-centimetre band: G3MCS (Aylesbury), G2RD (Caterham), G8AGM (High Wycombe), G8AOD (East Grinstead), G3BBL (Gloucester), G3OXD (Birmingham), G3NNG (Wantage), G3GWL (Bletchley), G3UQK (Salford), G2WS (Weston-super-Mare), G3VYB (Liverpool), G8AQL (Bexleyheath), G8ARL (Newbury), G3MAR (Birmingham), GW3JITZ (Sealand), G8AUE

THREE-BAND ANNUAL VHF TABLE

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<thead>
<tr>
<th>Station</th>
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<tr>
<td>G8AUE*</td>
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<td>G8APZ</td>
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<td>G8ADPA</td>
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<td>G3AHB</td>
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<tr>
<td>G48A8Z/P</td>
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<td>G8AUN</td>
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<td>22</td>
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This Three-Band Annual Table shows total claims to date for the year commencing January 1st, 1969. Claims should be sent as here-to-fare to: "VHF Bands," Short Wave Magazine, Buckingham. Summaries by bands will be published at suitable intervals.

*Note: G8AUE has four counties and one country on 23 cm also.
(Derby), G8AEJ (London), G5UM (Leicester), G8AUF (Derby), G8ACE (Hatfield) and G8ADC (Luton). There must be many more.

**March Two-Metre Contest**

Conditions for the two-metre contest over March 1-2 were only just average, and contacts over the 200-mile mark were very difficult to get. However, there was a gratifying increase in the activity level compared with the corresponding event last year, and this was due mainly to the advent of the G8/3 stations. A detailed check of the G2JF and G3DAH logs showed that just about 50% of the total number of contacts was with G8/3's and this sort of figure was confirmed by many other operators. Continental activity was surprisingly low when it is recalled that it was also the IARU Region I contest, over the same period. As far as can be ascertained there was only one German station coming through at anything like reasonable strength, and that was, inevitably, DL0ER from Essen. Nothing appears to have been heard of the French stations south of Paris and, with the exception of a few strong signals on SSB, the PAO's did not appear in their usual numbers or at their wonted strength. GDX was hard to get, and most paths were subject to severe fading, although pressure was fairly stable around the 1020 mB mark for most of the time.

In terms of good signal strength, quality and tidy operating, some outstanding stations were G8BLY (Winchester); G3SHK (Ruislip) with his very good SSB; G3RMB (Coventry); G8BBY (Rugby) who was heard calling a French mobile; G8ARL (Newbury); G3PWJ (Warley) on both AM and SSB; and G3BLP (Caterham), calling G3GZI (Redruth). GW3NUE/P was heard only weakly in the South-East (which is unusual for him) and by far the best GW signal came from GW3TXR/P in Welshpool who, incidentally, must have put up a very fine score, as he was passing a serial number of 190 about 30 mins. before the end of the Contest. G8BBB (Ely) was another good signal and has a final score of 143. G3JPX/P and G8BTT in Leicester were strong for part of the time, but their signals in Herne Bay were anything between S2 and S9 at quite short intervals and yet with a constant beam heading. G3NGZ near Cheltenham, operated by the owner of the callsign and G8BIJ, was another consistently good signal in the South-East and their excellent operating techniques and full modulation must have contributed significantly to their total, which stood at 165 at 4 p.m. Some first-class operating also came from two newcomers, G8BUT and G8BV1, who not only had good quality signals, but also seemed to know what it was all about.

G8APV/P, on from Firle Beacon in Sussex, reports hearing HB9AEB, I1BAF and I1EYK on the Sunday morning on the SSB channel. At that time I1BAF was giving a serial number in the 300's! A good question would be... was this Spor. E, extended tropo., or a legpull? G3SLJ, operating from Danbury, Essex, was plagued with flies on the Sunday. It seems that the 1 kW fire and the heat from the rig had hatched them out. But there were no flies on them from the score they put up! G3WGC, the Mid-Herts club, had a bit of excitement that cost them some working hours: they received a misleading report that they were operating on one of the guard channels, and this led to a sortie in the middle of the night to obtain another set of crystals. In the event, it was proved that they were at least 40 kc off the channel, and so in the clear. This was followed during the Sunday afternoon by a visit from a gang of hooligans who invaded the premises and smashed all the Club radio equipment. They still clocked up a score of 155 contacts though, which was very nice going.

G3LAS (Hertford Heath) with 156 contacts was a good signal all the time and must have been feeling pretty tired by the time it was over, as he was on throughout the whole 24 hours.

Many G stations were heard working F0CK/M on the Sunday morning. Operating the mobile was ON4PU with ON5LV plus a couple of SWL's. Several crates of Stella beer helped to produce some fluent English!

On the debit side there was the usual crop of badly over-modulated signals, gabbed callsigns without any attempt to use phonetics, and unnecessarily lengthy replies to CQ calls. If an operator announces that he is tuning from 144-1 up, it seems quite pointless to call him for a minute on 144-2! VFO's were again used fairly indiscriminately by some people. It is acceptable that one should quit one's own Zone for a short period to try for a piece of choice DX tuning a limited section of the band, but it does spoil the distant, weak contact for others if continued out-of-Zone operation persists. There was a gratifying absence, this time, of phone signals in the CW area of the band.

By and large then, an enjoyable Contest with a high level of activity and a lot of crafty winkling out to be done to knock up a good score.

**DX-Peditions**

G1RXV and G18AYZ are planning to go portable at Slieve Galleon, Co. Derry, 1,700ft. a.s.l. during the two-metre contest over May 3-4. They will be running 35 watts to a 10-elle Yagi. G13RN is expected to be portable during the same contest, running 50 watts to an 8/8 from 1,100ft. a.s.l., site about 5 km west of Larne.

For those looking for elusive Scottish counties, an expedition to Lanark and Dumfries is on the tapis. G3OHG, G3NZS and G3GTL will be signing GM3OHC during the May two-metre contest, 3rd-4th. The site selected is 2,400ft. a.s.l., with a good take-off to the South, and is on the borders of the two counties, so who knows, it may be possible to get two for the price of one if they can move a few yards. Gear will be a 2N3819 FET converter into an Edystone EC-10. The transmitter will be either a 640a or 750A with about 70 watts on CW, 60 watts AM phone and 100 watts SSB. The preferred mode is CW on 144-02 mc, with AM on 145-98 mc, or 145-93 mc as an alternative. SSB will be on the usual channel. Skeds can be made with G3OHG, QTHR, for times outside the contest.

Another chance to work some of the rarer GM counties is to be provided by the Dial House Radio Club, Salford, Manchester, who are making a two-metre trip over April 3-12. Itinerary is as follows: Wigtownshire, April 3-5; Bute, April 1969
6-8; Inverness-shire, April 9-10; Perthshire, April 11-12. Frequencies 145.80 mc or 145.08 mc, signing GB2GM. Operators will be G3WFW, G8AMO, G8CDM and three SWL assistants. Gear to consist of two HW-17 transceivers, home-built Rx and SSB Tx and 6/6 slot-fed beam. A 160-metre station, also signing GB2GM, and operated by G3WFW around 1875-1880 kc, will come up after close-down on two metres and skeds can be fixed via this station, or directly in advance through G8AMO, Dial House Radio Society, 1st Floor, Dial House, Chapel Street, Salford, 3. It is worth a mention that all these chaps are GPO engineers!

Easter Week also sees an expedition to the West Country by G8BPY and G8APO. They will be operating in Devon and Cornwall from a caravan. Gear to be a triple-superhet Rx, with trough-line pre-amp into an FET converter, and a hybrid Tx with a 3-10 in the final, modulated by AD149's. Antennae a halo whilst on the move and an 8-ele Yagi when static. First operation is planned from Wiltshire on Friday around 144-15 mc, and then from points West. Coffee will be laid on for any visiting amateur who may wonder what that Minivan/Sprite-400 combination is with all the aerials! It appears that this expedition has been inspired by the sheer boredom engendered during the long hours both operators have spent in trying to work the West Country from the London QTH at 50ft. a.s.l.

Imperial College Radio Society will be signing GW5YC in North Wales over April 9-16. Two-metre operation will be on AM only, the transmitter running 30 watts to a ten-over-ten Yagi. Five operators and one SWL make up the party. G3VUE and G3ROZ aim to put EI/GI on the two-metre map between June 8 and 22nd, when they will be trying SSB, AM and CW from Wicklow, Waterford, Mayo and Antrim. The transmitter will run full legal output on SSB and CW, and 90 watts on AM, to a pair of stacked Parabeams. G3VUE, QTHR, would be pleased to receive s.a.e. for skeds, and would like also to hear from anyone who could provide information on good VHF sites in these counties, and who can say where it might be possible to hire a Land-Rover or similar vehicle during the tour.

Club and Group Activity

A South Bucks VHF Club has now been formed in the High Wycombe district. Meetings are held on the first Tuesday in each month at Bassetbury Manor, Bassetbury Lane, High Wycombe, and those interested are invited to write to the hon. secretary, G3PQH, QTHR.

The South-East UHF/VHF Group meeting on March 7 was held at University of Kent, Canterbury, when Ray Hills, G3HRH, talked about transmitting aerials for UHF/TV. As the designer of many of the masts erected for both the BBC and ITA, Ray gave a comprehensive review of past construction and present plans from the initial statement of the service area requirement to the final result. For those who may contemplate erecting a decent mast for VHF/UHF, the cost of three 1,250ft. towers is around the £1m. mark!! The next meeting of the Group is at 7.30 p.m. on May 9 at Wye College, University of London, when the speaker will be Peter Blair, G3LTF, who will be expounding on the mysteries of Meteor Scatter and EME techniques. And who better?

The Leicestershire VHF/UHF Group had bad luck for their meeting scheduled for February 20. The violent snow storms had made it impossible for the lecturer to arrive, and many of the members were unable to get out of their homes. Some were telephoned or contacted on VHF and told that the meeting was off, but it must have been a great disappointment to them all to have missed G3MNQ, who was to have talked about "VFO's for VHF" on that occasion. However, all was not lost, and G3MNQ will be having another shot on April 17. He has built an FET
VFO especially for the occasion. Jack Hum, G5UM, QTHR, can supply further details of this and other meetings of this well-organised Group. The venue is again the Regional College of Technology, Leicester, and the time 7.30 p.m.

Special Events

As one of the many special attractions at the Lydd, Kent, Airshow over Easter, arrangements have been made to run an A.R.M.S. demonstration station from the airfield. Operation will be on two metres with a 10-watt transmitter and a 4-ele Yagi, SSB on the HF bands and a small AM transmitter/receiver on Top Band. The call will be GB2BAF ("British Air Ferries") and among the operators will be Captain Bill Ingle, G3OIZ. Talk-in facilities will be available, and for those mobiles who arrive operational and displaying a QSL card, entrance will be free. Among the events laid on for the Show will be static exhibitions by the three Services and, on Easter Monday, a flying display by the R.A.F. Red Pelicans and a dropping performance by the Red Devils Free Fall team. Time 2 p.m. to 6 p.m.

The programme for the Fifteenth International VHF/UHF Convention to be held at the Winning Post Hotel, Twickenham, on Saturday, April 26 from 2 p.m. onwards, has now been finalised. A change has been made in the arrangements this year, in that two lecture programmes have been organised to run concurrently, to cater for the newcomer to the bands and for the expert. Lecturers include G3BA on VFO's for VHF; G5UM on his well known "Quickstarters"; G3JVL on VHF phase-lock oscillators; G3HBW on VHF/SSB phasing rigs; G3MED on VHF receivers and G3FZL on measurement of IP's in SSB transmitters. The trade exhibition, raffle and display of home-constructed equipment remain as last year. Lunch is available in the Hotel. Whole-day Convention tickets, including the Dinner are 32s. 6d., from G3GMY, QTHR.

The Midlands VHF/UHF Convention and Dinner Committee have been able to arrange for G3NNG to address them on the occasion of their next gathering at Wolverhampton on June 14. His subject will be "A new approach to VHF/UHF receiver design," a subject about which Des must know a great deal in view of the regularity with which his callsign figures in the lists of Contest leaders. All those who have already attended one of these conventions will automatically receive a programme and ticket application form for the event. Those not already on the list can obtain a programme from F. W. Wright, 20 James Road, Kidderminster, Worcestershire, and a ticket application form from J. R. Hartley, 30a Salop Street, Bridgnorth, Shropshire, on receipt of an s.a.e.

Two-Metre Activity

In GI: From G18AYZ (Ballymena) comes comprehensive news of two metre activity up there. Stations known to be active are: G15AJ (Bangor), on 145-88 mc; G15SSJ (Belfast), 145-97 mc; G15SUM (Bangor), 145-88 mc, and SSB on the usual channel; G13IIF (Belfast), G13JM and G13RNY (Antrim), all on 145-95 mc; G13RXV (Co. Derry) and G18AYZ (Ballymena), both on 145-83 mc, and G18BDR (Castledown, Co. Derry) on 145-90 mc. Saturday night, from about 9.30 p.m. onwards, sees most activity. G18BDR is usually beaming north, while G18AYZ turns towards Lanarkshire and Cheshire, as this sets his beam over activity centres in Belfast and Bangor. G12BZV (Belfast), is often active on Sunday mornings from a fine site above Belfast Lough, and with a 320A ten-element beam, should be putting a good signal into C. G15AJ, G15SSJ and G15SUM have weekly sked with G3CCH (Scurthorpe, Lincs.) on Saturday evening at 9.30 p.m., and after that the local net starts up. G18BDR and G18AYZ are on the line-of-sight to and from G over Belfast and can listen around during ragchewing without having to turn the beam although no G contacts have as yet resulted. The idea that Friday night is Irish night seems to have died natural death, possibly because conditions have been pretty appalling recently—but the idea is still there and it is well worth while having a look in that direction at that time. Two-metre activity by Counties, ... thought the old six-over-six would come in useful ..."
far as present information goes, is as follows:

**Antrim**—GI2BZV, GI3FFF, GI3RNY, G18AYZ, GI3JUM

**Down**—GI3GXP, GI3SUM, GI3JIF, GI5AJ, GI5JJ, GI3BNC

**Derry**—GI3RXV, G15ALP, GI8BDR, GI3TJ

**Fermanagh**—GI3RNO, G18AWF.

*In GC:* Many operators will have worked GC8AAZ/P in Jersey during the recent opening and perhaps been surprised at the strength of his signal. The answer is not to be attributed to good propagation alone, but more to the fact that Lawrence now has an 8-ele beam up on the roof of the Mini, rotated by turning the car (!), and, operating as he does from the highest point in the north of the Island, can lay down a fair signal right up to the Midlands. He is still active around 144-15 mc on most Sunday evenings from Sorel Point ("YJ60f") and is usually assisted by GC8CHJ, secretary of the local Club. Those who wish to contact GC8AAZ personally should note that his address is now: 9 Sunshine Terrace, Bagatelle, St. Saviour, Jersey, C.I., but as he expects to move again shortly, QSL cards go via GC3GS.

Some details of a recent expedition to Guernsey are now to hand. The operators were G3VUE and G3ROZ, using the call GCVUE/P and located at a point some 425 ft. a.s.l. On the receiving side they had a TW Nuvistor converter tuning 28-30 mc and the transmitter was a TW2 running about 4 watts into 120 ft. of coax and a 14-ele Paraboom. Conditions were extremely poor, with most G stations peaking just above the noise, and very few S9 contacts to be had. Best DX was with GW8BOQ in Monmouth, RS-56, G2JF was a consistent 5 and 9, and G3NGZ, from R.A.F. Little Rissington, was peaking at 5 and 7/8 and was worked with the help of a little aircraft flutter. Stations heard included G3PWJ, G3VTS/P and G3GDJ, up to RST-599 on CW. In all, some 40 stations were worked, most of them in Southern England. Neither GB3VHF nor F3THF were heard during the visit. Amateur Radio is really keeping these two chaps busy as, apart from this trip and the GI/EI expedition already in hand, they are currently engaged in setting up a permanent station for VHF at Gilwell Park, Chingford, the International Scout Training Ground.

**GC3DVC**, the Jersey Club station at Fort Regent, St. Helier, is expected to be ready for VHF before too long. They already have gear for the HF bands, but antenna rotation is going to be a problem on VHF. However, they are building.

*In PA0:* For parchment hunters, a “Worked all Dutch Provinces” Certificate is now available. This is awarded for QSO’s since January 1, 1969 with the eleven Provinces of Holland, and can be made on each amateur band separately, or as a combination of bands. Claims, with 10 IRC's, should be sent to the VRZA Certificate manager, Post Box 190, Groningen, Holland after authentication by two licensed amateurs. For the benefit of those who may want to have a go at this, the Provinces are: Groningen, Friesland, Drente, Overijssel, Gelderland, Utrecht, Noord Holland, Zuid Holland, Zeeland, Noord Brabant and Limburg.

Still in Holland, several new stations have recently appeared on two metres, among which are PA0GSM, PA0VVB, PA0AWH, PA0JGF (on SS), PA0DUO, PA0VWH, PA0OHN, PA0EHL and PA0KHS, PA0WLB, not by any means a newcomer to the band—he has worked nineteen countries now—recently heard HG6RD while turning the car (!), and, operating up on the roof of the Mini, rotated the antenna from a TW2-28.50 to a 14-ele flat-top, now substituted by an 8-ele job at 30 feet. His converter was an E88CC cascode type, as described in the September, 1963, issue of SH0RT WAVE MAGAZINE, preceded by a Nuvistor pre-amp, but this has now been replaced by a GMO 290 version feeding into an Eddy-stone EC-10. The beam used to be a 4-ele flat-top, now substituted by an 8-ele job at 30 feet. The QTH is about 230 feet a.s.l., but is surrounded by high ground which, while not affecting two-metre operation too much, plays fair old havoc with 70 cm.

Readers are reminded that claims for this Award may be submitted for operation on Four, Two or 70 cm and that proof of QSO’s with 100 different stations on each band is all that is required. Details were given in the May, 1968, issue of SHORT WAVE MAGAZINE.

*News Items*

Don Hayter, G3JHM, perhaps best known for his work on four metres, has been very active on Two of late. He has knocked off 70 French stations since the beginning of the year, best DX being F9FT in Rheimes and F3UI in Le Mans. He also had a contact with F5NS while the latter was running less than one watt output and who was receiving Don with a pencil stuck into the converter input terminal. (Not quite sure why he should suddenly try this!) On 70 cm best DX was with F9ZG/P on Mont Pincon, Calvados.

G8BGV is now G3YDY (Chelms-
ford) having just got his ticket through before his B Licence was due for renewal. He was heard batting away on the key during the recent opening on two metres. G8BLG is now equipped for RTTY and would welcome skeds, as would his neighbour in Horncastle, G8BNW. Great efforts are being made by G3BA et al to put a two-metre SSB signal into GD where GD3FOC is poised over a hot receiver. A test on March 3 seemed to have staggered GD3FOC somewhat, as he had not bargained on quite so many calls in such a short time. He logged G3JCCH (Scunthorpe) and G3NEO (Sheffield) and heard a spate of others which, in the time available, he could not positively identify. It is possible that by the time this is in print, he will be able to transmit SSB also.

It was good to hear G3NOH on VHF once more, this time from an ad hoc meeting of the Verulam Society, who were being introduced to the possibilities of low-power SSB by G8BNR. After a long spell in and out of hospital, George is cheerily active if not quite on his own two feet again. G8BLD (Norwich) is putting out a nice two-metre signal and has plans for going up and down in frequency, HF to 23 cm. G8BQX (Hastings) and several others have had good QSO’s around the S 8/9 with F5NS in Caen. Not surprising? But F5NS was only running 500 milliwatts to a ¼-wave whip at the time. G8AZU and Co. will have to look to their laurels! David Evans, G3OUF, is not expecting to be active on any band for some time to come as he has just started his pilot training at the Hamble School. Is there an airfield on Sark? G8CBU (Luton) has a new shack in the garden and will be much more active on the bands than he has been recently. G8ABA (Leicester) is now building from scratch for two-metre SSB; the transmitter will run a QV06-40A linear into a pair of 4X150A’s. The SSB generator is a ten mc filter job; and the linear will cope with NBFM and AM also. The converter has TIS88A RF and 2N3819 mixer stages, and the antenna will be a ten-element J-Beam Skybeam at 45ft., so he should be able to hear ‘em and work ‘em.

Paul O’Brien, G3DNR (Broadstairs, Kent) comes up with an interesting comment. Of his first 100 stations worked on two metres, 80 were Europeans! Of course the QTH lends itself to EU contacts, but even so this is good going with only five watts to a QQV02-6. The site at 170 feet a.s.l. looking out over the Channel, and the 8/8 at 40ft., help to maintain a regular sked with F2XO at Boulogne on the first and third Thursday in each month, with signal strengths usually at RST 579 both ways. G3QG (Luton Hoo, Beds.) is having TVI trouble and is not very active at present. However, he is well on the way to a cure, and would welcome DX skeds and reports. Those who do work Bill will get an acknowledgement in the form of one of his hand-painted QSL cards which, from personal observation, can be vouched for as being most decorative. He did manage to get on during the last two-metre contest, and had some useful contacts with his seven watts to a J-Beam Turnstile. He would have made more had he noticed that the mike was unplugged for part of the time! Those looking for Glamorgan on Two might like to keep an ear cocked for GW8CGN (Llantwit Major) on 144-38 mc during the vacation period March 22 to April 22. The transmitter is fairly QRP, with only five watts to a QQV04-7, but plans are in hand to change this for an 829B running some 60 watts or so to an 8-ele beam. Skeds can be arranged by s.a.e.

It is pleasing to record another father/son combination on two metres. Geoff Barnes, G3AOS (Hale Barns, Cheshire) has been joined by his son Robert, who has been issued with the call G8CJQ. Having passed the R.A.E. with flying colours, he is now studying for his G3/3 (or is it G4?) licence. The OM himself has not been very active of late, but will be out Portable and Mobile during the summer months looking for the two counties he still needs to give him his century on Two.

G3VQL (Shrewsbury, Shropshire) has a moan about the G3BA/G3BHT expedition to GM and suggests that the arrangements are too regimented. To quote from his letter “... I presume we shall have the usual comments about sked holders (you lucky people) queueing up like squads of well-trained soldiers. No, this stuff is not for me...” Oh, well!

A/TV: GM3ULP/GM6ADR/T (Motherwell, Lanarkshire) is now radiating a test signal on 437-28 mc. Camera is a Vidicon with 625-line output, screen modulating a QQV02-6 running eight watts peak white, and operation is on most evenings.

**Contests**

Forthcoming contests include the Second 70 mc (Open), over April 12-13, and Fourth 144 mc (Portable), May 3-4, the latter to coincide with the IARU Region I fixture. The DARC have an SSB event scheduled for 2100z April 19 to 0300z April 20, and again 0700-1300z on April 20, presumably to give a rest period.

**Deadline**

Deadline for the next issue is April 5, and the address for news, comments and claims is: “VHF Bands,” SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and 73 de G3DAH.

"Short Wave Magazine" carries more paid Small Advertising of radio amateur interest than any similar periodical circulating in the U.K.—See pp.120-127 in this issue.
SOPHISTICATED CAR ALARM CIRCUIT

PROTECTING THE MOBILE RIG

N. E. A. RUSH (G3HBZ)

The original idea of a simple anti-theft alarm, from which this more sophisticated version developed, was described in the February, 1965, issue of SHORT WAVE MAGAZINE. In the first place, the circuit, reproduced in Fig. 1, consisted merely of the addition of a heavy duty DPDT switch which, when operated, connected the car horns to the courtesy light switch—and the primitive "alarm" sounded. This device was easy to install and was intended to be a deterrent to the casual thief and as such it was quite adequate.

However, with the purchase of a new car and the installation of more valuable /M equipment, it was considered that some additional refinements were desirable. The main practical shortcomings of the shorting-switch principle seemed to be:

(i) Although the alarm sounded when any of the car doors were opened, it also ceased as soon as the door was closed again.

(ii) If the door was left open by the intruder, the horns sounded continuously. This could result in the "alarm" being ignored by those within earshot because they attributed it to a probable wiring fault and consequently did not investigate.

(iii) The horns, which pass a fairly heavy current, were connected directly to the 12-volt supply and earthed via the courtesy light switch. If the alarm was set off and gained no attention the battery would rapidly be discharged.

After some deliberation, the circuit overleaf was evolved and the prototype actually in use in the writer's vehicle is shown in the picture here. The new unit overcomes the original objections listed because:

(a) By means of a self-holding relay, the alarm, once it has been actuated, continues to operate however quickly the door is closed again. As the "hold" contacts are virtually in parallel with the courtesy light switch, the interior lights remain on while the alarm is operating.

(b) By using the standard type of indicator flasher unit, suitably loaded current-

Construction and mounting of the car alarm unit. It is fitted on the bulkhead separating the engine from the driving compartment, and for this view the cover completing the assembly has been removed—see p.110 overleaf for circuit.
wise, the horns are sounded intermittently. This regular horn-blowing has been found to obtain attention very much more readily,

(c) If the battery voltage drops below that required to hold in Relay A, the system stops and in any case the on/off duty cycle of horn blowing is less arduous on the battery than the continuous load.

If the car door is left open after actuating the alarm, the “hold” contacts on RLA1 are shorted by the courtesy light switch, thus preventing the conditions in (c), but in practice the first attention the alarm has gained has resulted in the door being closed in an attempt to stop the awful noise!

**Installation**

Basically, the alarm unit, which is mounted on the engine compartment firewall, consists of a control relay RLA1 (of the double-pole, change-over variety), a 42w. indicator flasher and a second relay RLB (a single-pole make/break type which switches the horn circuit). Of course, the relay contacts must be heavy duty quality and capable of carrying the current involved comfortably. Those used in the original model are surplus ones and were obtained for a few shillings each from the advertisers in SHORT WAVE MAGAZINE. In addition to these items, which were built into a diecast aluminum box as a protection against grease and dirt, a “secret” operating device is required. This can take the form of concealed toggle switch, S1, a rotary switch with the control knob removed as a key, a two-pin mains socket with a shorting plug, or a key-operated switch which can be the usual ignition type recovered from a written-off vehicle at the local car breakers. This can be mounted in some concealed exterior position, such as on the radiator grille.

Only four external connections are necessary. Two to the horns—the “live” side provides the relay operating voltage, the “cold” side to switch the horns—one to the courtesy light switches and one to the reversing lamps, or other lamp load as explained later. As will be seen from the diagram in Fig. 2 here, when the alarm is switched on, 12v. appears at the cold ends of the relay energising coils and these are commoned to the courtesy light switches. If any car door is then opened, these switches apply an earth to the common point and the relays operate. Contacts A1 maintain an earth connection to both relays—and to the courtesy lights themselves—so holding the alarm in the actuated condition until switch S1 is opened and the system restored. The A2 contacts connect the car reversing lamps to the appropriate point on the flasher unit—to which RLB is also connected—so that the horns and reversing lamps hoot and flash in unison! For the flasher unit to function correctly it is necessary to provide a nominal 42w. load to fit it. This could be a separate 40w. headlamp bulb, suitably mounted, or as in this case, an existing lamp circuit borrowed via contacts A2. A pair of reversing lights, each of 21w., have been fitted to the writer’s vehicle and they load the flasher unit exactly. The pilot lamp connection to the flasher unit is brought out to a red indicator lamp on the outside of the unit.

**Caution!**

One final point—the idea of using the motor vehicle’s own horns as part of an audible alarm is a feature of several commercial products. Would-be car thieves and vandals are aware of this and by quickly lifting the car bonnet and wrenching off the horn connections this type of alarm can be effectively silenced. It is well worth while, therefore, to replace the standard connectors to the horn(s) with hefty soldered joints. Generous fusing arrangements will obviate any consequent risk from possible short circuits.

Though this alarm has been installed for over twelve months now it has so far not been sounded in anger, although it has twice caused blushes when, through forgetfulness, the unit has been triggered on returning to the car to drive home!

**GB2HEH—A ROYAL OCCASION**

For the Investiture of the Prince of Wales at Caernarvon Castle on July 1, a special-activity station is to be established, signing GB2HRH, for the period June 28-July 6 inclusive, working all bands 10-160m., mainly SSB. The station will be installed in a fully-equipped caravan, and sited in the Snowdonia district—but will not be on view to the public, as it will be on private property. Operators are to include GW’s 2HFR, 3IEQ, 3NWV, 3OXU, 3VBX, 5YB and G3WET.

Schedules are invited with stations throughout the Commonwealth, particularly with Welsh-speaking operators, as there will be opportunities for contacts in that language. A special commemorative QSL card is being issued, and further information (s.a.e. essential, pse) can be obtained from: J. G. Evans, G3WET, 22 Sheerifoot Lane, Four Oaks, Sutton Coldfield, Warwickshire—who will also be glad to fix skeds.
THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for May Issue: April 4)

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

A COMMENT in one of the Club newsletters is possibly well worth enlarging upon at this time. This is the matter of catering for the SWL interest and is very important for the well-being of a flourishing group. One of the points is to make sure newcomers get a welcome into the Club and are introduced. But, just as important, it would seem necessary to guard against any outbreak of piracy among the junior membership! It seems a fact that a serious attempt to cultivate the SWL interest can lead to an excess of juniors, some of whom clearly have little real interest in the hobby, and then to an outbreak of piracy by some of them. The writer has seen this happen in several groups at one time or another—and a case has been reported for this very issue—and can only say that it always leads to grief, sometimes to a prosecution, and invariably to a set-back for the Club concerned.

There must be groups around the country where this problem has been met and coped with successfully. We would like to know how?

The Reports

Cornish are first, and here we have a group which caters for a large slice of territory indeed. To cope with all this, there is a main meeting at the SWEB Clubroom, Pool, Camborne, which is down for April 3 and is the AGM. In addition there is a Falmouth sub-group, another at Newquay, also VHF and SSB groups. For the details on the latter meetings, we have to refer you to the hon. sec., the more so as the VHF crowd have moved Hq. to the People's Palace, Pydar Street, Truro, which looks from the map to be a bit tricky to find. Newquay group is at the Treviglas School, Newquay, every other Wednesday.

At Worcester, the lads have Hq. at 30 Perdiswell Park, Droitwich Road; we have no details of the programme at this moment, but understand that some "sorting out" is going on at the time of writing. Thus a contact with G3TQD seems indicated—see Panel, p.114.

GC might be rare DX for the county-chasers on Top Band, but there is no doubt that in Jersey there is a very active and lively club to maintain enthusiasm, on all bands and radio amateur activities. They get together at Fort Regent on Sunday mornings, and Monday, Wednesday and Friday evenings. The "main" meetings are on alternate Fridays, which gives April 11 and 25. The former is a talk on Workshop Practice, and the latter a "Bring-and-Buy Sale. There is a good Hq., with a separate space for the rig, a lecture room, and a small storeroom in addition, which everyone seems to be helping to smarten up and make comfortable. A Newsletter is also put out to keep members in touch with one another and the various activities.

From where we sit, it rather looks as though the Surrey April meeting will be on April 15 at the Swan and Sugarloaf, South Croydon, when the AGM is to be dealt with. However, we have no certain information owing to the Surrey newsletter being momentarily "out-of-phase" with our deadlines, so a call to the hon. sec. would be a sound way of making sure—see Panel.

Midland next, where it seems they are to watch a demonstration of Amateur TV, which will be given by G6MXW/T; this will be at the MARS place at the Midland Institute in Margaret Street, Birmingham.

Most of the RN and ex-RN amateurs are members of the Royal Navy ARS, whose newsletter this month carries a rather interesting piece on the development of Naval communications, as well as much else of concern to the membership.

In Bishops Stortford the lads will be getting together on April 21 to see the W1BB tape-and-slide talk, in the Mk. II version. The venue, as always, is the British Legion Club, in Windhill, on the A120 road going out of the town towards Ware, just before the fork.

Acton, Brentford and Chiswick use the Chiswick Trades and Social Club as their Hq., at 66 High Road, Chiswick; here they will be gathering on Tuesday April 15 for a talk by an engineer on the staff of the Vero organisation about the uses of Vero board. Non-members interested are of course cordially welcome.

The Cray Valley lads have two places where they meet; April 3 sees them at the Congregational Church Hall, Court Road, Eltham, for the AGM, but on the 14th the Natter Nite is taken at All Saints Church Hall, Bercta Road, New Eltham.

Nice to hear again, after an absence, from Harrow, where a lecture on RTTY is down for April 11, a Practical Evening for April 18, and the all-important Junk Sale rounds things off on April 25. All these events take place at Roxeth Manor School, Eastcote Lane, South Harrow where they are to be found every Friday evening, whether a formal programme is announced or not.

A real attraction is on the East Wores. bill of fare this month. They are to see the Burroughs Corporation film of the first manned flight into space, which has the daunting title "Highway to Eternity"—sounds a bit like a Hitchcock thriller film! This one is at the Old...
People's Centre, Park Road, Redditch, kicking-off at 8 p.m., on Thursday April 10.

Not very far away is Solihull, where the chaps have a place at the Old Manor House, 126 High Street. April 15 is slated for G5AER/W2IRS to discuss the ins-and-outs of Amateur Radio in the United States.

The hon. sec. of Southgate—see Panel—writes in to advise that they have shifted their Hq. to the Civil Defence Hut, Bowes Road, Arnos Grove, where they will be getting together as and from the March meeting. For all the details on their doings, and how to find them, drop a line to G3XSV.

It rather looks like the third Wednesday in the month for Verulam and the venue is the Cavalier Hall at St. Albans. The full details are not, at the time of writing, to hand, but no doubt the new hon. sec., G3NCK, would be pleased to pass on all the relevant information. We can say that here is one of the liveliest and most active Clubs in the South of England, with a team-spirit which would be the envy of many other groups.

North Kent get together at the Congregational Church Hall, adjacent to the Clock Tower in Bexleyheath. Here the form seems to be the second and fourth Thursday in each month, and there is usually something of interest going on. For he latest story, we have to refer you to the secretary, as we believe there has been a change of programme.

Talking of changes of programme, we have a buzz that this might also have happened at Chelford, who have booked the Hall, St. Martins Court, Kingston Crescent, for April 24. As the AGM occurs on the day before this issue comes out it is possible there will be a new hon. sec., but no doubt the present incumbent—see Panel—would be pleased to pass on details of the forthcoming attractions.

Mondays are favoured at Norfolk, at the Brickmakers Arms, Sprowston Road, Norwich. April 7 is the Bank Holiday and so is scrubbed from the programme, but on the 14th they have a Ragchewing session; on the 21st a talk on RTTY; and on the 28th a lecture.

Having to leave their old Hq. has been a blessing in disguise for the Salop boys; the group has taken on an AGM attended by 53 paid-up members, no less, as well as several visitors. Chews House in Dunstable is Hq. where there are weekly sessions. April 4 and 18 are set aside for Morse and the Constructional Project, while G2MI has April 11 to discuss his W/VE trip; doings for April 15 yet to be arranged.

R.A.I.B.C. have an interesting piece by G6TQ discussing his activities over the past year in their newsletter Radial. This club has got to together by way of the 3-5 mc band—Tuesday at 10.00 a.m., Wednesdays at 1:400, and the Cheshire Homes net on Thursdays at 1400, all clock-time and all on or near 3-7 mc.

After a rather bad period the Leeds crowd have started a revival, and are staging a grand opening on April 16 at their old Hq. at Swithmore Educational Centre, Woodhouse Square, Leeds. For the future a programme is being arranged which will include a series of talks for the beginner and the R.A.E. candidates. Let us hope sincerely that this revival of an old Club with a long history will be a great success. For details, contact G4AD at the address given in our Panel.

On now to Crystal Palace, who get together at Emmanuel Church Hall, East Dulwich, London, S.E.22; on April 19 at 8 p.m., G3BPT is to give a talk on RAEN, of which he is chairman of the committee. On May 17, the lecture will be on Colour TV, by G3NGS.

Active London Group

All who work in the Civil Service are entitled to join the Civil Service Radio Society. In addition to the Newsletter, they have two meetings a month, a separate room for the station and for the lectures, a bar, and somewhere to get a bite to eat at a very cheap rate before the meeting starts. All this, and much more is available at the Civil Service Sports Centre in Monck Street, London, S.W.1, there they have their Hq. April 1 is down for an informal, while on April 15 a Film Evening is planned. Another CSRS activity is the meeting, on or about 3625 kc at 6.30 p.m. on Friday evenings, which is for the benefit of their country members. A current problem to be overcome is with the aerial—though its coax feeder is 300 ft. long (up through ducts and trunking from a basement shack), the aerial itself is only about 30 ft. above street level, and has to be raised and lowered again for each session on the air.

Having heard of attempts to form a group, particularly in an area of low amateur population, one is always pleased to hear that the Club has come to life and is operating. We now know the Border ARS is a going concern. The Cross Keys at Kelso is the Hq., April 13 at 2.30 p.m. is the date and time, and “Aerials” given by G6UC, the subject for the lecture.

It is not so very long ago that we were making similar noises in regard to the Dunstable Downs gang, who have just finished their first year of existence with an AGM attended by 53 paid-up members, no less, as well as several visitors. Chews House in Dunstable is Hq. where there are weekly sessions. April 4 and 18 are set aside for Morse and the Constructional Project, while G2MI has April 11 to discuss his W/VE trip; doings for April 25 yet to be arranged.

RA.I.B.C. have an interesting piece by G6TQ discussing his activities over the past year in their newsletter Radial. This club has got to together by way of the 3-5 mc band—Tuesday at 10.00 a.m., Wednesdays at 1:400, and the Cheshire Homes net on Thursdays at 1400, all clock-time and all on or near 3-7 mc.

After a rather bad period the Leeds crowd have started a revival, and are staging a grand opening on April 16 at their old Hq. at Swithmore Educational Centre, Woodhouse Square, Leeds. For the future a programme is being arranged which will include a series of talks for the beginner and the R.A.E. candidates. Let us hope sincerely that this revival of an old Club with a long history will be a great success. For details, contact G4AD at the address given in our Panel.

On now to Crystal Palace, who get together at Emmanuel Church Hall, East Dulwich, London, S.E.22; on April 19 at 8 p.m., G3BPT is to give a talk on RAEN, of which he is chairman of the committee. On May 17, the lecture will be on Colour TV, by G3NGS.

A couple of extra-territorial groups next; first of these is British Railways, which caters for those members of the Railways Service who are interested in Amateur Radio. In its turn, this crowd have an affiliation with the International Railway radio-amateur group, known as FIRAC, which has members in 24 countries. Most of these countries are represented at one time or another.
The gathering for the Fareham & District Radio Club's 4th annual dinner on February 7, at the Red Lion, Fareham, Hants. Out of their 50 members, 24 are licensed—and five years ago they only had three tickets in the Club! At the top table, standing, are G3VLY (chairman, Fareham), G8BUJ (guest from neighbouring Gosport), G2QK (president, Fareham), and G3VFI (hon. sec., Fareham).

The other one is the R.A.F. Amateur Radio Society, for all serving and past R.A.F. types. Apart from the usual nets, newsletters and so on, suitable QSL cards are available, and various other services of a useful nature. The Hq. is at R.A.F. Locking, Somerset, where their Hq. station G8FC is maintained.

GPO engineers in the Manchester area have their own Club—Dial House Radio Society—and will be using the first fortnight in April for a DX-pedition to Scotland, leaving Manchester on April 3 and returning on the 13th after operating in Wigtownshire, Isle of Bute Inverness-shire, and Perthshire, both on VHF and the LF bands. The idea is to create interest in their Club, and if possible to gain more GPO members; details of the group and sked arrangements for the expedition can be discussed with the hon. sec.—see Panel.

How times flies—here is your old scribe huddled up over the electric fire typing his piece with temperatures near freezing—point, and in comes a letter from Bradford which says that on April 1 there is to be a Surplus Equipment Sale and on 15th a whole evening devoted to Field Day arrangements. A warming thought indeed!

Edgeware have Hq. at St. Georges Hall, 51 Flower Lane, Mill Hill, London, N.W.7. Here they have an interesting topic for April 14, when G6OU0/T is to talk about VHF, and possibly set up a live demonstration of Amateur TV as well. April 28, by contrast, is an “informal.” The Club call is to be re-activated as soon as some aerials can be erected, and in the summer it is proposed to run D/F events, weather always permitting, of course.

At Chippenham, the form as always is a weekly get-together each Tuesday, at Chippenham High School for Boys, Hardenhuish Lane, Chippenham. April 1, with due note being taken of the implication, has been set aside for a Surplus Equipment Sale and on 15th a whole evening devoted to Field Day arrangements. A warming thought indeed!

Down in Wales

University College of Wales are having an open evening on April 29 to which visitors will be welcomed. It is to take the form of a Stereo and Hi-Fi demonstration in Lecture Theatre A of the Faculty of Applied Sciences, parking for cars being available on the campus. The chaps visiting are requested please to arrive early as it is hoped there will be a capacity crowd, and 7.30 is the advertised starting-time. In addition to this “open” event, advance warning is given that on June 22 all the D/F experts should be heading for the Gower National Park where University College Swansea are having the Annual D/F Hunt. Further details will be given later.

A move to new Hq. is on for Stockport, the place being Brookfield Hotel, Wellington Road South, Stockport, and the dates the usual alternate-Wednesday pattern they have kept to previously. Thus, April 2 is down for a talk on The Quartz Crystal by Mr. T. Mc-Knight of Crystal Electronics; April 16 for Mr. Clark of Marconi to talk on Radio Communications, while April 30 is a Surplus Sale.

At Coventry they have meetings each week, and use alternate ones to put the Club gear on the air and have lectures—so, we find April 4 and 18 devoted to the rig, April 11 to a talk on Radio Navigation and April 25 to a talk about Vero Board by Mr. Woodhouse of the Vero organisation. For details, venue, and other information, contact the man in the Panel, on p.114.

Tough they must be at Purley—no less than 25 members turned out for the meeting on February 7, which, it may be recalled, was the night of the big blizzard. Although the show broke up rather earlier
than usual to let everyone get home, some of the chaps took as long as 4\!\!4 hours to reach base. And this mark you, for a Natter evening. Turning to the forward programme, we can say that the first and third Friday in each month is the form, at the Railwaysmen’s Hall, 58 Whyteleafe Road, Purley. However, April 4 is Good Friday and so the meeting is cancelled; the evening of April 18 is left open for completion of the programme, we can say that the first and third Friday in each month is the form, at the Railwaymen’s Hall, 124 Kingston Road, South Wimbledon. They have been having a bit of trouble with over-enthusiastic youngsters operating pirate “pop” stations on the MW band! But the G.P.O. brought five tracking monitors into action—and that was that!

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Cardiff Graduate and Student section of the I.E.E.

Names and Addresses of Club Secretaries reporting in this issue:

**ACTON, BRENTFORD & CHISWICK:** W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.

**BISHOPS STORTFORD:** A. Stanley, G3WUR, 43 Havers Lane, Bishops Stortford (0170). Bishops Stortford.

**BLACKPOOL & FLYDE:** J. Boulter, G30CX, 175 West Drive, Cleveleys, Blackpool.

**BORDER COUNTIES:** J. Nairn, 5 Murrayfield, Gordon, Berwickshire.

**BRADFORD:** P. Dewhirst, G3VFR, 36 Ley Fleaks Road, Idle, Bradford, Yorks.

**BRITISH RAILWAYS:** H. A. J. Gray, Eleven, Swanton Drive, Acton, Brentford & Chiswick.

**CHIPPENHAM:** N. Cutter, G3PQO, 1 Fosseway Close, Colerne, Chippenham, Wils. (Box 664.)

**CIVIL SERVICE:** D. McLennan, G3KGM, 52 Pinewood Avenue, Sidcup, Kent. (01-300 0757.)

**CORNISH:** J. Gilbert, 7 Polair Road, Penryn, Cornwall.

**COVENTRY:** C. Jaynes, 20 Belgrave Road, Wyken, Coventry.

**CRAY VALLEY:** D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent. (01-50 0641.)

**CRYSTAL PALACE:** G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23. (FORest Hill 6940.)

**DIAL HOUSE:** B. Clark, G3RXJ, Dial House Radio Society, 1st Floor, Dial House, Chapel Street, Salford, 3.

**DORKING:** R. Greenwood, G3LBA, 8 Deacon Close, Downside, Cobham, Surrey.

**DUNSTABLE DOWNS:** A. Don, G8BWZ, 51 Manor Park, Houghton Regis, Dunstable (67549), Beds.

**EAST WORKS:** R. J. Mutton, G3EVT, Summerhayes, Mill Lane, Alcester (2140), Warks.

**ECHELFORD:** M. Clift, G3UNV, 45 Fordbridge Road, Ashford (55620), Middx.

**EDGWARE:** E. H. Godfrey, G3GC, 15 Oxpens Avenue, Preston Road, Wembley, Middx.

**EXETER:** G. Wheatcroft, G3HMY, 27 Lower Wear Road, Exeter. (7.30, demonstration by the G.P.O. brought five tracking monitors into action—and that was that!)

**FAREHAM:** R. Greenwood, G3LBA, 8 Deacon Close, Downside, Cobham, Surrey.

**FARNBOROUGH:** B. Woodfield, G3REL, 538 Rosemary Lane, Blackwater, Camberley, Surrey.

**FULLWOOD:** G. B. Widnall, G3XJX, 56 Heavitree, Fullwood (77200), Yorks.

**GUILDFORD:** A. Wilkes, G3LXH, Schiehallion, Hookley Lane, Elstead (2180), Godalming, Surrey.

**HARROW:** R. H. Medcraft, G3RJB, 5 Powys Walk, Herford Road, Harrow, Middlesex.

**HEREFORD:** B. Edwards, G3JVM, 134 Dulverton Road, Ruislip Manor, Ruislip, Middx.

**KINGSTON:** M. Diprose, 36 Tiverton Way, Chessington, Surrey.

**LEEDS:** W. Ripley, G4AD, 436 Meanwood Road, Leeds LS7-2LP.

**LIVERPOOL (UNIVERSITY);** S. J. Dean, GW8CGN, Students Union, 2 Bed ford Street North, Liverpool.

**MAIDENHEAD:** E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (0170). Maidenhead.

**MAIDSTONE YMCA:** W. E. B. Kent, G3YCN, 72 Bower Mount Road, Maidstone (57624), Kent.

**MID-HERTS:** H. R. Thornton, 43 Fordwich Road, Welwyn Garden City (23163), Herts. (01*354 5921.)

**MID-SUSSEX:** E. J. Leits, G3RJX, 87 Meadow Lane, Burgess Hill, Sussex.

**NORFOLK:** M. J. Cooke, 76 Falcon Road West, Strowton, Norwich (64093) NOR-73R.

**NORTHERN HEIGHTS:** Mrs. A. Robinson, G3MDW, Candy Cabin, Upper Brockholes, Ogden, Halifax (44329), Yorks.

**NORTH KENT:** P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (01-836 8551.)

**PUDSEY:** F. J. Conway, G3VLX, 10 Tyersal Grove, Tyersal, Bradford (64220), Yorkshire.

**PURLEY:** A. Frost, G3FTQ, 42 Conville Road,Thornton Heath, Surrey.

**RADIO CLUB OF SCOTLAND:** A. Ritchie, G3WYL, 21 Cabin, Upper Brockholes, Ogden, Halifax (44329), Yorkshire.

**RADIO CLUB OF WALES:** A. Ritchie, G3WYL, 21 Cabin, Upper Brockholes, Ogden, Halifax (44329), Yorkshire.

**RANFORD:** S. Ldr. C. F. Selwood, RAFARS Hq., RAF Locking, Weston-super-Mare, Somerset.

**RHYL:** H. Douglas, 7 Forfford Ffynnon, Prestatyn, Clwyd.

**ROYAL NAVY:** R.S. R. Malcolm, HMS Mercury, Leyden, Petersfield, Hants.

**SALOP:** W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Cwmpod, Shrewsbury.

**SILVERTHORN:** D. Standley, G3WUR, 43 Havers Lane, Sidcup, Kent. (01-303 8655.)

**SOUTH BIRMINGHAM:** R. Brice, 60 Coralin Close, Chelmsley Wood, Birmingham 37.

**SOUTHEND:** H. Douglas, 7 Forfford Ffynnon, Prestatyn, Clwyd.

**SOUTHPORT:** P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (01-836 8551.)

**STOCKPORT:** D. I. Lunn, G3MRL, 4 Farnham Avenue, Macclesfield (79033), Cheshire SK11-8LT.

**SURREY:** R. Partridge, 42 Masstoke Road, Sutton Coldfield, Warwickshire. (021-705 3060.)

**TAUNTON:** G. Swetman, Little Copse, Monkton Heathfield, Taunton, Somerset.

**TWO HAM:** R. Greenwood, G3LBA, 33 Sefton Road, Croydon (10034), Surrey.

**UNIVERSITY COLLEGE OF WALES:** D. West, GW1Y, Students Union, University College of Wales, Swansea.

**VERULAM:** W. C. Dennis, G3NCK, 129 Colney Heath Lane, St. Albans, Herts.

**Worcester:** R. L. Avery, G3QGD, 24 Alexander Avenue, Droitwich (39423), Wors.
The Chesham Amateur Radio Society chaps are keen on competitive working—their station G3MDG took part in MCC, and also in the two-metre contest during the first weekend of March. They have a good selection of gear and a keen membership—which, we are told, is constantly increasing—and their twice-weekly R.A.E. lectures are being well attended. This photograph was actually taken during their participation in the Scout event last October.

Picture courtesy "The Bucks Advertiser"

at the Penguin Lounge, 37 Brighton Road, Surbiton.

Weekly on Fridays is the form at Taunton, where the meeting-place is at S.E.V.O. Hq., The Mount, Taunton. However, a change of venue is in the wind, and so a call to the hon. sec. seems to be indicated to get the latest information—see Panel opposite.

After quite a long break it is nice once again to hear from the Radio Club of Scotland by way of their GM Magazine. They assemble each Friday at 335 North Woodside Road, Glasgow, N.W. where something of interest is promised by the committee at every meeting—and if the recent past reviewed in their magazine is anything to go by they are not boasting.

Maidstone next, where Easter weekend is to be used for an all-out blitz on the odd items that so upset the NFD applecart last year. April 11 is down for the AGM; Hq. of course is the YMCA Sports Centre, Melrose Close, Loose, where they have extensive facilities available to them.

Guildford are working in very closely with Surrey University group, and indeed the meetings alternate at the two Hq. Thus, April 11 is the Guildford AGM, at the Model Engineering Group, Stoke Park, Guildford. On April 29 they go to Surrey University for a discussion on VHF portable operation.

A real Yorkshire welcome is promised by the Pudsey lads to anyone who may go to one of their evenings of makes an enquiry, either by phone or letter; Bramley Liberal Club is the spot, any Wednesday evening, and if equipped for /M on Top Band or Two, the call to look for is G3XEP.

Last month the Blackpool and Fylde chaps had their AGM and were able to record a very successful year in several ways. They have space at Pontins Holiday Camp Club Room, every Monday evening.

New premises! At last the search is over for the Hereford crowd, after a prolonged battle, and in what seems to have been a rather unexpected way. The new place is in the old Civil Defence Hq., Gaol Street, beneath the police-station. Parking in the space between Gaol Street and Bath Street. April 11 is down for a talk on Fault-finding and Alignment of the AR88D receiver, and on 18th they have a lecture by Wing Cdr. Wilson of the Civil Defence people on Emergency Communications.

It is a tradition with the Silverthorn chaps to have an annual camp over the Summer Bank Holiday weekend, with GB3SRC in operation. More normal operations are

TO GET INTO THE NEWS

Club Scribes and Secretaries should note these dates: April 4, for the May issue; May 9 for June; and June 6, for the July issue. Pse note also that reports must include the name/QTH of the Club secretary, for inclusion in the address panel. Address for "Month with The Clubs" is simply: Club Secretary, Short Wave Magazine, Buckingham.
carried on from Friday Hill House, Simmons Lane, Chingford, London, E.4 and details are available from G3XSA, as in Panel. Victory Hall, Cox Green, Maidenhead, is the place to look for the Maidenhead crowd, on April 7 and 15. The former will witness a demonstration of the Heath SB-101 transceiver by G3VCT, while the latter is the usual informal evening. A list of summer outings is being organised, details of which can be obtained from the hon. secretary, G3FVC—who, incidentally, has held his post since the group was first formed.

Someone has taken care over the arrangements at South Birmingham, where last month they had a lecture by G3LNN on SSB, and this month, on April 2, the firm of Amateur Electronics, will be along to demonstrate the Trio equipment to the lads. Venue, as always, is the Scouts’ Hut, Pershore Road, Selly Park, Birmingham 29. In addition, a party will be going to the Midlands Mobile Rally at Drayton Manor Park on April 20.

What is effectively a “nil” report comes in from the University of Liverpool hon. Secretary, for the very good reason that they are on vacation till near the end of April, and then will have noses firmly to the grindstone until mid-June sees the exams, out of the way. However, there will be a residual bit of activity doubtless, and so anyone who wants to know what they are up to can get in touch with the man in the Panel.

A new hon. secretary reports in for Farnborough, to say that Hq. is still at the Railway Enthusiasts’ Club, near Farnborough Railway station, on the second and last Tuesday of each month. G3SSJ talks about the History of Amateur Radio on the first evening in April; and in addition it is hoped to have the Club 144 mc transmitter prototype finished, when a “production run” of nearly 25(!) will be started by members.

Because Fareham normally get together on Sunday evenings, the first week in April—Easter weekend—is scrubbed. However, on the 13th there is a quarterly general meeting; a talk on VHF construction on the 20th; and an all-day dummy run for Field Day on the 27th, weather permitting. This idea of a quarterly general meeting seems to be a good one—the object is to review progress at regular intervals and see where improvements can be made. All normal meetings are held at Portchester Community Centre, near Fareham, on the Sunday evenings.

Next meeting for Mid-Herts. will be on Thursday, April 10, eight o’clock at the Welwyn Civic Centre, when G3GGK will be discussing how to set about Equipment Reviews. The Club participated, quite successfully, signing their own G3WGC/A, in the recent Open Contest on Two Metres, in which they made 155 contacts, including EU’s and GDX.

At Rhyl, their last meeting had an illuminating talk by GW3UMB—who is a professional instructor in Morse and Procedure. We have no information regarding forward plans.

According to the Northern Heights report and touching on the preamble to this piece last time out, their problem is not lack of volunteers for the selection of a committee but putting on the list those keen members who are waiting their turn to serve—good show! As one might-suppose, the Northern Heights meetings are well attended, the venue being the Sportsman Inn, Ogden, Halifax, where they have the AGM on Wednesday, April 9. On the 23rd there is to be a lecture-demonstration on Colour Anodising Aluminium, by G3IKS, and on May 7 a visit to Manchester Airport.

Programme for Mid-Sussex is fortnightly on Thursdays—at Marle Place Further Education Centre, Leylands Road, Burgess Hill—where on April 10, G3WPO will Look at 160 Metres; on April 24, there is to be a “sale of surplus equipment” (the good old jumble-sale, which every Club must have from time to time!). They are also running a Constructional Competition (converted ex-Govt. gear not eligible), which is to be judged on May 22. The Club shack is being fitted out for the Tx and workshop, and it is intended eventually to run a 150-watt CW transmitter—on which we congratulate them (though the reason given is “in deference to TVI”!).

Deadline
This must be first post on Friday, April 4, please, addressed simply “Club Secretary,” SHORT WAVE MAGAZINE, BUCKINGHAM. For the June “Month with The Clubs” we need your reports and comments by May 9, latest. Keep the Club wheels turning, keep warm—and keep your hon. treasurer happy if your sub. is due. No Club can be in a viable condition unless there is a surplus in the kitty—even if it’s only 2s. 9d. Some Clubs have £100’s of reserve funds (which can be embarrassing, because it is so difficult to get agreement on how the money ought to be used). If at your AGM, the treasurer can show a modest carry-forward, then your group is a going concern.

“... And while you're at it, you can do the living room...”
THE OTHER MAN'S STATION

G3WOB

THE town of Ilkley in Yorkshire has only two licensed radio amateurs, i.e. G3WOB and G3WVD, both highly active on the bands. The station developed by William McAllan, G3WOB, at 20, Oakburn Road, Ilkley, has been designed to give all-band operation on both AM and SSB, including AM coverage of 2 and 4 metres. Apart from endless incursions into the design around transistorised circuits to meet the requirements of his research work at Bradford University Schools of Chemical and Control Engineering (involving items like miniature transmitters for telemetry of chemical plant control data on plant variables to process control computers), G3WOB operates the following commercial amateur-band equipment:

KW-2000A plus KW-1000 Linear Amplifier, K.W. Vanguard, Minimitter and Codar A.T.5 Transmitters for AM working; also T.W. Communicators for 2 and 4 metres AM operation, with other home-built valved and transistorised apparatus. Receivers in use include an AR88, Eddystone EA-12, and various transistorised home-built units for monitoring and similar purposes.

Mobile equipment in a Zephyr 6 Automatic was successful in winning at both the South Shields and Bridlington Rallies last year.

Aerials available include a Mosley TA33, dipoles for 40 and 80 metres, a 400ft. long wire for 160 metres, also Yagi and 8-over-8 beams for VHF.

G3WOB conducts QSO's in English, French, German and Italian and is a regular member of the German Wetterrunde each morning at 6.30 a.m., when 40 stations all over Europe, each equipped with weather-reporting instruments, issue reports daily. The station up to now has accounted for 250 countries, mainly on SSB, and over 2000 German AT-stations have been worked.

G3WOB in his capacity of overseas training tutor, Bradford University, has to visit all countries in Europe every few months to supervise 100 students in training abroad. This gives him many opportunities of meeting foreign amateurs.

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This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

**NEW QTH'S**

**E14BX**, J. M. Bellew, 11 Long Avenue, Dundalk, Co. Louth.

**G2BIM**, L. W. J. Leask, 40 Woolbrook Park, Sidmouth, Devon. (re-issue)

**G2F NK**, J. H. Ellis, 15 Georgian Close, Leacroft, Staines, Middlesex. (re-issue)

**G3XQL**, J. Barker, 15 Hookstone Road, Harrogate, Yorkshire.

**G3YQL**, W. M. Arnold, 25 Park Drive, Heaton, Bradford 9, Yorkshire.

**G3YFH**, E. Bedford, 4 Castlegate, Newark-on-Trent, Notts.

**G8BRU**, G. Gallamore, 34 Langdale Road, Parlington, Urmston, Manchester. M31 4NE. (Tel. 061-775 4738)

**G8CEF**, D. Walsh, Sedan, Stock Lane, Ingatestone, Essex. (Tel. Ingatestone 667)

**G8CHF**, H. Hughes, Brackley House, Warrington Road, Goose Green, Wigan, Lancs.

**G8CHT**, D. Heaton, 1 Jer Lane, Gt. Horton, Bradford 7, Yorkshire. (Tel. Bradford 71128)

**G8CIA**, G. Austin, 38 Willow Crescent, Hatfield Peverel, Chelmsford, Essex.


**G8CJB**, J. A. Bradley, 106 Castlecroft Road, Finchfield, Waverton, Cheshire.

**G8CJQ**, R. Barnes, 5 Prospect Drive, Hale Barns, Cheshire.

**G8CJU**, B. A. Pickers, B.Sc., 8 Croftwood, Markfield, Leics.

**G8CJX**, P. Gill, 43 Oriel Drive, Aintree, Liverpool, L10 3JL.

**G8CJY**, B. Morton, 266 Bedford Road, Liverpool, L20 5BB.

**G8CLF**, A. C. V. Humphreys, 24 Van Dyck Avenue, New Malden, Surrey. (Tel. 01-337 1662)

**G8CLH**, C. S. Manklow, 51A Ashburnham Road, Hastings, Sussex.

**CHANGE OF ADDRESS**

**G3MARF**, D. F. Craig, 13 Clifford Road, North Berwick, East Lothian.

**G3BJQ**, W. H. Tanser, 21 Hookwater Road, Chandlers Ford, Eastleigh, Hants.

**G3FJE**, Sheffield and District Amateur Radio Society, Church Hall, High Street, Sheffield, Beds.

**GW3GKZ**, M. D. Fowler, Ty Gwyn, Aberwynant, Islaw'r Dref, Dolgellau, Merionethshire.

**GM3HJB**, A. S. Culley (ex-VE3GLC), 126 Castle Hill Road, Aye, Ayrshire.

**G3HYJ**, O. F. Simkin, 6 Riseway Close, Valley Drive Estate, Norwich, Norfolk. NOR. 86-P.

**G3INU**, R. J. Appleby, 27 Harrow Court, Silam Road, Stevenage, Herts.

**G3LHA**, R. L. Bastin, 40 Stamford Avenue, Coventry, Warks. CV3 5BX. (Tel. Coventry 67133)

**G3RBU**, Amateur Radio Society, Students' Union, University of Bradford, Bradford 7, Yorkshire.


**G3RYZ**, M. G. Byrne, 16 Downham Gardens, Tamerton Foliot, Plymouth, Devon.

**G3SIIH**, R. F. C. Bennett, 206 Corsham Road, Whiteley, Melksham, Wiltshire.

**G3SMB**, W. Reilly, 213 Long Lee Lane, Long Lee, Keighley, Yorkshire. (Tel. Keighley 5480)

**G3THA**, D. W. H. Ashton, 44 Woodlands Road, Formby, Liverpool. L37 2JW.

**G3UEN**, R. W. Stiles, Outgate, South Sea Road, Flamborough, Bridlington, Yorkshire E.R.


**G3UEN**, M. Bellew, 3/A/29, Glenholt, Abergwynant, Merionethshire. (Tel. 021-472 0250)

**G8CLF**, D. Heaton, 51A Ashburnham Road, Hastings, Sussex.

**GM3HJB**, A. S. Culley (ex-VE3GLC), 126 Castle Hill Road, Aye, Ayrshire.

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**G8CLF**, D. Heaton, 51A Ashburnham Road, Hastings, Sussex.

**GM3HJB**, A. S. Culley (ex-VE3GLC), 126 Castle Hill Road, Aye, Ayrshire.
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**Selling**:

**For Sale**

- Heathkit DX-100U CW/AM Tx, in excellent condition, with handbook and spare £45 or near offer. Will deliver within reasonable distance London, Crump, GSVGC, 50 Lendard Road, London, S.E.20.

- Selling: KW-2000 with AC/PSU, not used since overhauled by K.W. Electronics (est. £171), price £20. Sommerkamp FT-DX500 Transceiver, as new condition, £170. Mosley TA-33/IR Tri-Band beam, with 30ft sectional mast and home-built rotator, £15. Large carbon resistors, 6ohm 100 watt, just the job for that dummy load, 20s. each. (Bedfordshire) — Box No. 4767, Short Wave Magazine Ltd., 55 Victoria Street, London, S.W.1.


- Latest Heathkit transistors! Car Radio, 12v.-pos./neg. earth, mint condition, £11. Handbooks included and delivery to 50 miles. — Carpenter, G3TIS, 10 Avenue Road, Forme, Somerset.

**Exchange**

- Receiver R.V.R. 90, 30 to 100 mc in three switched bands, for AC mains, with meter and phones, compact, ideal amateur 4-metre or commercial bands, for Quality SSB HF communication receiver with product detector. Also wanted to purchase valves C1134 and QV604A. — Macleod, 17 Vatisker, Stornoway, Isle of Lewis.

- For Sale: Solarcon CD-710S Oscilloscope, performance guaranteed, at £85 or offer. Five transistors, quality output, high performance. — Elkin, Ring Gibson, Windsor 6322 day-time, or Slough 4399 at 7.0 p.m.

- Sale: National HRO-M receiver, in good condition. Wanted: nine GC/BS coil packs. PSU, speaker and manual, £27 10s. Avo Type CT-38 electronic multimeter, in good condition, £20. Also R.I155L receiver, with PSU and output/speaker stage, in good working order, £12 10s.—Kneale, 10 St. John's Close, Stratton, Cirencester, Glos.

- Selling: Marconi CR-150/6 receiver, with power supply, excellent condition, £35. Philips 4-track tape recorder, £12. Eight-transistor LW/MW radio, 80s. Wanted to buy: Communication receivers, SSB transmitter, and compact 10-metre AM Tx.—Edkin, G3AMT, 10 Winterslow Drive, Leigh Park, Havant, Hants. PO9-5DX.

- Urgent: R.308 receiver in any condition (consider a wreck!) also any information about this Rx or where to find one. — Topham, G3WKW, 19 Highfield Avenue, Sale, Cheshire.

- For Sale: VHF Receiver — BC-221, £30. Carriage extra. — G3AMT. 10 Winterslow Drive, Leigh Park, Havant, Hants. PO9-5DX.

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WANTED: Now or second-hand, RSGB “Bulletins” for year 1967 (preferably bound) or would consider series of years including 1967. Details and price, to include postage, pse. (Hampshire.)—Box No. 4768, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Heathkit DX-100U transmitter. State age, condition internal and external; realistic prices only, pse.—Box No. 4773, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: KW-2000 Tx, must be in good condition. All letters answered and will collect.—Acton, 45 Dunchurch Crescent, Parklands, Sutton Coldfield, Warwickshire.

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SMALL ADVERTISEMENTS, READERS—continued

SALE: Heathkit RA-1 receiver, with manual, little used and absolutely perfect, price £30 or sensible offer, carriage paid.—Darragh, Greenhaven, Southdowns Road, Bowden, Cheshire. (Tel. Altrincham 3560.)

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REQUIRED: High-band Pye Ranger, or similar. In working condition preferred. —Clay, 51 Botany Lane, Lenton, Huddersfield. Yorkshire. (Tel.: Kirkburton 2688.)

A WAITING posting: G3OLV wishes to sell five-month-old Inoue 700 Line Transceiver, with PSU, for £100. Complete with original box, etc. Details see Low Electronics advertising prior to December ’68. Price now asked £150, or near offer.—Coombes, G3OLV, QTHR, or ring Reeth (Yorkshire) 333.

WANTED: To buy, hire, or on loan, handbook for R.1475 receiver, or correspond others. —Pascoe, 26 North Parade, Falmouth, Cornwall.

SALE: Trio SR-59BE receiver with extras, including crystal-controlled BFO, crystal calibrator, voltage regulator and speaker, in mint condition. First £30 secures.—Box No. 4775, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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