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CONTENTS

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E. & O. E.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Market *It is becoming increasingly difficult to find any informed person who, understanding even some of the major implications, approves of Britain being projected into a European consortium—the recent vote in the House of Commons notwithstanding. We are stronger than either Germany or France, yet we would have to accept the rulings of a governing committee including both these countries, coupled with the names of Italy, Holland, Belgium and the Grand Duchy of Luxembourg (pop. 314,800 and rather less than a third that of the City of Birmingham!).*

However, the questions for this space are not the political ones but how the Common Market commitment might affect Amateur Radio. In terms of amateur population, meaning AT-stations licensed, we are nearly as strong as all the Six put together, with the DL's the next most numerous. Except that there might conceivably be a freer and easier flow of personal contacts and hence of ideas, with prospects unquestionably improved for our manufacturers of radio amateur equipment—in Europe, it is only the U.K. that has any significant industry based on Amateur Radio—it is difficult to see our role on the European amateur scene as being very different from what it is now.

On the other hand, it might be possible—but may not be altogether desirable—to form a sort of European Amateur Radio Organisation to take in all the Seven, with its own secretariat and financial structure. But this would inevitably provoke conflicts in other directions.

Which leads us easily on to a consideration of the International Amateur Radio Union, and in particular the standing European body, Region I of the IARU. But that must be for another time.

Austin Forsyth, G6FO.

HOW TO USE AN OSCILLOSCOPE

INTERPRETATION OF THE TRACE IN THE AMATEUR STATION APPLICATION

Part I

C. BOWDEN (G3OCB)

Our well-known contributor produced a very complete article on the construction of an amateur-station Oscilloscope, published in the March-April 1966 issues of "Short Wave Magazine." Here he discusses in some detail how such an instrument can be used for practical work on the bench. Whether you have built the instrument as originally described, or have bought an oscilloscope, or are looking at the possibilities of the Heathkit 10-12U 'Scope and their RF Signal Generator RF-1U in the kit form, this article will suggest the enormous possibilities opened up by the possession of an oscilloscope.—Editor.

THE general design of oscilloscopes has recently been discussed in these columns, and a practical circuit has been described—*see* SHORT WAVE MAGAZINE, March-April, 1966.

It is now proposed to explain in some detail the uses and applications of 'Scopes in the amateur workshop. The original discussion assumed that the reader knew what the Oscilloscope does. As this is a more fundamental approach, we will start by explaining how the displays are formed, which will help newcomers to understand the displayed traces more readily.

Basically, a spot is put on the screen due to the impact of high speed electrons upon the screen material, which glows when struck by these high energy "bullets." The electron stream consists of a flow of negatively-charged particles. By applying a positive or negative electrostatic (or magnetic) field to the beam, its path can be bent. Thus the spot can be made to move across the face of the screen.

If a pair of horizontal plates is fixed in the tube and a voltage, the magnitude of which varies linearly with time, is applied to them, the spot will also be deflected linearly. A positive voltage would attract the electron beam and thus the spot would move from left to right as the voltage is increased, as shown in Fig. 1(A), opposite.

When the spot reaches the right-hand side of the tube it would move off the face altogether unless we prevent the voltage from rising further. In practice we reduce it to its original value in a very short time and the spot returns to its original position. The cycle is then repeated, the spot making linear excursions across the tube and then returning quickly to the original position. The waveform of the applied voltage against time is plotted in Fig. 1(B), and it is called a "sawtooth" waveform. As this voltage varies linearly with time it is called a "timebase" waveform.

Spot Deflection

By applying equal and opposite sawtooth voltages, *i.e.*, push-pull deflection, the spot can be made to travel equal distances either side of the centre of the tube without the need to apply steady DC potentials (shift voltages) to centralize the trace. At low speeds the spot itself can be seen moving. As the speed is increased, however, the spot appears first to lengthen and then to become a solid line. This is because it takes a definite time for the spot to die away on the screen and the eye retains an image for a definite period of time (persistence of vision). Some cathode-ray tubes are available in which the image lasts for many seconds, such tubes having been designed for radar or other special purposes, but they are useless for general oscilloscope work.

By application of some other voltage—for example, the 50 c/s mains voltage—to another pair of plates in the tube at right angles to the original pair, the spot can be made to move vertically as well as horizontally. Fig. 1(C) shows a graph of one cycle of a 50 c/s waveform applied to the vertical plates and also one cycle of a 50 c/s sawtooth waveform on the horizontal plates. The sketch shows how the waveform is displayed on the tube. The horizontal, or "time," axis of the graph is called the X-axis. The vertical or "amplitude" axis is called the Y-axis. The corresponding surfaces in the tube are called the X and Y plates.

If the input to the Y plates is changed to a wave of twice the original frequency, *i.e.*, 100 c/s, and the timebase is kept at 50 c/s, then two complete sine waves would appear on the face of the tube. If the Y-input frequency is not an exact multiple of the timebase frequency then the trace on the tube will be unstable and very difficult to view or interpret.

The deflection of the spot occurs very rapidly and hence the trace, unlike a meter needle, can follow very high frequency waveforms. So we can examine the amplitude and shape of very complex waves. The deflection of the spot is proportional to the applied voltage. Thus (as long as the 'scope amplifiers, if used, are working within their bandwidth) we can easily calibrate the screen. For example if a trace ½in. long is produced by an input of 1/10th volt r.m.s., then this is equivalent to a peak-to-peak input of about 0·28 volt. Hence this is equivalent to a deflection of one inch for every 1·12 volt applied. Thus, by using the attenuator in the 'scope a large range of voltages can be measured with

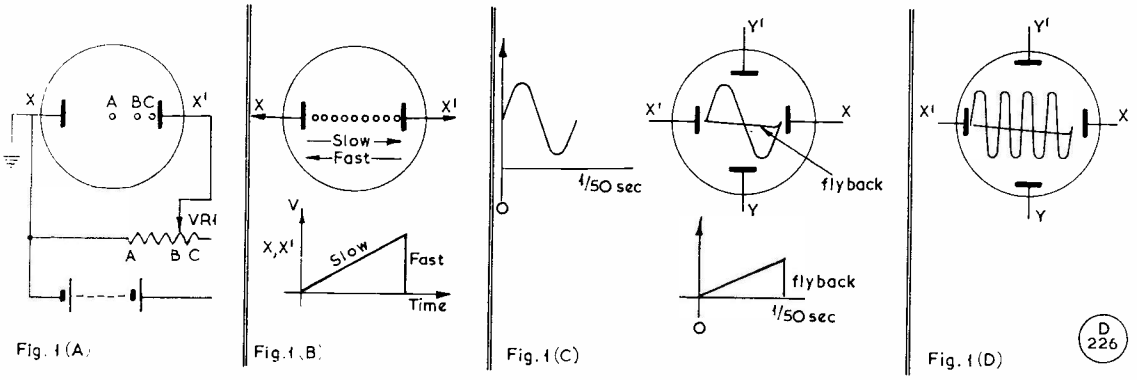

Fig. 1(A) shows the movement of the spot. Fig. 1(B) is a saw-tooth waveform, also called a time-base waveform. Fig. 1(C) shows the production of the waveform trace, with a 50-cycle sine wave (mains) across the Y-Y' plates, and a 50-cycle saw-tooth across X-X'. Fig. 1(D) is the trace from a 25-cycle wave if the time-base is unaltered, showing several cycles of the input wave with the 1/50th sec. (.02 second) time-base. Note that in Fig. 1 (D) the trace would actually show 5 cycles—see below.

a fair degree of accuracy. It is very important to remember that due allowance must be made at all times for any capacitive or resistive loading of the circuit being tested by the oscilloscope. For example, a tuned circuit may be completely detuned unless it is retrimmed after the 'scope has been connected. It is also very important to ensure that we are not feeding in too large or too small a signal, either into the 'scope or any equipment being tested, or we may cause over-loading or in some way nullify the results we are checking.

In practice we feed the required waveform into the Y terminal and adjust the timebase frequency (speed) until an almost steady picture is obtained. A slight adjustment of the synchronising control will then lock the picture. As long as we know what sort of trace we should get and how to interpret any differences that may appear then we will find that the oscilloscope is an invaluable instrument. We will now consider how we can make practical use of an oscilloscope.

It enables us to view the output of devices such as microphones, amplifiers, oscillators and so forth merely by feeding the waveform into the Y-amplifier and adjusting the timebase speed and Y input until a stable trace results. However, the picture that we see does not necessarily tell us what we want to know. Merely speaking into the microphone and seeing the trace on the tube (which we should not be able to lock in this case) tells us no more than that the microphone is working. The output is varying in such a complex fashion that the trace cannot tell us much and it is necessary to go about the task of evaluating such a piece of equipment in a different way, if useful information is to be obtained.

Frequency Comparison

We have already discussed the formation of a 50-cycle trace. If we remove the 50 c/s input to the Y-amplifier and replace it with a frequency of, say, 250 c/s, the trace will now look like that of Fig. 1(D). We see that in the same period of time (timebase has not been altered) 5 cycles of the wave will appear on the tube. Obviously we can in this way compare waves which have a direct numerical relationship. Where there is no simple relationship between the frequencies to be compared it is often better to use an alternative method. If two voltages of the same frequency are applied to the X and Y plates (the timebase having been disconnected) the result is either a straight diagonal line or an ellipse (Fig. 2, overleaf). The straight line is produced when the two frequencies are exactly in phase. However, if either of the waves is not sinusoidal, the line will not be straight.

The ellipse is produced when a phase difference occurs between the X and Y voltages but the dimensions of the ellipse will depend on the phase angle and on the relative amplitudes of the voltages. When the amplitudes are the same and there is a 90° phase angle a perfect circle will be displayed. As the phase angle is increased the ellipse decreases in width, until it again becomes a diagonal line when the two frequencies are 180° out of phase. The slope of the line will now be in the opposite direction. Fig. 2(A) shows how the phase shift of an amplifier can be checked—*see* p.206.

So far we have been considering waves of identical frequency but differing phase angle. If, however, one of the voltages is not quite of the same frequency as the other it will gradually differ in phase by an increasing amount until it is completely anti-phase and continue to change until it is back again in phase some time later. This sequence of events will repeat itself and will produce patterns on the screen known as "Lissajous Figures." Examples are shown in Fig. 3. As the difference in frequency between the two signals increases the pattern will alter and may become confused but at certain points patterns resolve into a more definite picture. Each time an exact

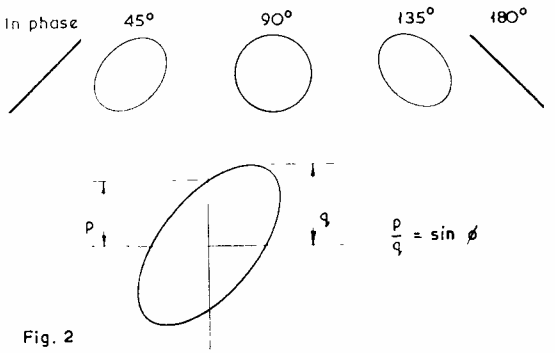

Fig. 2

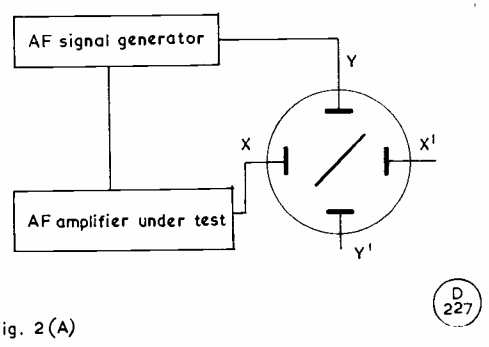

Fig. 2(A)

Fig. 2. Patterns obtained by feeding signals to both X and Y plates; the frequency of both signals is the same, but the phase is different; the phase shift can be calculated by measuring the "p" and "q" heights. Fig. 2(A) shows the set-up for checking audio amplifier phase shift. Signal inputs to X and Y plates are equalised independently, then both signals are applied together and the phase angle calculated.

multiple of the two frequencies occurs the pattern will be quite simple, as the first three sketches in Fig. 3 show. More indirect frequency ratios produce more complicated patterns, as the last two sketches indicate, but it is possible by using this method to compare frequencies up to a ratio of about 10:1. Thus, with only one or two known frequencies it becomes a fairly simple matter to calibrate items such as audio signal generators with a fair degree of accuracy.

Audio Frequency Testing

An important application of the oscilloscope is that it enables one to see exactly what is happening to a signal as it progresses through a circuit. The point at which distortion is introduced can be found and the nature of the fault easily identified by examination of the signal waveform at that point. For example, on an audio amplifier it is a simple matter to follow a test signal through the various stages and to observe whether it changes appreciably in *shape* as it is amplified through the stages. It is, of course, necessary to have a pure test signal to start with. This can be obtained from an audio frequency generator, or perhaps by using the tone output from the AF terminals of a signal generator. This signal, at a suitable amplitude, can be fed into the input of the AF amplifier under test. The gain controls of the generator and amplifier should be adjusted so that overloading does not occur, and as the 'scope is connected to various points throughout the amplifier, the 'scope gain control (or attenuator) should likewise be set to avoid overloading of the 'scope. The deflection amplifier may or may not be required, depending on the amplitude of the signal. For example, the output from the anode of a power output stage may be more cenveniently viewed by feeding it direct (*via* a blocking capacitor) to the Y plates. The waveforms in Fig. 4 show how certain typical defects may appear. It should be appreciated that several of these may be present at one time!

At Fig. 4(A) is shown the pure test waveform at a frequency in the range 400-1000 c/s. Waveform 4(B) exhibits a degree of third harmonic distortion: Waveform 4(D) also shows third-harmonic distortion but of a different phase relationship. Waveform 4(C) shows a typical case of second-harmonic distortion, such as would be caused by operating a valve with too much bias.

Waveform 4(E) indicates how a parasitic oscillation would appear on the trace. The waveform itself is not seriously distorted but the presence of a parasitic generally results either in hiss or distortion of the output signal, or both, and its presence is not readily traceable by ordinary methods of testing. Waveform 4(F) shows the sort of distortion that might be caused due to severe overload of a magnetic circuit, *e.g.*, the output transformer. Waveform 4(G) suggests clipping of a peak due to anode-bend distortion or excessive bias. (Both peaks may be clipped where there is insufficient HT to the stage, or where a stage is overdriven.) Reduction of signal input would undoubtedly result in a vast improvement in the waveform in the latter case.

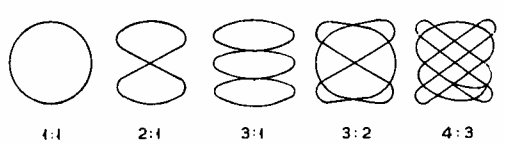

Fig. 3

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Fig. 3. These are the well-known Lissajous figures which can be conjured up on the trace when the saw-tooth time base is removed and the input frequencies are put across the X and Y plates. The maximum numbers of loops are counted, along the edge, vertically and horizontally, to arrive at the "ratios" shown under each. The shape for 1:1 may appear circular or flattened, depending on the amplitude ratios of the waves.

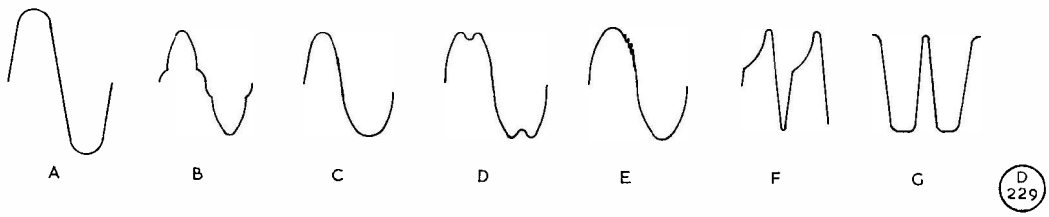


Fig. 4. Trace shapes obtained when looking at audio signals. The significance of these waveforms is discussed in the text.

Checking Stage Gain

Although an AC voltmeter can be used for this check a 'scope enables one to see whether any distortion is introduced in the stage at higher signal levels, and therefore will provide more information. Knowing the deflection sensitivity of the tube (and amplifiers when used) the input and output voltages to a stage are measured. It is convenient for this purpose to make up a plastic scale calibrated in volts which matches the performance of the 'scope being used. This saves the bother of having to measure the trace every time measurements are made.

Frequency Response Evaluation

Once again an AC voltmeter could be used for this test but your oscilloscope will enable you to find whether any peculiar distortion is being introduced to any particular frequency. The output from a variable AF oscillator is supplied to the amplifier under test and the output is fed to the 'scope. It is important that the oscilloscope response is level at all frequencies over which this test is to be made and the output of the AF generator must similarly be constant at all frequencies over the range of test. A graph is plotted showing the variation of output with frequency.

More sophisticated equipments for checking the response of AF amplifiers have an output frequency which varies as the timebase varies and the amplifier response curve is thus plotted on the screen. These equipments often have very wide bandwidth outputs and can be used, amongst other things, for checking the frequency response of 'scopes themselves (which can be thought of as one item of electronic equipment talking to another), also the performance of TV apparatus and the like. But unless the owner of an oscilloscope is a real hi-fi enthusiast, who understands all about waveform perfection, it is doubtful whether he would have much use for a wobbulator working in the *audio* frequency range.

On the other hand, RF wobbulators are very useful indeed and their circuitry, construction and application will be discussed later in this article.

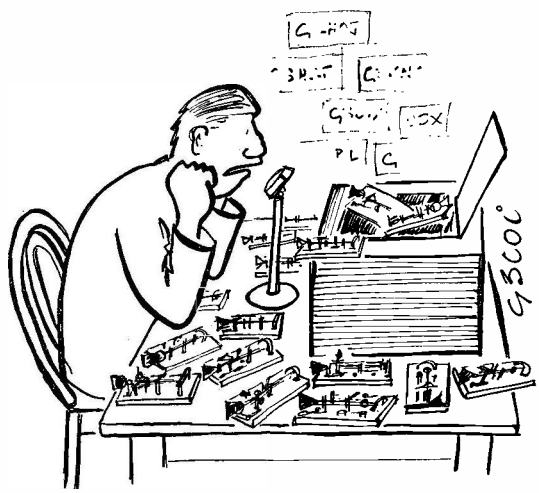
(To be continued)

R.A.E. INSTRUCTION

Commencing with the August issue, we shall as usual be listing those centres at which courses of instruction will be offered for the Radio Amateurs' Examination, "Subject No.55," and the Morse Test, during the winter session 1967-'68. Authorities responsible are asked to let us have details by July 7, addressed: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, and marked "R.A.E. Course."

NO-MORSE LICENCES, NETHERLANDS

According to the latest issue of the *Region I Bulletin,* in the Netherlands the effect of issuing licences equivalent to our "B" category (VHF only) and extending them to cover the two-metre band has meant a much larger increase in the no-Morse PA's than in those licensed for the HF bands (for which a Morse test has to be passed, in accordance with international regulations). In fact, in Holland, the VHF-only licences are now about one-third of the total in issue.



". . . Yes, I'm gradually getting the bugs out of this rig . . ."

THOUGHTS ON THE VS1AA AERIAL

SOME IDEAS FOR ITS REJUVENATION

E. JOHNSON (G2HR)

The original single-wire fed aerial was the Windom, due to an American amateur. It was later modified, in 1930, by G2BI, and became known as the "Windom with the G2BI tap." Later still, it was again modified by VS1AA, now GM3IAA. While some of the conclusions in this article may be arguable, as a single-wire feeder type it is worth investigating.—Editor.

THE VS1AA aerial, or modified Windom, enjoyed a well-deserved popularity in the past, but seems to have lost favour in recent years. The extreme simplicity of construction has much to commend it, and sundry contacts the writer has made during the past few months indicates that the pendulum may be swinging back. In order to get the best performance, however, certain aspects merit deeper investigation. A lot of hit-and-miss can be avoided if a few fundamentals are clearly understood.

The Starting Point

At the risk of repeating *ad nauseam* what may be found in many text-books it is as well to examine the conventional voltage and current distribution along a half-wave dipole (Fig. 1). For this purpose it is useful to think in terms of *electrical degrees*, as shown. If one considers the current distribution in the form of a sine wave, the voltage is displaced by 90°. The latter therefore becomes a cosine curve. At any point along the aerial the absolute values are therefore in direct relation to the angular functions. At *resonance* the wire acts as a pure resistance, the reactive components cancelling out. It is, of course, correct to refer to the *impedance* at any point, as Xc and XL are present but 180° out of phase, leaving R.

Impedance Variation

At any given point along the aerial, therefore the E/I ratio determines the impedance. This ratio can be represented by the cosine of the angle divided by the sine. A little elementary trigonometry will thus show that the impedance can be represented by a cotangent curve. Fig. 2 indicates what happens when three half-waves appear on a wire, each of which is, of course, 180°. At angles of 0° and 180° the cotangent is infinity, and at 90° zero. In practice these values are never realised because of end-effects introducing capacitance, and at a current loop, or antinode, the impedance is not zero. Nevertheless, the original Windom multi-band aerial evolved from the variation of impedance along the aerial. If the feeder is the same gauge as the radiator, say 14g., the former is tapped some 22°-23° along the wire. It is essentially a one-band aerial, but a variation was evolved which seemed to be the solution for a multi-band arrangement.

The VS1AA

It will be seen from Fig. 3 that if a feeder is tapped at 1/3rd along the wire, *viz.* 60°, then on even harmonics it appears at the same point on the current curve, and the impedance at this angle is clearly the same. According to the number of half-waves on the aerial the tap in some cases will obviously be at 120° electrical degrees. Now, the sine of an angle greater than 90° is the same as the sine of its supplement, *viz.* 180° minus that angle. (One does not have to worry that this value is negative in some quadrants of a circle.) Consequently the impedance is substantially the same. It is found that a 20g. feeder has an impedance virtually of this order.

Odd Harmonic Operation

On odd harmonics, Fig. 4, there is a considerable mismatch as the tap appears at 180°, this representing a high-impedance point. Whilst it is a fact that operation is satisfactory when properly loaded into a *pi*-section output, there is a large standing-wave on the feeder, which in effect is now part of the radiator, and the aerial is not operating as a modified Windom. Use can be made of this difficulty, however, by making the "feeder" an integral number of half-waves long. The whole system will then act as a resonant "end-on," whether one considers the length "a" to "b" or "a" to "c." It will be apparent that unless there is a substantial vertical drop from the horizontal section there will be a partial cancellation of radiation as the first half-wave on the "feeder" will be anti-phased with that appearing on the aerial. In the original true Windom this modification was made such that the length "a" to "c" was an integral number of half-waves, and owing to the tap position in this instance, the section "a" to "b" was

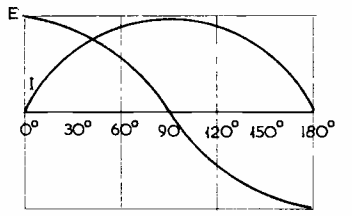


Fig. 1

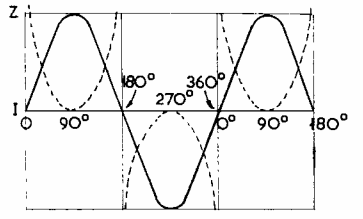


Fig. 2

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Fig. 1. The standard representation of voltage and current distribution on a half-wave resonant system. Fig. 2. What the current and impedance curves look like on a third-harmonic aerial.

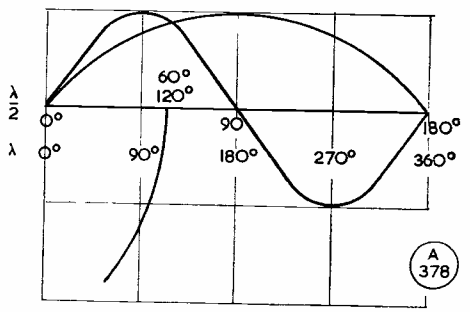


Fig. 3. The intersection of current curves, at one-third the way along the wire, showing the same E/I ratio for the fundamental and second harmonic. (The second harmonic is twice the fundamental frequency.)

merely an odd length out of resonance and played no substantial part in radiating. It is believed, if the writer's memory is correct, that this was known as the "G2BI modification," after the late Col. Palmer, who first evolved it. (Correct, *Editor.*)

Adjustment

As the length of an aerial increases progressively with the number of half-waves appearing thereon, with true VS1AA operation on even harmonics the impedance is bound to vary somewhat at the 1/3rd tap position, and thus one cannot expect a perfect match throughout without at least a small standing-wave on the feeder. Even with a perfect match, although the current will be low, inevitably there will be some radiation from the feeder, and one cannot guarantee a perfect polar-diagram.

The customary method of adjustment is largely trial and error. Small lamps are inserted in the feeder, and the tap adjusted until there is a *minimum difference* in brightness. In a perfect match there should, of course, be no difference, but this is unlikely to be achieved in practice. Two lamps should also be inserted in the aerial either side of the tap. Any substantial difference in brightness here indicates that the radiator has not been cut to resonance.

When there is reason to think that a perfect match is impracticable, and this will certainly apply, then it is desirable to eliminate any undue reactance being reflected into the Tx end. By making the feeder an integral number of quarter waves long, the termination will be purely resistive, assuming the aerial is resonant, but for reasons already given (odd-harmonic operation), it is better to stick to an integral number of half-waves. At this juncture one cannot too strongly emphasise that if there are standing-waves on a feeder, all the juggling in the world with ATU's and matching devices at the transmitter end cannot affect the standing-wave ratio.

True Windom Points

If for some reason one wishes to use the original Windom, there is no real reason, within limits, why the conventional tapping point should not be somewhat varied, but one is restricted within narrow limits. You may ask why cannot you feed at one end or in the centre, the two extremes? An examination of the impedance curve will show that the very large difference in impedance would need an impossibly thin feeder at the end, and conversely a feeder diameter of which would be out of this world at the centre. There is a comparatively narrow range of impedances achievable with wires of the gauges normally in use. Nevertheless, it *is* possible to erect a one-band aerial with a different tap position, remembering that a slight approach towards the centre will call for a thicker gauge, and conversely a thinner gauge in the other direction. This is a matter of trial-and-error utilising the methods as already outlined.

Matching "Red Herrings"

So many amateurs suffer sleepless nights owing to their inability to achieve a perfect match, *i.e.* a standing-wave ratio of 1:1. This is impossible to obtain in practice, whether it be a single-line feeder, or the more common twin or coax used with other forms of aerial. So much nonsense has been aired about this, that if, for example, one uses a 30ft. length of low-loss coax, often called "625" coax, the loss will be about 1 dB at 145 mc when perfectly matched. A standing-wave ratio of 4:1 in this instance will cause an additional loss of a few dB, and virtually undetectable. It obviously follows that with a single-line Windom type feeder where initial attenuation for a given length will be very low, one has little cause to worry. The worst that can happen is increased radiation off the feeder—true, this does represent an additional dB loss—but a useful one by contributing to overall radiation, as there is no anti-phased cancellation, as with a twin line. Despite the foregoing remarks, one naturally avoids a high SWR on low-impedance feeders, to avoid overheating at current loops and dielectric loss, even break-down, at voltage maxima.

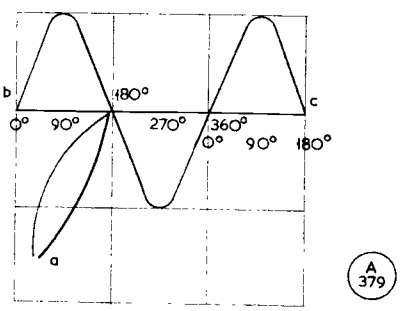


Fig. 4. The "VS1AA tap" becomes a severe mis-match when trying to operate the system on its third harmonic. But there is a way to overcome this difficulty—see text.

SIDELIGHT ON STANSTED

One of those directly affected by the noise and demolitions in prospect for the development of Stansted, Essex, as a main U.K. airport is Sir Roger Hawkey, G5ZG, who lives in Takeley. Sir Roger was one of the commentators on the BBC's local discussion programme on May 12, on the subject of Stansted, and expressed himself in no uncertain terms as to what the outcome of the development could be.

DISCUSSING SINGLE SIDEBAND

PRACTICAL AGC CONSIDERATIONS—AUDIO DERIVED AGC—TRANSISTOR PRODUCT DETECTOR—SIDEBAND SWITCHING ADDING AN SSB UNIT—FRONT-END CONVERSION

Part XII

B. A. WATLING (G3RNL)

IN April the most important modifications to older receivers were discussed. These will have a great effect on the reception of SSB signals. As explained the addition of a good filter, which will reduce the IF bandwidth, has much more effect than increasing the sensitivity. The noise-level will be reduced, and stations will be R5 which were only barely perceptible before. A licensed amateur incorporating these modifications will find that, suddenly, listening is more of a pleasure than transmitting. The novelty will not last long, however. Soon the other limitations of the receiver will become evident. Wouldn't it be nice, in multiway nets, not to have to jump for the RF gain control when the chap round the corner comes on. It would also be handy to be able to give reliable signal strength reports. Many operators can—they even go so far as to give S-meter readings on the unwanted sideband. And what's all this about product detectors introducing considerably less distortion than envelope detectors? Does this mean that the reports that have been handed out to some stations, referring to the doubtful quality of their signals, could have been due to the receiver?

Inter-Related Factors

All these points are, in fact, linked in some way. One cannot effectively solve them, however, without first having improved the selectivity of the receiver, and secondly, being prepared to do some major modifications to it. Considering first the points regarding AGC and S-meter readings (which, of course, cannot be incorporated without AGC) the problem stems from the fact that the BFO is being injected somewhere in the IF strip, and the AGC is developed at the end of the IF amplifier. This means that the high level of BFO injection required will cause a standing bias on the AGC line. Only signals over-riding the BFO injection will cause the existing AGC to operate, and hence kick up the S-meter. These signals will be distorted. They are, in fact, "overmodulating" the BFO.

One answer would be to incorporate a product detector which, as discussed last time, can provide the required isolation of the BFO. With this system the AGC is still developed at the end of the IF strip, but detection, including BFO injection, can be effective after this point. This change in the system need not be the complete answer. Unless the BFO is screened and well away from the IF stages, then stray pick-up can, and usually does, occur. This results in a standing bias on the AGC line.

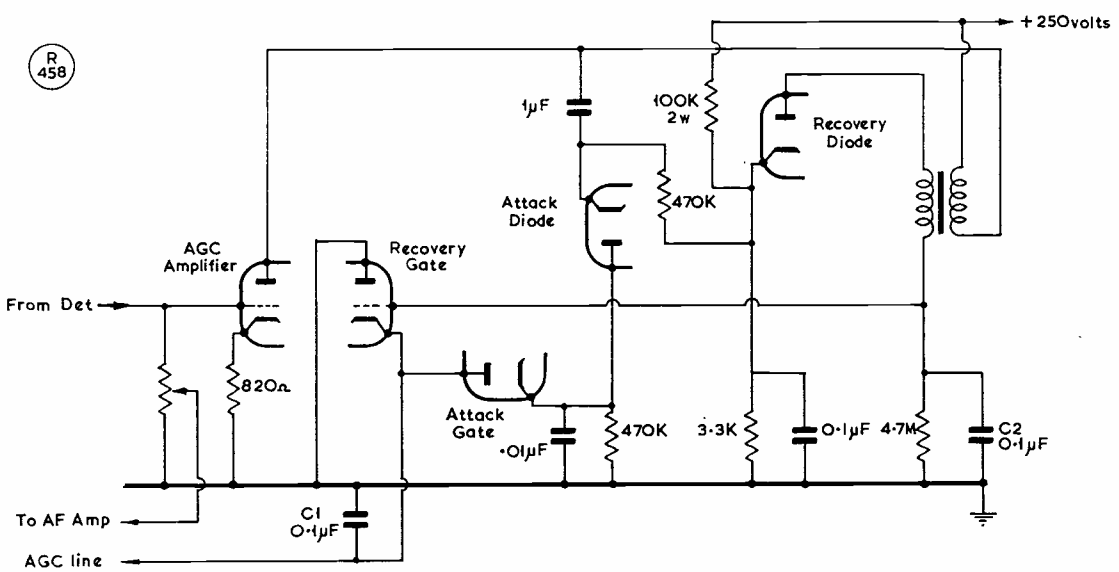


Fig. 1. The audio AGC system devised by WØBFL —see text, opposite.

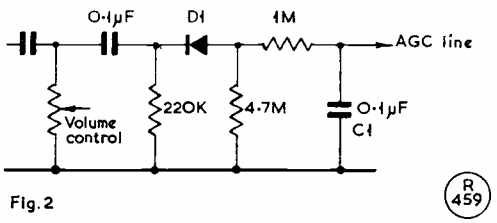


Fig A simplfied audio AGC system used by G3RNL and discussed in the text.

Audio-Derived AGC

Before going into product detectors let's consider the possibility of *audio derived* AGC. This can solve two of the problems in one go. As soon as one decides to investigate this possibility one finds that the text books mention that this *can* be the answer, yet they fail to inform you how! The only system that is described in detail is that by WØBFL, which appears in the ARRL's *Single Sideband for the Radio Amateur*. As one can see from Fig. 1 the system is somewhat complex, and difficult to incorporate as a modification to an existing receiver because of the extra valves required. From comments on this system the results achieved appear to be extremely good. It is used by W9BIY and W9IHT in their receiver, also described in *Single Sideband for the Radio Amateur*. In this a slight modification to WØBFL's circuit is applied—this is the incorporation of a 270K resistor in series with the AGC line before C1. The effect is to slow down the attack time slightly to prevent noise pulses operating the AGC.

The only experiments done at G3RNL on audio AGC have been with a simple circuit. This can be very easily incorporated in any existing receiver, and while the results are not absolute perfection, they are very adequate for amateur use. The circuit of this simplified audio AGC is shown in Fig. 2. The choice of diode raises an interesting point. Using an ordinary germanium diode for D1, such as as OA79, gave some rather peculiar effects. However, a silicon diode, which has a knee voltage of about 0·5v., proved to give the desired results. A BY100 power diode, strangely enough, seems to be the best. This then means that there is a slight delay before the AGC operates, which is desirable anyway. The attack time-constant is due to C1 charging through the 1 megohm resistor. The release-time constant is determined by C1 discharging through the 1 megohm and 4·7 megohm resistors in series. If, as at G3RNL, the audio gain control is after the first AF stage, then the AGC provides an extremely flat response. It is, perhaps, not quite as fast as it should be for optimum performance, probably due to the fact that the diode is being fed from a high-impedance source. (The addition of a cathode follower before the diode could alter this.) Results received at G3RNL are such that the RF gain need not be touched for signals varying from S6 to S9+30 dB. Large local nets on 160 metres are not a battle any more!

Product Detector Points

Product detectors, as previously mentioned, can result in some added advantages over envelope detectors. These amount to less distortion and some gain, with the added advantage of BFO isolation from the IF strip if IF AGC is used. One of the simplest is a triode product detector, as shown in Fig. 3. The original AM detector, which generally doubles as an AGC diode, can still be utilised for AGC provided that leakage of the BFO into the IF strip if avoided. If the original AGC is used, it is advisable to change some of the component values to provide a fast attack and a slow decay (3 or 4 seconds).

The addition of an extra valve in an existing receiver may not be very practical. There are several alternatives. One is the use of a transistor product detector as described in Part X of this series. This can be made either self supporting, or put up on a piece of *Veroboard*, while the power for it could be derived from the cathode of the audio output stage, or even stepped down from the HT rail. An alternative to a transistor is using a diode product detector. Any of the circuits described in Part II of this series are suitable. A typical one suitable for use in a receiver is shown in Fig. 4, p. 212.

Sideband Switching

Now as to the desirable facility of sideband-switching on a receiver. This is useful in that sideband suppression reports can be given—but only if the filter used in the receiver has 60 dB or more of unwanted band rejection. If not, the wanted sideband will kick up the S-meter when switched to the unwanted side. Ideally, when switching sidebands the received frequency should not change. The easiest, yet most expensive, way to achieve this is by using two filters sharing a common BFO frequency. This method is used in some of the more

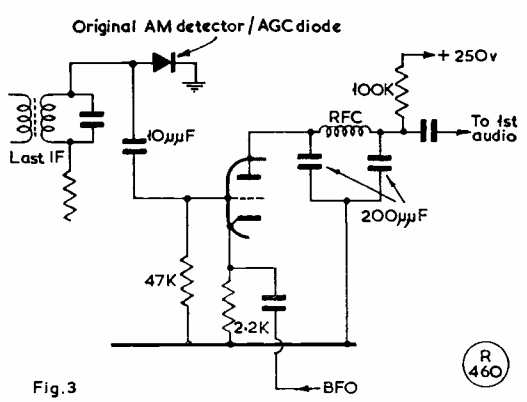


Fig. 3. A triode can be used as a product detector and this is a practicable arrangement—see above.

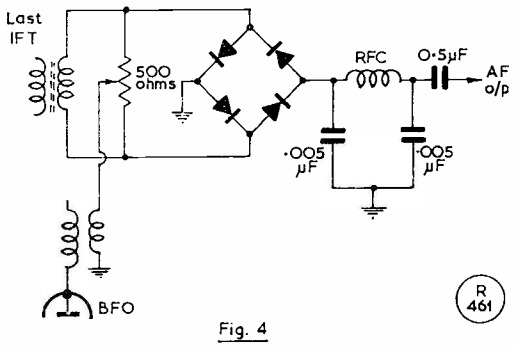


Fig. 4. A typical diode product detector circuit.

expensive equipment from the States, *e.g.*, Collins.

An alternative method, shown in Fig. 5, is to switch the BFO and local oscillator by the same degree. This is, however, difficult to achieve over any whole band.

The other alternative is when a multiple conversion receiver is used with one of these conversions crystal controlled. Assume, for example, a first IF of 1·6 mc and a second of 455 kc. The crystal required to perform this conversion will be either 1145 kc or 2055 kc. If the 1600 kc input is at LSB, then, using the 1145 kc conversion crystal, the resultant 455 kc signal will also be LSB. If the 2055 kc conversion crystal is used then sideband reversal will occur, leaving the resultant 455 kc at USB. The rule for sideband reversal is that when the sideband signal is subtracted from another frequency reversal should occur. Otherwise it will remain the same.

Add-On SSB Units

Finally some points on add-on units for an existing receiver. A lot of people contemplate this possibility in an attempt to achieve near optimum results with the minimum of constructional work. The classical method of producing an add-on SSB adaptor is to take off signal from near the end of the

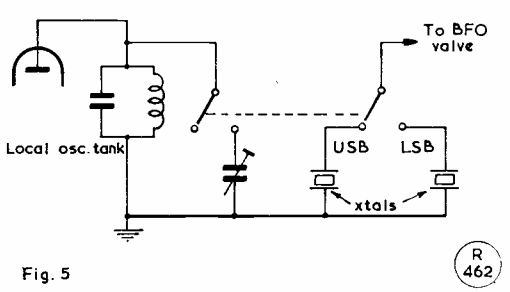


Fig. 5. A method of sideband switching where the local oscillator and BFO settings are changed together and to the same degree in order to keep the receiver tuned to the same frequency.

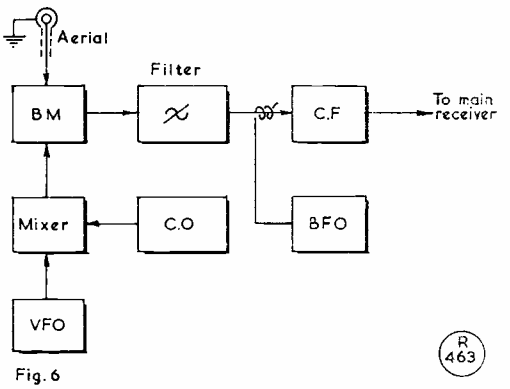


Fig. 6. Suggested arrangement for a tunable front-end converter—see text.

IF strip, and then put in the necessary selectivity, followed by a product detector and a new form of AGC. The increased selectivity can either be performed by a filter at the incoming IF, or by a further conversion down to about 50 kc where the necessary selectivity is easier to achieve with ordinary LC circuits. Sideband switching could, in this case, be performed by switching the conversion oscillator crystal frequency. This form of adaptor has some disadvantages when used with older receivers, particularly on the higher frequency bands.

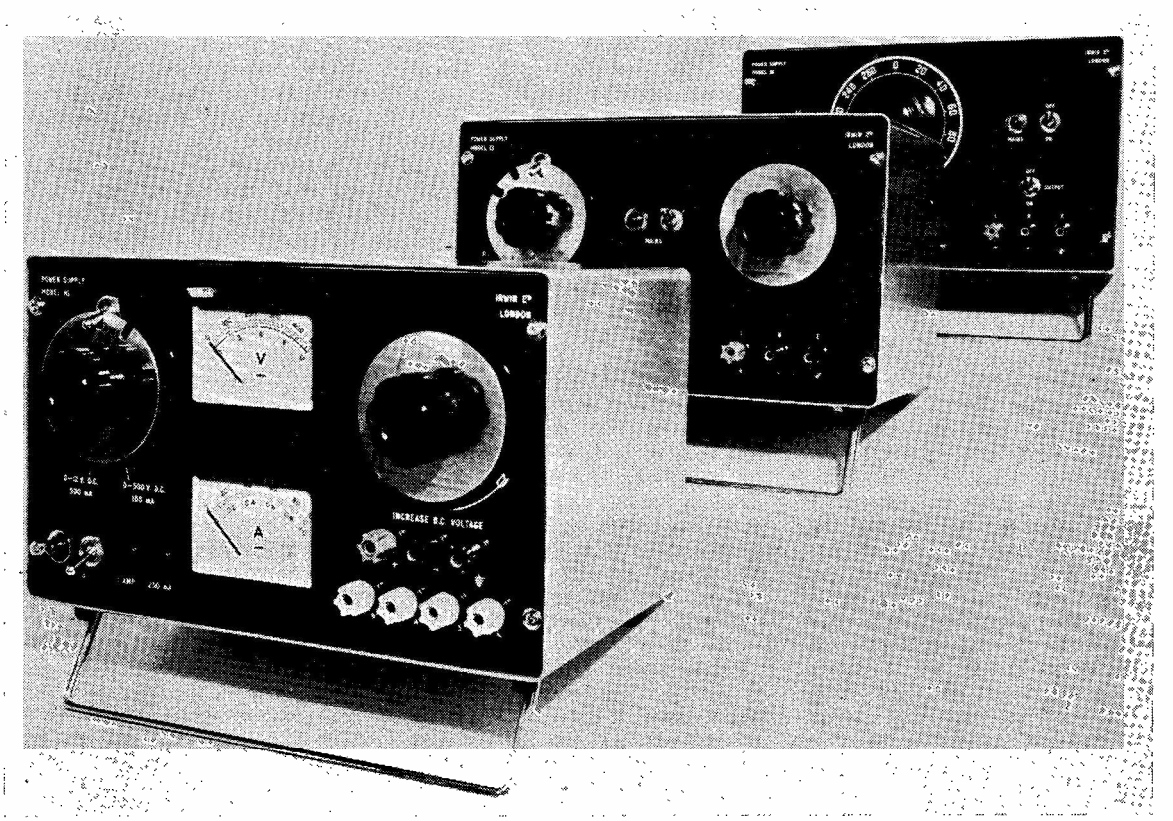
As explained in April, the selectivity should be as near to the front end as possible. This avoids problems encountered with cross-modulation. Since one of the difficulties with older receivers is signal-to-noise ratio and stability, then an add-on unit at the IF will be next to useless. The answer is to use the standard receiver as an IF strip and have a front-end converter. The common method of doing this is to have a crystal-controlled converter for the HF bands using, say, 80 metres, as a tunable IF. The necessary selectivity must then be inserted in the receiver's first IF. This is acceptable if the stability of the receiver is good at the tunable IF. If not then all the work put into the converter is almost wasted! Even if it is OK, the added disadvantage of having to modify the receiver by building in a filter in order to get near optimum results is an added discouraging point. A more attractive proposition, in the writer's opinion, is to construct a tunable front-end converter which includes a high-selectivity filter, and use the existing receiver at a fixed IF. The BFO can be included in the front end, injecting at low level at this point. This would mean that main receiver drift would not show up unless it was of the order of several kilocycles. Even then it would only appear as a loss of gain. The front-end converter could be a single conversion, using perhaps a crystal mixer VFO, with a high IF at between 5 mc and 9 mc. If 9 mc was chosen then one of the commercially available filters could be used. Fig. 6 is the block diagram of a typical front-

end converter. No RF stage is shown, for the reasons discussed in Part XI. Instead, a low-noise triode balanced mixer can be used to achieve a good signal-to-noise ratio. It is important that the aerial be correctly matched to the receiver input on the band in use—otherwise second-channel breakthrough can, and will, occur. With this type of add-on unit the only modification to the main receiver required would be to add some form of audio derived AGC—which brings us back to Fig. 2 on p.211.

(To be continued)

VISITOR LICENCES IN POLAND

We are informed that the Polish authorities are now prepared to issue temporary licences to visiting amateurs already licensed in their own country. These are free of charge, and the procedure is to address the application, with a photostat copy of the home licence, to: Biuro Koordynacji Lacznosci Radiowej, Plac Malachowskiego 2, Warsaw, *via* the Polish Embassy, with a request for a travel visa (which is anyway required to visit Poland). Thus, the application itself is forwarded by the Embassy on the issue of the travel visa, so ample time should be allowed for the official wheels to turn. Callsigns used are the applicant's own, suffixed by the Polish district in which operation is to take place, *e.g.*, G3SWM/SP6.



The Irwin range of PSU's has been developed to provide reasonably priced, universal, self-contained bench power packs for use in laboratories, schools and the amateur station. By rotary transformer, the output voltage is infinitely adjustable within the range chosen, and on all LV ranges the output is isolated from mains by a separate transformer. Selection of a particular voltage range is by rotary switch, mechanically interlocked with the output switch to avoid the possibility of changing to a higher voltage range with the load still connected. On the DC ranges, rectification is by silicon diodes. All meters are moving-coil multi-range and are automatically switched. (Where no meters are fitted, sockets are provided to connect them externally.) All units are housed in hammer-tone, silver-grey metal cases, 12 inches on the maximum dimension, with a fold-under leg for handy manipulation.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

ONE of the things that always make your conductor marvel is the way amateurs in this country mainly use—and work DX on—extremely poor aerial systems, simply to avoid friction with neighbouring folk who quite happily put up a TV array that bears a strong relationship to a Giles cartoon so as to be able to watch the latest manifestations of the Idiot's Lantern. In spite of the oft-repeated adage "if you can't hear them you can't possibly work them" these characters try to overcome the shortcomings of the aerial by putting up the transmitter power—an extremely expensive way of going about things and one that rarely pays off.

This thought was sparked off by reading through an American book on Aerials recently, wherein there was a chapter on the Yankee system of local authority planning ordinances. It seemed pretty clear that the W's labour under just as much in the way of restrictions as we do in the U.K.—and yet it also seems to be the case that the majority do make some serious attempt to erect the best possible aerial they can manage. Admittedly, there is far more competition in the U.S., due to the greater proportion of licensed amateurs per head of the population, but this does not entirely explain the attitude of the G's, and indeed one might say that if the average chap over here does not put up a beam or other good aerial system merely out of feeling for his neighbours, it is not likely that they will reciprocate by keeping their television aerials out of sight—or even in a decent state of repair!

Forty Metres

Here we have a band you either love or hate; a band that can give good DX results and yet that sounds upon superficial examination rather like bathwater going down a rather twisty waste-pipe.

G2DC (Ringwood) has managed to work the odd station on 40m. and in the process noted that the "bathwater" noise seems to be gunning for Radio Peking on about 7004, and retires to 6995 kc almost as soon as Peking goes off.

One of those who does *not* hate the band is G3VRZ (Birmingham), who seems to have used nothing else during the month. As a result, Hugh is able to offer CO2, PY, UA9, ZS6, W7's, ZL2BDA (*ex*-G3PHO) and VP1, with HK6 and KV4 as gotaways. All this with 150 watts of CW to a dipole.

All that GM3SVK managed was OY5S—virtually a local to Fred—and a few inter-G contacts, mainly because rainwater leaked into the feeder of his 7 mc aerial.

Probably the fastest QSL return ever from an overseas station, is the comment of G3PQF (Farnborough) on his contact with HI8XAL; the speed being all the more marked as there arrived, by the same post, cards from a couple of ZD8's and a 9M4 confirming QSO's made as far back as mid-1965.

Ten Metres

This is probably the allocation of most interest to most people at this time, as a pointer to the way the rise in the sunspot count is having its effect in the log. All of which is a polite way of saying that when we selected April 16 as the date for the Ten-Metre Activity Period, the crystal ball was quite definitely deranged. Comments all round varied from "not too good" to "blankety-blank awful!"

5Z4AA (Mombasa) was sadly disappointed with conditions; if things had remained as they had been prior to the Period, Bob could reasonably have expected to have booked in about 50 countries. In the event, in four hours and forty minutes a total of 69S, scattered through 26 countries, were raised, and oddly enough 26 of the stations worked were in the U.K. No short-skip stuff appeared at all, and all contacts were over paths of 1500 miles, or more. The W stations were only audible for short, almost fleeting, periods.

One of those who were a little restrained in their choice of epithets to describe the conditions was G2DC, who simply called things "much below par," and sent in a short log covering around three hours in three separate periods. However, Jack's 16 contacts, all on CW of course, ranged over five Continents.

Allan of G3IDG (Basingstoke) listened to the CW end of the band also, and came out of the fray with a total of 22 countries and all Continents; unfortunately G3IDG did not indicate times, and so a direct comparison with the other logs was not possible.

A nice long letter accompanied the Activity Period list from G3WP (Chelmsford) who stayed on the CW end most of the afternoon and only managed to work one W at a rate of 559 both ways; however, the morning session yielded him contacts with four UA-type stations, and in the course of the day quite a few signals of interest were heard both on CW and SSB. G3WP uses an HA-350 for reception, fed into parallel 14 and 28 mc dipoles on a common feeder, and says that this aerial seems to bring up the images on his receiver—rather confusing, that with a 3·5 to 4 mc IF, the image of 28 mc comes out as 20·5 to 22 mc, nicely bracketing the 21 mc band.

Turning now to the other notes, G3NOF (Yeovil) found things somewhat variable, with conditions poor during the first week of May; several morning openings to JA and VS6 were followed by VU signals around 1300, and 9V1 as late as 1530, Africans in the early mornings and again in the evenings, at which time there were also South American stations to be worked. Don mentions CE3RC, CR8, JA, OD5, VQ9G, VS6's, all W call areas including W7PEY and WA7EJN (both in Arizona), ZS's, 5N2AAY, and 5Z4AA.

Ever thought of putting a 10m. Quad in the roof-space? G3PQF

(Farnborough) has done just that, with the device pointing East, in the hope, presumably, of working VK. The only snag is that so far it seems only to be " working " the local TV sets, which is rather a bind. However, before the Quad went up (or in), Dave worked quite a lot of DX, including MP4TBO, CX3, 4X4, VP9, XW8AX, 5H3KJ, CR9, ZS, 9Q5, YA, JA, several LU's, CR6, ZD8, PJ2CR, and ZP5JB.

Weather may be a favourite topic among the British, but it is even more so among the people of Unst—in particular GM3SVK, who finds the wind tends to vent its spite on his aerial systems and so reduce his operating time. Fred found the ten-metre band " reasonable "—which rather sounds like damnation with faint praise—but none the less worked LU3EX and VK4FH on CW and VK8HA, VS9ALV, and ZC4MO on SSB. More exotic were the gotaways, in the form of 4W1G, VQ9G, 9M6, FY7, HR1KS, YN1SR, FB8YY, 5U7AL, VP8IU, and VP8JG—as Fred remarks, it is enough to make the log-book curl!

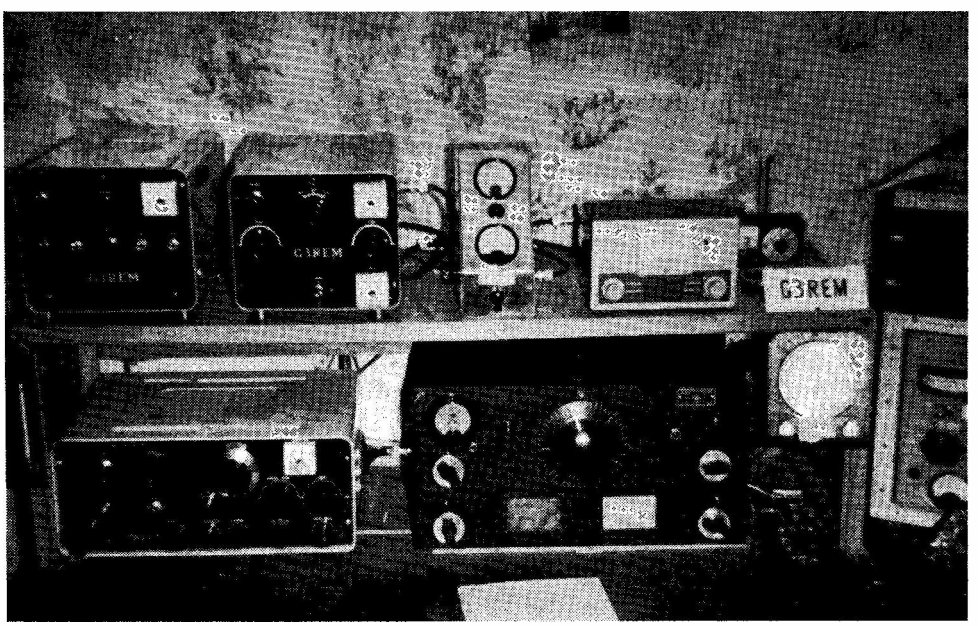
Andrew, G3VWC (Bishops Stortford), has also been erecting aerials, in his case a ground-plane for Ten, and so has not done much operating, albeit the first trials of the new device resulted in several ZC4's, and a CR7 who escaped his grasp.

The scores in the Tables under the call G3IAR (Sevenoaks) seem to be steadily rising, and on this band Mike notes such calls as VQ8CG, VP1VR, TU2BQ, ZD8CX, and ZS8L.

No band is particularly mentioned by G2DC, as he has only been on at odd times. However, Jack discusses the sunspot count over the month of April, the average being 65·5, although the count was as high as 105 on April 1st, falling to 51 on the 15th, and its lowest to the time of writing, 32, on the 16th—the very day chosen for our Activity Period! No wonder things were not very lively! Hope remains, though, as the *average* sunspot count should continue to rise slowly right through to October, when it is predicted at 101.

G2CZM (Chesham) writes to say that an ex-G, now in U.S.A., and operating under the call K5QWZ is looking for a contact with Rutland on SSB. G2CZM says that Bob, who was worked on 28 mc, operates mainly in the areas around 14240, 21340, and 28650 kc, and has only a contact with Rutland missing, to complete the set of English counties.

QRP/AM on Ten is mentioned by G3GIQ (London, W.5) as his ploy for the month, as a result of time spent testing out a mobile rig which he had just converted to the band. With 3 watts, hooked up to the beam, Henry has been amazed at how much DX could be worked. On AM, UF6HI and FG7XE; on SSB, CR6 and 7, KP4, MP4MAY, ST2SA, TU2BQ, VP2SY, YA1, FV and HD, 5R8, 5Z4, and last but not



G3REM is operated by John Austin at 40 Cross Keys, Bearsted, Maidstone, Kent. Licensed in August 1962, he has a pretty comprehensive layout. At lower left is a Sphinx three-band SSB Tx and then an HRO with some useful modifications. After the bug-key and at extreme right is a Geloso rig. On the upper shelf, to the left, is a home-built TT21 linear and its 1250v. solid-state PSU, to match the Sphinx, then an aerial control panel, and the invaluable Heathkit SWR bridge, with an RF monitor unit behind. G3REM served in the R.A.F. during 1937-'46, flying in aircraft carrying the (then) battery-type Tx/Rx gear, and one of his Squadron's routine jobs was target-towing for the Royal Navy—so John learnt his CW by having to use " blinker " with an Aldis lamp ! (Well, it's one way of getting the Morse !)

THREE-BAND ZONES and COUNTRIES TABLE

Starting date: January 1, 1967

Station	7 mc		14 mc		21 mc	
	Zone pts.	Countries	Zone pts.	Countries	Zone pts.	Countries
G3IAR	230	38	741	121	676	82
GM3SVK	173	26	703	96	575	69
GM3JZK	135	20	429	50	404	30
G3VDL	86	17	479	39	355	37
G3PQF	75	20	113	21	149	14
G3VWC	22	18	67	16	100	21

Note: The placings this month are based on the " 7 mc Zone points " column. For Zone 14 Score card on which this table is based, see p.92, April 1967 issue.

least, 9V1NP all seem to bear out the contention that Ten is very good when it is awake.

An unlucky chap is classified as one who did not find the band open once during the month, and on this basis G3VDL (Chalfont St. Giles) qualified handsomely for the title. He did not catch *one* opening!

On the other hand G3NWT (Risley) managed to find one or two, although he claims to have worked " nothing unusual." Among them he counts ZE1AA who apparently is the original holder of the call; if this is the case he must have been around for thirty years or more. Geoff mentions hearing from ZL3JO of the sad case of the ZS who forgot the matter of switching off the beam-rotator and hence managed to winch the entire rig out of the window—sounds as though someone has tongue-in-cheek!

Low-powered Phone seems to be popular at the moment, and G3UAN is one exponent. Robert uses a small rig, crystal-controlled, to put out between five and twelve watts on the band, receiving by means of a G2VV converter driving an HE-40, the whole bag-of-tricks being coupled to a dipole aerial. Keying this rig produced various W's, while the act of plugging in the mike resulted in ZC4, UA9, UB5, CR4, MP4's, 9J2, and UL7. Robert remarks on the difference in operating technique enforced by his use of crystal control, and finds he has to listen for signals on his own frequency, call CQ, or hope that a call to another station will be heard when the DX tunes the band—this latter seems to be rather a fond hope!

Top Band

The quite remarkable weather conditions have naturally had an effect on the Two Marconicyle band. At the time of writing it is in typically summertime condition, with static at S9 from one end to the other, thanks to a sudden and gratefully appreciated heat-wave; but during the last five days we have also experienced rain, sleet, snow, and hail, the first-mentioned accompanied by the all-too-familiar noises in the speaker.

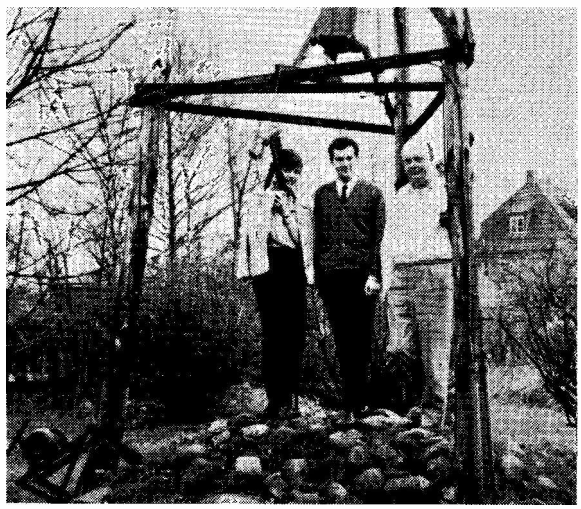
One does not think of G3PQF in terms of 160 metres, but Dave has had at least one QSO during the month, with GM3SVK, and was very pleased to make it on his " bit of wet string." No doubt about it, the lad from Unst is putting a *very* big signal into the South of England, and as a result there is quite a lot of QRM whenever he comes on. As many people will know, GM3SVK, GI6TK, and EI4AN are spending about an hour, each evening they are on, in looking out for the weaker stations who normally do not get a look in. This means that breakers and people who tune up on the frequency are doing many stations a considerable disservice by way of lost contacts in the QRM thus created. GM3SVK points out that they are looking for the *weaker* chaps particularly, and all will get a chance, if only a certain amount of commonsense is used by all concerned.

On the international side of things, we have another of W1BB's letters to report, this time on his recent trip to JA. Leaving aside the personal contacts which made the trip a memorable one for Stew and his XYL, it seems that interest in Top Band is on the increase in JA. They now have a band of frequencies (1907·5 to 1912·5 kc) and are very keen on making sure it does not fall into other hands through disuse. It seems quite likely that contacts between JA and the West Coast W's are possible, but the question of QSO's with the East Coast is a thorny one indeed. A few moments'

" . . . Now then, you Top Band boys, what am I bid . . . "

consideration of a good atlas will make it clear that the path between W1 and JA is probably the toughest possible on this band, and indeed it may well be finally achieved by making use of the " long way round " over Europe.

Still on the international tack we have an SWL report of considerable interest in from G3RPB, who took a trip to Denmark and Germany at Easter, accompanied by a TRF 3-transistor receiver which was also used on his trip to Nigeria last autumn. To deal with the Nigerian picture first, the four-inch ferrite rod aerial produced signals from Loran and also the Hifix beacon on 1900 kc. In Denmark, the receiver was able to find 160m. signals from the following G's: G3LYW, G3UBW, G3IGW, G5PP, G3SYS, G3WDA, G3TKF, G3VTY, G3USK and G3NT, of which the best were G3IGW and G3NT. Incidentally, while Keith was in Denmark he met OZ1W, who was active on 160m. about ten years ago; apparently he has been trying to get his permit to Top Band renewed ever since, but no luck so far.



When G3RPB (centre) visited DL1FF (right), he saw the famous Top Band vertical aerial with which he has done so well with the DX on 160m. It is a full-sized ground plane—in addition to which Amins has a very fine station to go with it.

On a more local level, the hunt is as keen as ever, and still has its comic moments, as G3VLX (Sidcup) reports. 'Twould seem Deryck was listening one evening to a CW QSO between GW3UMB and GW3NLC, both of whom were in counties on his " wanted " list. Both of them went on to SSB, and at that moment Deryck heard G3VLT signing with G3PNU (Cumberland)—also on his wanted list—and therefore called him. However, he did not have time to net accurately and lost the contact. Next step in the chain was to call GM3NXA (Perthshire)—also wanted for counties—from whom he got a QRZ? By the time he had sorted himself out and finished trying for GM3NXA, all the others had also disappeared! There *must* be a moral to this tale somewhere.

Sorry to hear that G3UJS (Snettisham) has manged to become " horizontally polarised," due to a back injury, and seems likely to be that way for some time. A temporary aerial and station has been rigged up by the bedside to enable Dave to operate local Phone on Top Band (thanks to the efforts of one of the locals) and he is now finding, as so many of us have done in the past, what a boon a transmitting licence is when one is laid up. It is to be hoped that G3UJS is returned to the ranks of the upright as soon as possible.

Quite a novel variation on the " invisible aerial " trick of using thin wire comes from GM3UVL, who is doing his best to make an improvement in communication by attention to the earthing system. Bill proposes to use the thin wire from old TV scanning coils as his earth system; he proposes to lay several radials deep into the ground, but it would seem that the wire is so thin it would break when the hole is being refilled, and so a thin wire counterpoise system would probably be more practical.

A very new licensee is GM3WIG (Roxburghshire) who writes in to pass on the word that he is ready willing and able to give the county-hunters a run for their money, and will QSL all contacts and *useful* SWL reports. George says that for a few months at least, he will be CW only.

Two letters from Leeds this time, from G3VTY and G3WDW, both of whom are asking for the G3U and G3V Table to be altered to let the chaps with G3W callsigns in. This is a proposition that we would prefer not to accept for the moment, as the Table normally runs for a year at a time and it would be somewhat unfair to change halfway through, particularly with the summer season of DX-peditions coming on. On the other hand there is no reason why the G3W-- types should not start accumulating so as to enable them to enter the Table in a good place when the time comes round.

A fugitive from the VHF bands is G3RND-G6AAR/T, who has moved from Yorkshire to Cowes in the Isle of Wight, and is operational on Top Band and Eighty, looking for contacts, especially with stations he previously worked on VHF. G3VMK (Watford) is a fugitive in the reverse direction, going from One-Sixty to the HF bands where he has control of 150 watts of AM and CW. However, we expect to hear him on 160 metres now and again.

G6FO (Buckingham) has got his indoor-frame Tx/Rx aerial working well on 1980 kc and is now in the (possibly unique) position of being able to swing his radiation peak through 180°, showing a 25 dB

change between maximum and minimum on " transmit," and a very sharp *null* on " receive," with daylight ranges up to 30 miles or so on CW/SSB. Details of this " Top Band beam " will appear in due course. It has interesting practical possibilities for the flat-dweller (it is a diamond configuration, with 4ft. sides) and in the reduction of local QRM (for which purpose it was originally devised).

Eighty Metres

A very small clip indeed this time, as the majority seem to have put in *nil* reports. G3VOK (Luton) came back from the DX-pedition to Guernsey (*see* p.234, this issue) where he had been operating a KW-2000, and found the home DX-40U under crystal control rather a come-down. Not a lot seemed to be happening during the first part of the period under review, and then suddenly it seemed the 80m. band had opened up, yielding 5H3, ZS6, CO2, ZP9, KP4, XE1—new countries to Brian, which made it all worth while.

A welcome return to the fold to G2HKU (Isle of Sheppey) who was a regular correspondent for years but nowadays finds time limited by the work stuff. In the eighty-metre context Ted says he has not found much DX of late, but mentions a pleasant semi-local QSO with ON8UL, who has a Quad—yes, that's not a misprint!—on 3·5 mc, located on top of a mountain, with which he puts out a fair old signal! In addition Ted draws attention to the number of American-speaking oil or gas rig stations that have appeared on the band of late. One of these characters is 9+20 dB on 3760 kc every morning at the G2HKU location.

The only other correspondent with any printable views on the band is GM5AFF (Edzell) who has been using 25 watts to an inverted Vee, and has been after the VE and VO stations on the band with considerable success. Incidentally, GM5AFF has been licensed for 18 years and says he cannot remember having met so many courteous operators, particularly amongst the G, GW, and GM stations.

TOP BAND LADDER

(G3U-- and G3V-- stations only)

Starting date, January 1, 1966

Station	Counties	Countries
G3UTS	91	15
G3VMW	83	16
G3VGR	82	15
GM3UVL	80	13
G3UBW	80	18
G3VMK	70	11
GW3UUZ	65	14
G3VLT	63	13
G3VES	63	16
GW3VPL	61	15
G3VOK	60	14
G3UVT	57	11
G3UXP	56	9
G3UGF	54	10
G3VMQ	52	14
G3UJS	51	12
G3USE	51	12
G3VTY	49	9
G3VSL	47	9
G3UGK	43	13
G3UMK	39	7
G3VLX	39	6
G3UCS	36	?

Fifteen Metres

It is hard to realise that this is the most recent allocation to Amateur Radio in the context of DX working, granted about fifteen years ago. Your scribe well remembers the frantic scratching around to create something that would " go " on the band in time for the opening night, and the numbers of short-skip contacts up and down the U.K. and Europe that burst on a startled world just after midnight. In the London area at least, it was the amateurs' turn to look a little startled in the following few days, as they realised the magnitude of the TVI problem they were faced with.

Top of the pile of reports is GM5AFF. Doc has been getting at the DX, both on Phone and CW, which latter mode served for contacts with JA's, W6 and W7, FG7XX, TA2AC, HZ1AT, TI2PZ, 9V1OB, and 3C7BRY. SSB yielded 4U1SU on the Gaza Strip, and a crop of JA's. On the other hand, G2HKU says that he worked nothing startling on 21 mc, apart from VK8HA (who airmailed his card from Darwin immediately) and the usual run of JA, VK and ZL contacts.

Steve, G3USE, has found his progress restricted by the combined effects of college and TVI, but nevertheless mentions the hooking of OD5, 5A1, and 9H1 on this band.

The next customer is G3GIQ (London, W.5) who forgot to put his callsign on the letter, and hence caused your poor old E.P.E. to scratch his head somewhat! Henry seems to have got his beam back up but is still not happy, as he missed the deadline last time round with a far healthier score, and this month has only 9M6MG and HL9KQ to offer.

G3NOF found conditions, in general, down somewhat during the period under review, with the early morning and the period around noon both unproductive, although WØIPJ/KM6 was heard several times around 0700 on a frequency of 21350 kc. JA and YA signals have been audible in the mid-morning period but Don had only W contacts, apart from one with CR4BC.

An increase in the numbers of jammers parked in the band is mentioned by several correspondents, notably G3VDL, who also found the skip conditions rather shorter than the previous period. This did not prevent him from using 60 watts of CW to a dipole to work HZ1AT, UAØKUV, VS9AHN, 7Q7LC and FL8RA, the last two being new ones.

Just to prove his gear is operational, G3NWT sent in a list of pickings from 15 metres, including KG6, KR6, VS9MB (who is now back in business after about six months off the air), VK and ZL (both worked around *midnight*) ZS8L, assorted 9M6's, XW8AX, KW6, and an LU who was giving out a signal which Geoff claims to be quite the strongest ever heard from South America.

That odd series of JA contacts reported by various stations last time out seems to have been due to anomalous propagation of some sort,

as GM3SVK reports that his clutch of them were all worked within half-an-hour on the same morning. To compensate, Fred kept away from them (maybe he thinks them habit-forming!) and the VK's. The CW list included HZ1AT, YJ8BW, KH6IJ, VR2DK, and the SSB lot were HV3CJ, VS6FS, W2JXF/HI4, and 9Q5CZ.

If your neighbour is interested in racing, the best way of annoying him is to cause TVI while the racing is on TV on Saturday afternoon. Just such a misfortune befell G3VWC, who is now busy on the construction of high-pass filters so that he can operate again.

A quite enormous list comes in from GM3JDR (Golspie) this month, in which we notice KR6AB, I6KDB, I7AA, and I9FLD on Sideband, while the CW list has so much that we can only pick the cream, in the form of CO2FC, HM1DH, 7Q7LC, CN2HC, VP1VR, FL8RA, VS9MB, CT3AS and CM1AR.

G3IAR added a comment to his Table entries by way of a list of his most interesting contacts, and from this we see 9Y4LA (Tobago), 9G1YJ, 9X5WM, HZ1KE, VP8JD, all worked on Fifteen.

When W1BB and his xyl W1DQF were in Kyoto, Japan, on their recent trip to the Far East, they met a number of JA3's, members of the local club, and boosted the idea of DX on 160 metres. JA3AA has since done very well on the band, working a number of W's.

The letter from G2DC this month is, as we have already remarked, in much more general terms than usual, and the only thing Jack refers to in the 21 mc context is *that* BC station on 21260 kc which broadcasts anti-American propaganda.

Twenty

G3IAR offers EL2AK, VP2LS, VP2KR, VQ9HJB, VP1LP, PJ2CE, YK1AA, VP2AZ and ZF1GC as his best for this month, with no further comment; and your scribe would only add that it seems pretty obvious in which direction Mike's current interests—and aerial polar diagram—lie.

Most of the other correspondents are more forthcoming, and we build up a general picture which suggests that, by and large, things were not as good as the previous month, although far from impossible. The fall-off was quite marked at the early part of May and appeared to be due to solar conditions but, as always, bad spells come to an end, and indeed, at the time of writing things were back to near normal. Thus, G3NOF found that the early-morning route to the Pacific down a bit, as was the path to the West-Coast W's, but on the other hand the VK's in the morning over the long path were better, remaining audible until as late as 1000. In the afternoon there were

FIVE-BAND DX TABLE

(New Cycle)

Starting date: January 1, 1967

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc
G3IAR	162	51	82	121	38	48
GM3KLA	88	23	16	44	30	43
G8DI	90	17	55	66	28	21
GM3SVK	130	23	69	93	26	14
G3VWC	37	4	21	16	22	5
GM3JZK	75	30	30	50	20	10
G3PQF	70	33	14	21	20	23
G3VDL	70	19	37	39	17	4
G3VOK	58	7	1	38	6	36
GI3GTR	44	1	12	35	12	9
GM3JDR	136	—	101	84	—	—
G3TTG	38	—	—	38	—	—

Note: Placings this month are based on the "7 mc" column.

several occasions when KG6 and KR6 were heard; thus an extract from the log would show CP1GN, KG6's, TU2AY, various VK's (including the RAF lads at VK8OX), a gaggle of VP8's, VQ8CG, VQ9EF, VS9AHN, VS9ALV, and various others. Don was probably a little cross at missing FL8MA, heard on SSB at 2200 several times on 14220 kc, and VK2AVA/2 on Lord Howe Island, who was noted at 0615 on 14180 kc; both these gotaways were, of course on SSB.

Our picture can be further filled in by scanning the band with GM3SVK, who found that generally the path into S.E. Asia was open from 0800 to around 0930 in the mornings, Europeans most of the day, and in the early evenings a path opened to VK and JA, followed by Africa, Antarctica, and South America, until the small hours. As a result GM3SVK worked items such as CE1FC, CR4, HC6, HV3SJ, KG6's and KR6's, assorted MP4's, OX3, PJ2CT, TI2CAP, UA1CK /JT1 and others on SSB, while the key yielded KL7MF, JA8JL, 3A2TU and VU2VZ. The latter raised doubts in the mind of GM3SVK but a look in the *Call Book* shows a station with the call VU2VZ, so he is probably OK.

Turning now to the letter from G3GIQ, Henry seems not to have spent much time on Twenty, so that his list is short—K8VWM/KG6, KH6BVS, KR6UL, and VU2DKZ.

There is no doubt that the big contests tend to bring out the DX, and GM3JDR benefited from this trend in the way of 14 mc countries worked during the recent SSB affair. Don has a long list, which includes, on the SSB side, CN8AW, DU1FH, F9RY/FC, JA's, KL7, KP4, PY's, TF3EA, VS9's, VU2's, XW8AX, VP5RS, ZF1GC and much else, while CW was responsible for EA6BD and 6W8DD.

Short-skip appeared very prevalent to G3VDL throughout the month, but the band always seemed lively when it was checked. The G3VDL CW was used to work VS6FX, CX2AL and CP5AA, the latter for a new country and Zone.

"Rapidly becoming the bed-of-nails band" is the unflattering description of Twenty given by G3NWT, who worked CX9AAN, VK's, and a ZP3.

From Top Band, attention is now being turned to the HF allocations by G3USE, mainly 14 mc CW, on which he has a mixer-type rig which runs about 30 watts, reception being on an HRO, and using a Mosley aerial. Steve has his sights set firmly on a DXCC, and has already accumulated 65 countries. This month's additions to the score include UF6, EL, ZS, SVØ, and VS9 hooked on Ten, OD5, 5A1, and 9H1 on fifteen, and YV, PY, KL7, and HK on Twenty. A recent batch of cards from the bureau included the ones for contacts with HP1AD, TA2AC, and OX3FS, all of whom were found on Twenty.

Another member of the Luton Lot is G3VMK (Watford) who is getting ready to fire up in earnest on Twenty, and has commenced by working a few W's using his Top Band dipole only 10 feet off the ground!

GM5AFF seems to have concentrated his energy into the 21 and 14 mc bands, and on the latter has had CW QSO's with VK, YV's, ZS2PX, CE9AT (who will QSL when the next ship arrives, some time in 1968!), and U5ARTEK. SSB gave him XE2IH, JX5AK, ZS5RS, MP4B, and JA. The CW contacts are achieved with the help of a Heath DX-60, and Doc says that his CE9 was quite a thrill—even after 18 years of the Amateur Radio game there is no doubt that one *still* experiences a sharp sensation when something like this is achieved.

A three-times weekly sked is kept between G2HKU and ZL2KP, which has been running since last November, and quite frequently Ted uses the QRP position on his KW-2000 for this regular QSO; in addition there are contacts in the log with VK and JA on SSB when on the QRP switch. Contacts made using the full 90 watts of SSB include JA, VK, CX3BBD, XE2EED (who sent a QSL card by airmail and enclosed an invitation to visit him and a Mexican flag!). VK9AG was also worked, and OA4UZ in Lima.

DX-Peditions

This is the time of year when the sap rises, and young men begin to think of being DX-for-a-day. We hear from GM3UVL that his friend Allan, GM3VAR will be operating portable in Berwick for the last two weeks of July and looking for contacts.

A mention of a DX-pedition that has ended comes from G3TTG, who, with G3VCV and G3NID, operated as 5R8AZ and 9V1GZ, using an NCX-3 to a dipole and a 8KW trap aerial. All contacts will be QSL'd upon receipt of cards, albeit their own stock of cards has not yet come from the printers.

A group from the University of Manchester will be on St. Agnes Island, in Scilly, from June 23 until July 2, operating as GB2SI or GB3IOS, on all bands 160 to ten metres, and on Two using

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
	Phone and CW	
G2NJ	98	98
G3NPB	98	98
G3LWQ	98	98
G3PLQ	92	95
G3UBV	76	91
G3UVR	73	80
GW3PMR	71	77
G3PPE	68	83
G3TPW	57	75
GW3TLW	55	70
G3IDG	55	59
G8HX	47	80
G3VGR	41	82
G3KPT	41	70
G3SQX	34	64
G3VMQ	32	52
G3VLX	18	39
G3VWC	4	20
	Phone only	
G3NPB	88	88
G2NJ	80	81
G3PLQ	55	58
G3MDW	52	69
G3VMQ	22	40
GW3PMR	21	42

(Failure to report for three months entails removal from the Table. New claims can be made at any time.)

G3VUM/P. There will be special cards, and since in our system Scilly scores as a county there should be no shortage of takers.

Around the same time—in fact from June 17 till July 1, G3OHC will be operating mobile on the Continent, using ON8IN, G3OHC /DL and G3OHC/LX. Most of the operation will be on the HF bands or on Eighty depending upon conditions at the time, with a KW-2000 feeding a Hustler aerial.

From May 29 until June 2, G3ESP, G3HCX and G3US will be signing G3ESP/LX on the bands 10-80 metres, using a Mosley vertical aerial and a Sommerkamp transceiver.

Contests and Awards

This time it is almost all results—we have recently received the lists for the Phone Leg of the 1966 *CQ* World-Wide DX Contest, but, sad to say there was very poor support from the U.K. The only station to appear in the Top Ten is G3HDA, placed second in the 28 mc list. The best of the all-band single operator entries from the U.K. was G3TWV; in the multi-operator section there were three entries of note—GB2USA, G3IAR and GB3CJ, the first-named being operated by G5AAB, G5ACP and G3KVF. Congratulations are due to all these keen types, and our hope is that next year a few more stations in the U.K. will come on so as to give them a run for their money.

A much more local sort of affair is the Grafton Top Band Contest. Winner of the members' section was G3SIL with 106 points, who also ran out as first CW member and first in the Phone lists as well, to make sure! As for the "open" section, here the Phone winner and overall winner was G3OLB/A, the second overall and CW leg winner being G3LIV.

Another award is brought to notice. This is called the Hong Kong Firecracker Award, and naturally enough involves working several VS6 stations, the exact number depending upon the Zone in which the applicant lives. G's are required to show at least eight different VS6's worked since the starting date of January 1 1964. For the details—and one could not say fairer than to comment that it carries a very nice certificate with it—write to Box 541, Hong Kong.

Preliminary notice is given of the VK/ZL/Oceania DX Contest, which is organised by the Wireless Institute of Australia, and runs between 1000 GMT on Saturday, October 7 till the same time on the Sunday for the Phone Leg, and 1000 GMT Saturday, October 14 through to 1000 on the 15th for the CW affair. Scoring is along the lines of two points for each contact with a VK or ZL, one point for a contact with anywhere in Oceania, on each band, times a multiplier which is the sum of the VK/ZL call areas worked on each band. Contest exchanges will be to the usual six digit pattern, with RST and a serial number starting from 001.

Reporting the HF Bands

Here and There

Several people took up the theme of the preamble last month, notably G3IDG, who feels that an allowance should be made for luck, and develops this theme by suggesting that those times when it seems as though nobody will come back to a call are possibly self-generated—in other words, by listless operating, which needs some sort of stimulus by way of a new country or something to make one "snap out of it." On the other hand G3NWT reckons that a good yard-stick is to divide calls made by QSO's resulting, and that it is quite fair to disregard cases where it is known that the station concerned has in fact gone back to a more DX'y prefix.

On a slightly different theme, GM3SVK refers to the work being done on CW in the way of daylight Top Band Tests between himself and G3RXH (Skipton), G3VYF (London) and G3VCH in Chelmsford, usually on Mondays, Wednesdays, and Fridays, on 1840 kc, the sked time being 1730 GMT. Reports from anywhere will be appreciated on this series of tests.

QSL Cards

Various notes on this front during the month, and the first one gives details of VQ8CG, Peter Burt, who was a regular in "VHF Bands" under his old call G3NBQ. Peter is now at Curipipe in Mauritius, and his cards are being dealt with by G3APA, who says that as soon as he gets the logs, and the cards arrive from the printer, he will be sending them out. Ted also mentions that in addition to the normal channels, he can be reached at BM/TXRX, London, W.C.1.

From G3RUR, we hear that DL7FT is acting as QSL manager for several stations, notably 3V8BZ, TG9EP, KL7EBK and EA6AR. Similarly G3NOF passes on the news that ZD9BH cards should be routed to W2GHK, as also should cards for 9X5GG and 9U5ID. VK2AVA/2 cards should be sent through WA2RAU; VQ9EF QSL's *via* WØBIG; and those intended for VP5AB through to W1WQC.

Ever Been Had?

Anyone who worked 1G1HKP (Ganges Island) on April 1 was on the wrong end of a "practical joke." Apparently Ganges Island, or Nakanotorishima, was discovered by a Japanese fisherman in 1907, but its existence later became a matter of doubt. Since then searches have been made, *e.g.*, in 1933 when the Japanese Navy looked for a week, but it has not been found, and is not shown on current maps.

Sign-Off

And there you have it—all from your letters and contributions, and from such other sources as Geoff Watts's *DX News-Sheet*. Thank you all for your news and comments and remember the deadline for the next issue, which will be first post on **Monday, June 12,** addressed as always to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. Till then 73 es DX.

VHF BANDS

A. J. DEVON

IT has again been a picture of conditions varying as the weather—from encouraging to very poor, not to say atrocious in some parts of the country. But never mind! We are bound to get a sustained break *some* time and, as ever, it remains a matter of watching the signs. The barograph trace for the last month shows a succession of hills and valleys, and there were some GDX opportunities during the hilly periods of a couple of days or so.

Activity on two metres and 70 centimetres has been sustained by the contests, which have helped to advance most people's scoring. It is fair to say that the RSGB has made a good move in instituting these contests, even if there is the possibility of saturating the market by making them too numerous and intense. However, anything that stimulates activity is a good thing for itself.

* * *

An important event during the period was the Midlands VHF Convention, at Wolverhampton on April 29. By all accounts this was a very successful occasion—with an attendance of almost 170, of whom 109 stayed for the dinner. With G4LU in the chair an interesting programme had been arranged, organised by G6FK and his committee, and including a small trade exhibition, as well as some very sophisticated commercial equipment. A closed A/TV circuit was provided by the Slade group, enabling the crowd to spread out comfortably, while still keeping in touch with what was going on. By making it a strictly Amateur Radio occasion—in the sense that the speakers talked to the point, without the formal and sometimes slightly patronising clap-trap we often have handed out at such events—those present found it not only an enjoyable and worth-while meeting of VHF types, but also felt that they had learnt something. The object of the organisers was to make it an informal radio amateur get-together, in what was truly a " 5-star atmosphere "—and in this they certainly succeeded.

* * *

Much of the news this time is about forthcoming expeditions, when the object is to activate some location rare or difficult in the VHF sense—and also, of course, to have an enjoyable and interesting holiday. It is a very full list, and is now as follows:

June 3-5, EIØBI, Bere Is., Co. Cork, on 70·26 mc.

June 23-July 2, G3VUM/P, University of Manchester A.R.S., on 144·10 mc, from St. Agnes Is., Scilly, AM/CW. Sked arrangements to be made before June 20 with: S. R. Turner, G3UJI, Hulme Hall, Victoria Park, Manchester, who will also be handling the QSL's. (Note that the Scilly Is. score as a county in our system.)

July 12-24, G3BA/G3BHT/G4LU will be in various EI/GI counties, on two metres, using CW/SSB only, the first eight days in EI, and the remainder of the time in Northern Ireland. Skeds are offered for anyone with a reasonable prospect of working the distance, and especially with those prepared to go out /P to make QSO's. Arrangements through G3BA, *QTHR*, as soon as possible, with an s.a.e. (Callsign and itinerary will be notified later.)

July 20-30, EI3SU/P, Southampton University R.C. 4-metre portable expedition to S. Ireland. Their gear will be an FET converter, a 50w. AM/CW/SSB Tx and a 4/4 J-Beam at 30ft. As six operators will be available, it is hoped to keep the station going pretty steadily. Though skeds are *not* specially requested, contacts early in the period would be much appreciated in order to check out on the gear. Correspondence to: Hon. secretary, University Radio Club (G3KMI), c/o Junior Common Room, The University, Southampton.

August 2-12, G8APX will be signing EI2BN/M and GI8APX/M

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1966

Starting Figure, 14

From Home QTH only

Worked	Station
51	G5NU
45	G3FDW
42	G3DAH
41	G3COJ
36	G3FIJ (115)
34	G2AXI
33	G3FNM
31	EI2A
29	G3SZX (75), G3USF (186)
28	G3TQZ, G5UM (147)
25	G3KQF
24	G3FVC
22	G2CDX, G3TDL
20	G3IOE
17	GW3CBY (65)
15	G8VN (76)

This annual Counties Worked Table will run till August 31, 1967. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving callsign and date for the county worked. Total of stations worked in excess of 50S may also be claimed and will be shown in brackets after callsign. To keep the Table up-to-date, claims should be made at frequent intervals.

on 70 centimetres, and would very much appreciate schedules and arrangements for local contacts over there. Write: W. Jarvis, G8APX, Royal Masonic School, Burwood House, The Avenue, Bushey, Herts. Though GDX on the 430 mc band may seem pretty difficult under /M conditions, in fact G8APX has been doing very well with it. We hope that he can make a good sked list.

Aug. 30-Sept. 12, GW3UCU/P, of the City University, London, E.C.1, on a three-band (70 cm.-2m.-4m.) expedition to Breconshire. Sked arrangements through G3VFD, *QTHR*.

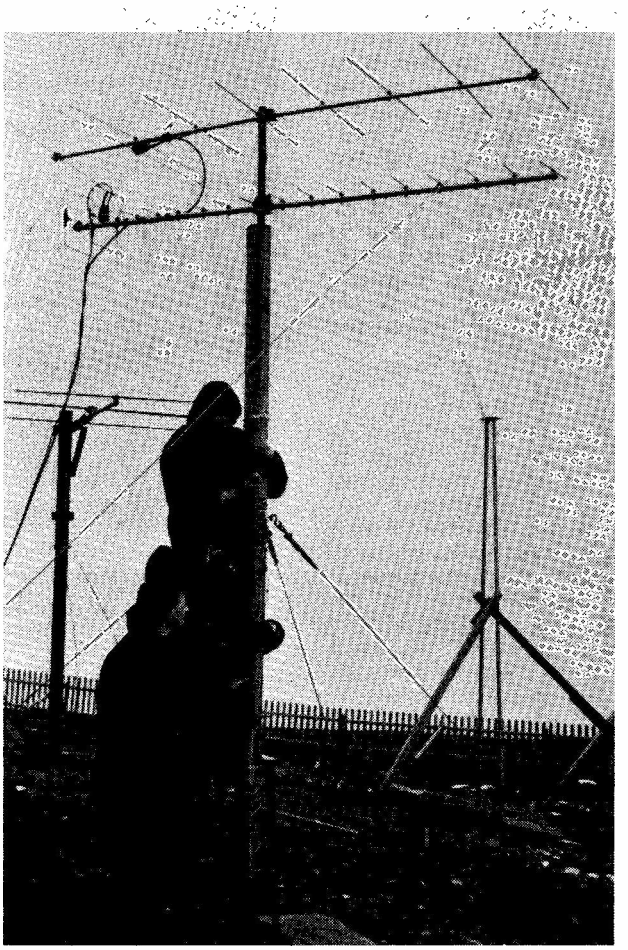
The foregoing enterprises (for such they are) should result in a high level of useful and interesting VHF activity—and we hope to hear all about them as time goes on.

* * *

Now to look at some of the individual reports. One of those putting out a big signal on 4 metres is G3OHH, from his new QTH at Mow Cop, Staffs., 1,000ft. a.s.l.—indeed, G3TCT (Guildford) says: "I find the new G3OHH beacon very useful!" But Roger is also now on two metres, with a 50w. PA, a 4-ele Yagi, and an A.2521 converter into an AR88D, and has already worked 20 counties.

Over in Dublin, EI6AS has got going on SSB, using a Viceroy exciter section on 14 mc to mix into a 5763 on 131 mc, followed by a QV04-7, with a QQV03-20A PA. He is ready for the break in condx. G3EKP (Belthorn, Lancs.) who, like EI6AS, is in all columns of the Three-Band Annual, says that during the 4-metre event in April he actually worked no less than 15 GI's. G3KQF (Barrowash, Derbys.) is devoting most of his VHF attention to 70 cm., but is also /M on two metres, with a mini-halo fed off-centre by a ¼-wave whip—which amounts to a neat single-wire feed system. G3FVC (Maidenhead) has improved outside to a slot-fed 8/8 at 35ft., complete with CDR, and is now able to get out to the north, in spite of being in a hollow. He is on most evenings, using CW, on 144·08 or 144·73 mc.

Very new on the two-metre band is G3WHK (Morden, Sy.) who nevertheless comes into the Tables with 19 counties and two countries. For GM8APX/M, his recent Scottish tour produced QSO's on 70 cm. with GM3FYB, GM8AGU, GM3AVT and GM3PIB; the contact with GM8AGU was held for over 30 miles, while running along the coast of the Moray Firth.



The VHF aerial set-up on the summit of Snaefell, I.o.M., when the callsigns used by the Cambridge party were GD3SKT and GD3STQ. Contacts made totalled 163 on two metres and 73 in the 430 mc band. In the picture, reading top to bottom, are: G8AIY, G3STQ and G3VCR.

A "heard" report from EI7AF, Birr, Co. Offaly, who on May 7 logged G3LEE/P, G3LSF/P, G3MAX/P, G3NJF/P, G3OUL, G3PUO/P and GW2HIY—without being able to raise any of them, though he was getting them at up to RS-58 and was trying hard with his 144·08 mc CW. EI7AF (who is G3UIG and EI3AE as well) is operational on 4m. too and has worked a number of G/GM's on CW.

G3UFS (Lancing, Sx.) also on 4 metres, with a 4-ele flat-top at 35ft., runs 35w. in the 829B PA of a modified (ex-police) Marconi Tx and on the Rx side has a Band II TV pre-amp. feeding into an RF-27 unit, with a crystal-controlled E88CC front end. He has now worked 104

different stations on the 70 mc band.

G3LAS (Berkhamsted) takes a healthy step up in the Three Band Annual, and G8APJ (London, E.10), G5NU (Reading) and G3UOR (Caterham, Sy.) claim for the various Tables, G3UOR now being at 14C and 134S in the 4m. All-Time. G3TKQ (Colchester), also putting in claims, explains that he is not so active nowadays because he is only at home with the gear for odd week-ends, but keeps in touch from Sutton Coldfield by working /M on two metres.

* * *

A strong line from G3LMT (Exeter) assailing us for " publishing yet another article on modifying surplus gear for 4 metres "—his point being that this sort of thing is just not good enough for the band. Indeed, he says that " people seem to end up using all sorts of junk for receivers and the London area stations seem to be the worst offenders " (!). Well, of course, he has a valid argument. But this is just like the early days of VHF all over again, when too many people were content with primitive gear—till they found out for themselves (with a little persuasion by your A.J.D., writing in this space about 30 years ago!) that such gear was really only suitable for short-haul local QSO's. There can be no question that the present steady improvement in activity and equipment on the 70 mc band is directly due to easily-modifiable surplus (such as the B.44 and the R.220), which has had the desirable effects of (*a*) First bringing people on to the band, and then (*b*) Inspiring them to go in for something better. In this sort of context, almost anything reasonably effective is permissible if it gets people thinking.

For the Midlands VHF Convention on April 29, G3LLJ/G3OQB had apparatus set up for the measuring of noise-factor, for those who wished to submit their converters to the test—some of the results were surprising, not to say mortifying!

THREE-BAND ANNUAL VHF TABLE

September 1966 to August 1967

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	TOTAL pts.
G3EDD	27	3	47	9	32	5	123
G3LAS	32	3	39	8	16	2	100
G3FIJ	29	5	36	8	6	3	87
G2AXI	24	2	34	10	—	—	70
G3BNL	15	2	16	3	28	2	66
G3EKP	26	6	13	5	10	4	64
G5FK	26	3	13	4	13	2	61
G3AHB	11	2	26	4	12	2	57
G5UM	13	2	28	2	11	1	57
G3TLB	9	2	39	6	—	—	56
G3OHH	29	4	20	2	—	—	55
EI6AS	25	6	20	6	3	2	52
EI2A	5	2	31	7	—	—	45
G3KQF	—	—	25	7	11	2	45
GW3CBY	4	2	17	4	6	2	35
G3WHK	—	—	19	2	—	—	21

Scores are since September 1, 1966, and will accrue until August 31, 1967. Position is shown by last-column total as aggregate of all scores. Own county and country score as one each. Entries may be made for a single band, any two or all three. Claims should be sent in as often as possible, to keep the Table up-to-date.

Deadline

We have a little time in hand before the next piece is due, which your A.J.D. will use to get the outstanding tabular matter up-to-date. Your own next offering should be in by **Monday, June 19,** addressed, as always, to: A.J.D., SHORT WAVE MAGAZINE, BUCKINGHAM—and let us hope that during the period we shall have an EDX break. And if you are out over Whitsun, watch it. *73 de A.J.D.*

INDICATING ABSORPTION WAVEMETER

COVERING 1·6 TO 44·0 MEGACYCLES

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

WHEN tuning buffer and other stages of a home-constructed transmitter, a wavemeter to show the order of harmonics is almost essential. The one described here has proved very useful over a long period. If strongly built and properly calibrated it should meet the station need for a wavemeter. It has separate plug-in coils for each band. Experiments made with switched windings did not result in any switched coil being found which would cover at least 1·8-30 mc and yet be completely free from slight unwanted resonance or absorption effects at spurious resonant points.

Fig. 1 is the circuit, and feeding the diode in this way gives reasonably sharp tuning with high sensitivity. (The large coil is tapped instead to save winding space.) A 200 $\mu\mu$F capacitor is not essential for tuning, but around 200-250 $\mu\mu$F is best. The meter can be 0-1 mA, or any more sensitive instrument available. The diode is an OA81, OA71 or any similar type—*see* circuits p.226.

The Coils

Three are used, covering approximately 1·6-5 mc, 5-16 mc and 14-44 mc. It was found that coils wound with 34g. enamelled wire on 1in. diameter paxolin tube could be slid inside bases from old octal valves. This encloses and protects the windings, for durable calibration. The outside diameter of these bases was just under 1 3/16th in. Some valves are slightly smaller, but would accommodate $\frac{1}{4}$in. or $\frac{7}{8}$in. diameter coils. The glass bulbs were rotated and pulled off under a cloth. The bases are cleaned out, and wires unsoldered at the pin tips and pulled out. Each paxolin tube is slightly over $\frac{1}{2}$in. long.

Fig. 2 shows the coils. The largest has 43 turns side by side, tapped at 3 turns from the earthed end for the diode. The next coil has 12 turns, followed by a $\frac{1}{4}$in. space and 2 turns for diode coupling. The smallest coil has $3\frac{1}{2}$ turns spaced to occupy $\frac{1}{4}$in. and the diode coupling is $\frac{3}{4}$ turn about $\frac{1}{8}$in. away. Coverage of the smallest coil should be

The instrument described in the article by G3OGR. It is in effect a calibrated wavemeter, with meter indication. If carefully used and calibrated with reasonable care (see text) it will be found invaluable for a number of checking functions on transmitter circuits. The meter-and-diode takes the place of the loop-and-lamp on the earlier and more conventional type of direct-reading wavemeter.

checked. Each winding is then treated with clear *Bostik* or other insulating cement fixative and pushed into its octal base. The wires are scraped, threaded through the pins, and soldered. Discs of 1/16th in. paxolin were cut and cemented to the open end of the bases to protect connections and windings. Band coverage is marked on each coil, to be on top when the coil is plugged in.

Construction

The case should be rigid and insulated. The one shown was made from perspex. Ends are 1½in. x 1½in. x ¼in. thick. Sides are ⅛in. perspex. 4¼in. by 1½in. Top and bottom are also ⅛in. thick, 4¼in. x 2in.

Holes were cut and filed for the meter and variable condenser, and octal holder. Adhesive was smeared on meeting surfaces of a side and end, and these items were correctly positioned and held in a vice. Fixing is with the ¼in. 6BA countersunk bolts. A 3/32nd in. drill was put through the side and into the end piece, then the side only was drilled ⅛in. and countersunk. The hole is then tapped and the 6BA bolt put in tightly. Repeat for other holes, keeping items clamped together during drilling, tapping and fixing. The bottom is held with screws only. A steel 6BA bolt with a sharp notch filed across its end will tap perspex.

A ready-made case or box, or one of hardwood, paxolin, or other insulated material, would do equally well. Parts are wired as in Fig. 3.

Calibrated Scales

The knob has a sharp pointer. Markings are on a thin 2in. x 2in. card, later covered by thin perspex 2in. x 2in. held with countersunk bolts. Markings were for 1·6, 1·8, 2, 2·5, 3, 3·5, 3·8, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 21, 28, 32, 36 and 44 mc.

If a *calibrated* GDO is available, tune it to various frequencies and place the wavemeter at such a distance that a *small* reading is obtained on resonance. A receiver and one megacycle crystal spotter can be used to check the GDO if necessary.

An amateur band crystal in a transmitter will give marker points at its own frequency and at multiples through the bands. A 3·5 mc crystal thus gives calibration at 3·5, 7, 14, 21 and 28 mc. Some deliberate mistuning of exciter stages may give other multiples such as 10·5, 17·5 and 24·5 mc. (The PA is *not* on for any of these calibration checks.)

Calibration is also possible off a receiver with (reliable) scale markings. This is done by coupling the coil *loosely* to the Rx aerial lead—usually a loop of a turn or two of the Ae. connection, presented to the end of the coil, is enough. With the receiver set to a known frequency (as given by its own calibration) on which there happens to be a signal, adjust the wavemeter condenser till the absorption effect is noted. The wavemeter is then at the (known) frequency. When first trying the method, it will be found that either *(a)* The coupling is too tight, giving too broad a *null*, or *(b)* It is not tight enough. The adjustment is get the sharpest possible *null* effect—

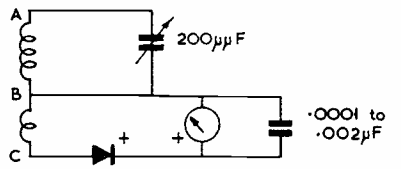


Fig.1 Indicating Wavemeter Circuit

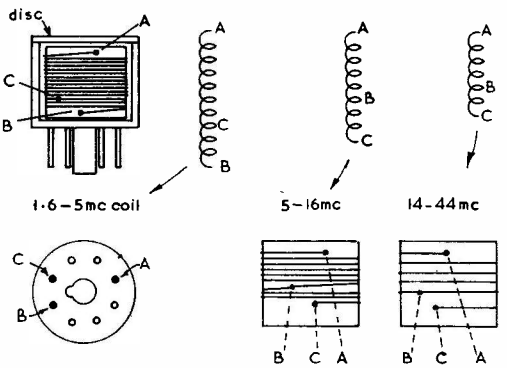


Fig.2 Plug-in Coils

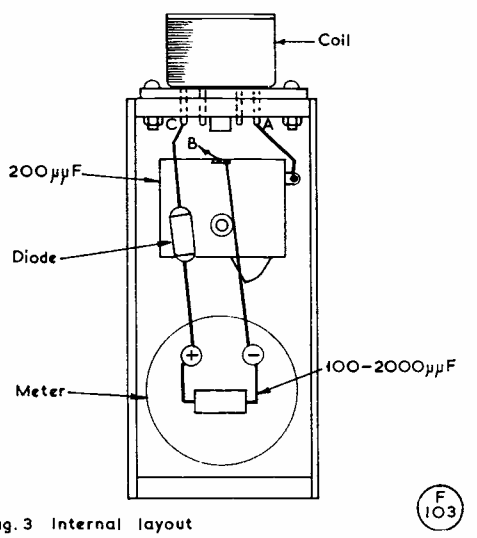


Fig. 3 Internal layout

just a "whisper" as VCI goes through resonance—as the lightest coupling will, of course, give the most accurate calibration.

Uses

Low-level buffer and multiplier stages easily supply enough RF power. The wavemeter must be kept well away from any source of strong RF, especially the PA coil. Coupling is least with

coils well apart and at right angles.

The wavemeter shows if a multiplier is tuned to unwanted harmonics. For example, 5·25 or 8·75 mc from a 1·75 mc VFO, or 10·5 mc from a 3·5 mc VFO, or numerous other multiples outside permitted bands.

Normally, a physical position for the instrument which gives full-scale from the PA tank RF should give no reading at 2x the frequency. If it does, harmonic output is too great. The bad practice of doubling in the PA can give quite a large meter reading at one-half the wanted PA output frequency!

If an end-fed aerial is used, the wavemeter can be placed near the lead-in, but clear of the transmitter. Maximum meter reading agrees with maximum lead-in current, maximum aerial current, and maximum radiation. There should be no change in frequency, or to the aerial/earth system, while tuning for maximum transmitter output by this method.

BOOK REVIEW

The ARRL *HANDBOOK*, 44th Edition

"THE Radio Amateurs Handbook," 44th Edition, 1967, published by the American Radio Relay League.

It is a very long time indeed since the ARRL came out, way back in 1926, with the first edition of the *Handbook*, basically as an operating aid, but including some technical matter. Since that first, instant, success, it has undergone many changes, and in the later years a new edition has been an annual event.

F. E. Handy, W1BDI, was the Communications Manager of ARRL for many years, and he it was who made the book such a success that it was affectionately known as "Handy's handy handbook for hams"—a title which admirably sums up the edition now under review. To a large extent this reputation is the result of the constant checking and improvement that has gone on over the years, and to the fact that those associated with it have always managed to be bang up-to-date and yet to avoid adding information on trends which have become fashionable for a year or so and then disappeared from the scene without leaving a trace.

Perhaps this evolution can best be considered by comparing the current version with earlier ones, of which the 1939, 1953, 1956 and 1966 editions are mentioned.

Back in 1939, the only thing that was the same was the label on the cover. Technical articles included information on the construction of a six-foot rack, a TRF receiver, and other things which are long-forgotten, such as the old 112 mc band. About the only familiar thing on the constructional side is the description of the A-frame mast; and all the basic AC and DC theory in the earlier chapters, and valve theory, was presented in a manner different from today.

By 1953, television had begun to cast its blight across the U.S., and hence the foreword commented that the constructional articles had been given a thorough revision to take account of the new requirements for extensive screening and filtering; modern valve types had made their appearance in odd places, and the first mentions of SSB and the generation of SSB signals had taken their place, as had the "Selectoject"—although there was as yet no mention of the transistor.

When the 1956 edition is scanned, it is noted that the part dealing with SSB has vastly expanded and has become much clearer, the transistor has appeared, with already a mention of the existence of VHF types of device, although the section devoted to them in the Tube Tables shows that a few point-contact devices were still current.

By 1966, the *Handbook* had been for quite a while printed in a different, easier-to-read type face, and the drawing of circuits was in accordance with a revised standard; the circuits themselves were markedly different, and such old favourites as the "Selectoject" had become transistorised.

The current, forty-fourth edition shows that the constant revision and up-dating has continued; a great part of the chapter on VHF transmitters has been rewritten and takes account of the current state of the art; the chapter on Semiconductors now includes a section devoted to field-effect transistors and their principles, together with information on a practical method of establishing the forward current rating and peak-inverse voltage of an unknown diode; and a simple but useful transistor tester. One also notes the arrival of an extremely useful page on the method of calculating the sag in a span of aerial wire, with a nomogram attached, which makes the problem of erecting an aerial that will not only stay up but also not sag excessively resolves into a simple matter of reading a table and the putting a ruler across the nomogram. An "economy" SSB package and many other items are also new.

As a result of the continuous revision and checking that goes on, this edition of the *Handbook* is, like its predecessors, very free from errors, and of course the index is admirable and comprehensive; the advertisement section can only be described as mouth-watering, and is a complete guide to what is available on the American amateur market.

To sum up, it is felt that the *Radio Amateur's Handbook* is an essential purchase for any amateur or SWL who does not already have one, or who owns a copy more than a couple of years old—or indeed for a professional who wishes to have on his desk a ready reference to current practice and principles, presented in such a manner as to enable workable designs to be evolved from the graphical and practical approach.

Editorial Note: The new ARRL *Handbook* is available from us, ex-stock, at 44s. post free—or, in the library edition, with hard covers, at 54s. Delivery is immediate. Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HF-BAND CONVERTER, CRYSTAL CONTROLLED

SIMPLE TWO-STAGE UNIT FOR TEN AND FIFTEEN METRES

L. CASE

MANY of the old (and new) communications receivers in use at the present time provide quite excellent performance on the lower frequency bands but on 21 mc and 28 mc especially, suffer from a lack of stability or sensitivity, and often lack adequate bandspread tuning.

The obvious answer to these problems is a crystal-controlled converter preceding the main receiver, which is then used as a tunable IF/AF amplifier on one of its lower frequency ranges.

The simplest arrangement that could be thought of is shown below. An EF183 frame grid RF pentode is used as mixer-amplifier and makes use of one of the *Denco* range of miniature dual-purpose coils, which when tuned by the 100 $\mu\mu$F variable VC1 covers a range of approximately 20 mc to 30 mc. The crystal oscillator stage takes a 6C4 triode, and no difficulty should be experienced in making the crystal oscillate in the circuit shown.

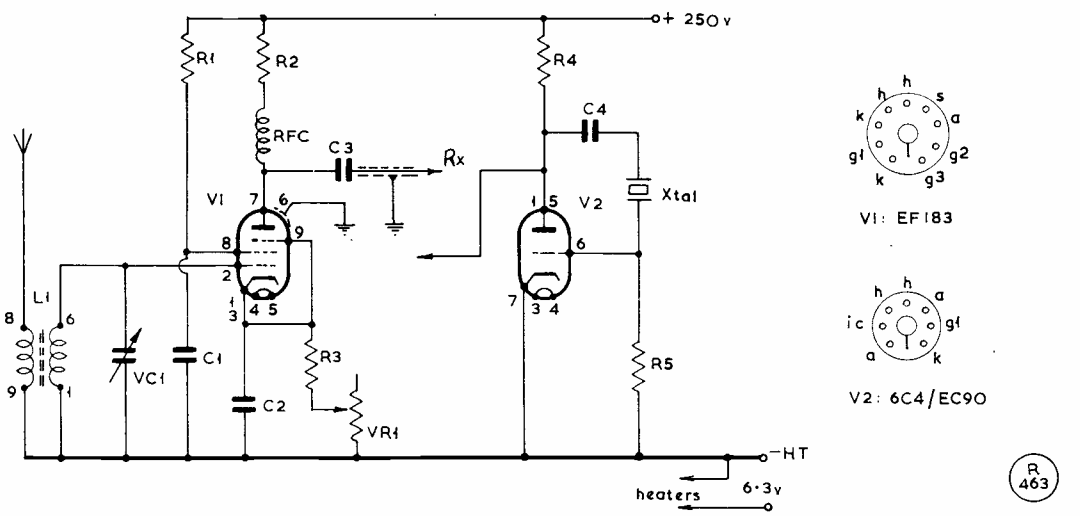
The crystal actually used is one of the surplus FT-243 types obtainable for a few shillings, and has a fundamental frequency of 7850 kc. Any crystal having its fundamental near to this frequency would also prove suitable. The *third* harmonic of the crystal is employed for 21 mc reception and the *fourth* harmonic for 28 mc, thus saving the price of an extra crystal and any associated switching.

The oscillator frequency is above signal frequency in both cases and therefore when tuning from HF to LF on the receiver dial you are in fact tuning the band from LF to HF, *i.e.* 2·550 mc-2·100 mc for 21 mc-21·450 mc, and from 3·400 to 1·700 mc for 28 mc to 29·700 mc.

Layout is not too critical as long as wiring is made short and direct in the RF stage. The only comment required about the construction is the flying lead connected to pin 1 anode of the 6C4, for injection. This should be insulated along its complete length and be of fairly stout and rigid wire. Its position may be experimented with but the writer came to the conclusion that bending the free end of the wire around pin 2 control grid of the EF183 was good enough. On no account should this lead make electrical contact with pin 2 of the EF183.

After checking all wiring power may be applied to the converter and a strong beat should be heard on the main receiver at 7850 kc, indicating that all is well in the crystal oscillator stage. Next, connect an aerial to the converter input, and converter output to main receiver aerial input using a short length of coaxial cable.

Tuning the receiver over 2·10-2·55 mc, with VC1 of the converter open approximately 25°, should produce a number of amateur signals on the 21 mc band; these should be peaked for maximum S-meter



The circuit of the converter. The CO gives a difference-frequency low in the main Rx tuning range and both 21 and 28 mc can be covered on the same coil with VC1. By switching out the crystal oscillator the front-end becomes a preselector and in this application a range of additional coils would enable other bands to be covered. Values are: C1, C2, C4, .01 μF; C3, 100 $\mu\mu$F; VC1, 100 $\mu\mu$F, tuning; R1, 33K; R2, 4.7K; R3, 180 ohms; R4, 47K; R5, 10K; VR1, 5K lin. pot.; RFC, 2.5 mH, standard; xtal, FT-243 type, at 7850 kc; V1, EF183; and V2, 6C4 or EC90. For L1, the Denco blue-range 5 will cover 20-30 mc.

reading (or maximum loudness) by means of the iron-dust core of L1. To receive 28 mc signals, tune the receiver 3·4 mc-1·7 mc with VC1 open approximately 160°. Each band is tuned on the main receiver and signals finally peaked up on VC1.

No difficulty should be experienced in setting up the converter and the improvement in stability and sensitivity will be noticed immediately. The only drawback with some converters of this simple type is that spurious responses appear all over the tunable IF range and spoil the whole effect.

No trouble of this kind should occur on the 15-metre band although on 28 mc a few do appear and are unfortunately unavoidable because the 10-metre band is so wide.

Power requirements are quite small, *i.e.* 200-250 volts at 15 mA or so and 6·3 volts at 0·45 amps., which might be taken off the main receiver, or a small power unit could be constructed.

By providing the HT lead to the 6C4 anode with a SPST switch, the converter can be used as a pre-selector covering 20-30 mc with the CO switched off. If additional coils are switched into the L1 position for all the amateur HF bands we have a pre-selector for 160, 80, 40 and 20 metres plus a pre-selector-converter for 15 and 10 metres

The converter has been in continual use for approximately 18 months in conjunction with a Lafayette HE-30 received and no trouble has so far been experienced. What was once an ordeal attempting to tune and hold SSB stations on 10 metres is now a distinct pleasure.

CRYSTAL-MIXER VARIABLE OSCILLATOR

EXPERIMENTAL CIRCUIT FOR BENCH WORK

THE crystal-VFO mixer type of circuit for generating the transmitter drive frequency is well known, and is much used in commercial circuitry. But it has useful applications in conventional amateur Tx circuits as well. For one thing, the principle ensures high-stability output with very simple construction, and, for another, it is a practical and useful way of employing those odd-frequency crystals, outside any band, which so many of us seem to have acquired over the years. Thirdly, and probably most important, the LF oscillator, which is the variable element, can be accurately calibrated over a wide frequency range.

The purpose of the present note is to discuss a simple one-valve type of crystal-VFO drive oscillator, which will be of interest to the experimenter looking for something new to try on the bench. He might well emerge with the best VFO unit he had yet possessed and then he can apply his ingenuity to transistorising it!

By using a multi-electrode valve—a X61M, which could be substituted by a 6K8—both oscillator circuits are combined in one envelope, so to speak, as the circuit diagram suggests. In the model, a 5905 kc crystal is used in Section A, and an LF oscillator tuning 1000-1500 kc in section B. The " A plus B " result is thus 6905-7405 kc, which is selected in the 7 mc output circuit tuned by C5; drive to the succeeding buffer amplifier stage is taken through C6.

The section B circuit can either be coils wound for the purpose or a commercial product of the appropriate range having " grid-reaction " or " grid-aerial coupling " windings. If the oscillator tends to squeg, HT should be reduced by increasing the value of R4. This can be checked by listening over the B-range on the receiver; the beat should be clean, strong and absolutely T9x.

Some Practical Points

The crystal oscillator, A-section, is mounted, together with the valve, above chassis; the 7 mc output tuned circuit is on the same level. The section-B oscillator, with its calibrated variable condenser C4, is sub-chassis, with a slow-motion driving head on the condenser.

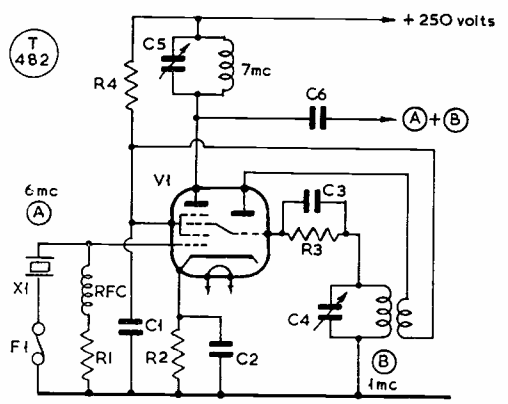
The low anode-grid capacity in section A permits the valve to be run with fairly high screen voltage, thus increasing the CO output. The crystal fuse F should be included, because it will prevent that item being blown by over-excitation.

To get going, procedure is as follows: Cut the B-section HT supply, and tune the crystal oscillator side in the normal way. Then switch in the LF oscillator and

Table of Values

Crystal-VFO Mixing Circuit

C1, C2	= ·005 μF	R4	= 25,000 ohms
C3	= ·0005 μF	A	= 6 mc crystal (*see text*)
C4	= 250-300 μμF tuning	B	= To tune 1,000-1,500 kc (*see text*)
C5	= 50-100 μμF tuning	F	= 100 mA bulb fuse
C6	= 50 μμF	V	= X61M, or 6K8
R1, R3	= 50,000 ohms		
R2	= 500 ohms		



An experimental crystal-VFO mixer circuit for bench work. The A (crystal) and B (tunable oscillator) frequencies combine to produce the output. The advantage of the arrangement is that the variable section of the circuit can be designed to work over some suitable low frequency range, greatly simplifying the problems of stability and calibration.

adjust for minimum dip. Listen on the receiver, and find the setting on C5 that gives output in the 7 mc range. The readings of C4 and C5 will react, in that a wide change on C4 will necessitate a readjustment on C5 for minimum plate current, and hence maximum output at the A-plus-B frequency. These points amount to the " feel of the circuit " and are best established by careful checking of the output against the receiver (for calibration) and in terms of grid drive into the following stage (for output).

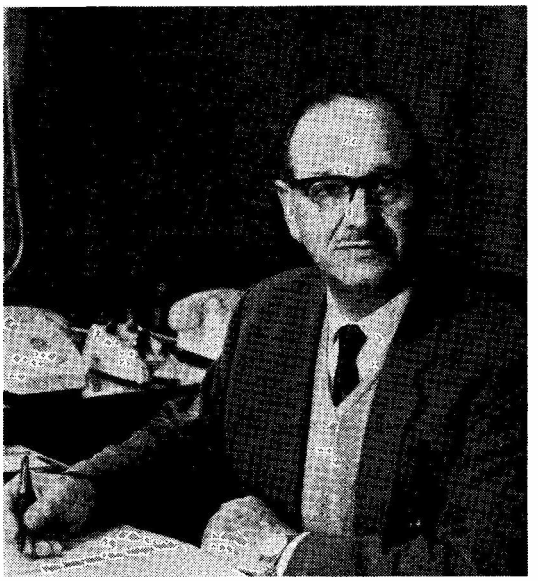
Since the A-frequency will be present in the output circuit, there are two particular points to watch: If coupling into the buffer is too tight, both frequencies (A and A+B) may be drawn if the output tuning is too near the A-frequency. " Too near " cannot be defined in precise terms, because it depends very much on the *Q* of the circuit tuned by C5. But, obviously, if the crystal frequency is well outside the band, it is not likely that the output circuit would ever be tuned near enough to the fundamental (crystal) frequency to draw both.

With the model, it was found that RF output over the whole 7 mc range was ample to drive a 6AQ5 doubler to 14 mc for a 6146 PA running at 50 watts.

As regards stability—which was the object of the whole experiment—the drift on the 7 mc output, checked against a BC-221 and various stable BC stations, was only a matter of a few cycles over a four-hour test run. Clearly, the stability depends upon the quality of the B-section of the circuit. But this is not difficult to achieve over 1000-1500 kc.

The actual choice of crystal frequency and LF range to tune on the oscillator will, at first, appear to depend mainly upon what is available. But, in fact, one has to be a bit careful to make sure that neither harmonics of the crystal fundamental *nor* of the LF oscillator fall within the amateur bands. The system can still be made to work even if they do, but it makes VFO setting under operating conditions rather difficult, not to say confusing, and some stage in the transmitter chain may pick up the wrong frequency; there is, in any event, obviously a limit to how close the wanted output frequency can be brought to the crystal frequency.

" . . . Said I'm a bit short of audio here . . . "



Recently elected to the Council of the Confederation of British Industries—the employers' representative body—Mr. Cedric Benham is chairman of Painton & Co., Ltd., Northampton, manufacturers of a wide range of specialised components for the radionics industry. He is also G4TZ, of Greens Norton, near Towcester, Northants., and has a nice rhombic-aerial installation for working the DX.

NICE PUBLICITY ITEM

In contradistinction to the sort of stuff about Amateur Radio that usually appears in the public print, the *Braintree and Witham Times* of May 5 carried an interesting story on the two-way A/TV working between father-and-son Ralph Royle, G2WJ/T and Jeremy, G3NOX/T, over a distance of about 12 miles, Great Canfield-Saffron Walden, Essex. They can ring up, talk and look at one another—and Jeremy's young family—with a bright and steady picture both ways. Their vision transmitters are, of course, on the amateur 430 mc band. Most of the gear at both ends is home-built and we would say that this is probably the only such father-and-son amateur set-up in the world. Grandfather G2WJ is a very well-known old timer, having started in Amateur Radio in the early 1920's. He is as fit and well and as active as ever.

WHAT DOES "A" DO?

The invitation on p.115 of the April issue resulted in quite a number of suggested replies—but none really hit the points we wanted to make. This only shows how difficult it is, in practice (and we get a lot of that!) to deal with such a situation. Correspondents are thanked for their endeavours to assist.

GD6UW ON THE ISLE OF MAN

ANOTHER SUCCESSFUL DX-PEDITION

J. A. LUSH (G3TGY)

FIVE times in the last seven years members of the Cambridge University Wireless Society have spent part of their Easter vacation on the Isle of Man. Regular readers of SHORT WAVE MAGAZINE will have seen accounts of previous expeditions, which have included details of almost every form of disaster. Determined that everything should go as smoothly as possible this year, we started planning soon after the start of the University year, last October. Our first discovery was that rather more people were interested in going than in previous years, so it was decided that we should split into two parties, each of which would spend about ten days on the Island.

Manufacturers responded with generous loans of gear for the expedition. It appeared that we should be able to set up two LF band stations, one on single sideband on 80m. down to 10m., and the other on 160m. and 80m. AM and CW, as well as portable stations for Top Band and twenty metres.

We were fortunate in being able to use an ex-Govt. Land-Rover belonging to one of our members, G8AXS. Those of us who went last year had not forgotten how heavy even the lightest of transceivers can seem when being carried under one's arm across Liverpool, and the vehicle certainly made it possible for us to take a lot more gear than in previous years.

What could have been a disaster for the trip came just a week before we were due to leave—the SSB transmitter which we were going to borrow disappeared in mysterious circumstances. This turned out to be something of a blessing in disguise, however, for a few frantic phone calls brought Mr. J. B. Lowe to our rescue with the loan of one of his transistorised FT-100 transceivers.

After that everything went smoothly enough, and the last day of term saw a heavily-laden Land-Rover set off for Liverpool, where we descended on the long-suffering family of G3SKT for the night. The crossing the following day was calm compared with that which the second party were to experience, and just over twenty-four hours after leaving Cambridge we reached our boarding-house overlooking Douglas.

Top Band

For 160 metres we had borrowed a Codar AT-5 and an Eddystone EA-12 from the manufacturers. This was an excellent combination with which we had no trouble at all, and we were never short of calls. The aerial was a 300-foot long wire, strung from skylight to skylight across the square, about forty feet above the ground. We spent almost all our time on CW, with occasional Phone sessions during the afternoon. Our best DX contacts were W1BB/1, W2EQS, and K1PBW (twice)—the first time we had worked Stateside stations on Top Band from the Island.

We had been given GPO permission to operate two stations simultaneously during the first ten days, using the callsign GD6UW, but after March 29 we had to use this call on the HF bands only. From then on we used GD3VBL and GD3VNQ on 160m. Total number of 160m. contacts was 370, of which 250 were by GD6UW.

HF Bands

Now to the HF bands. The FT-100 fed a Mosley trap vertical sitting on the window ledge of the top floor operating room. In the first few hours of operation we discovered that ten metres was wide open to the U.S.A., and from then on we were kept more than busy working W after W for hours on end. Occasional forays on to Fifteen and Twenty brought forth a reasonable crop of DX, but nothing really exotic was heard or

The HF-band station for the GD6UW expedition, with G3UDD (left) and G3VCR seeing to things. Their gear consisted of a Sommerkamp FT-100, an Eddystone EA-12 and a Swan Transceiver. Well over 1,000 contacts were made, with another 350 by GD3VBL, using the same equipment in the "CQ" SSB Contest.

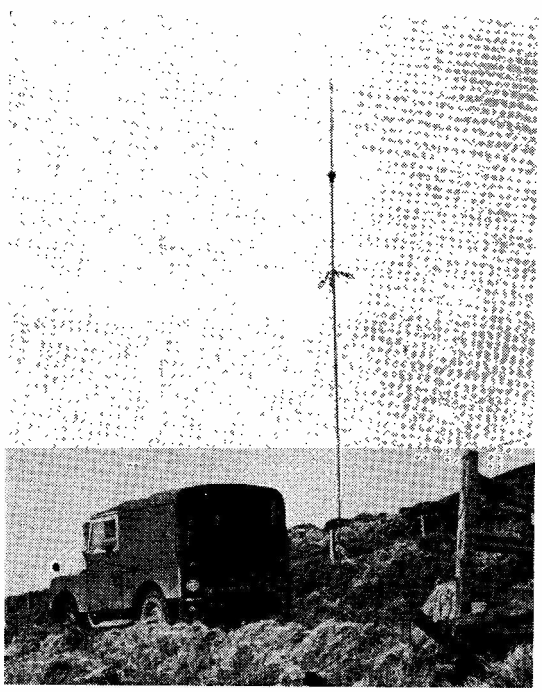
worked. A few days after our arrival we decided to put up the 80m. dipole that had been rolled up on an old cable drum since the previous year, and with this aerial we had no trouble in working into Canada.

In order to raise the American Phone stations on Eighty, we borrowed the EA-12 from the Top Band rig downstairs, and once we had got the aerial change-over sorted out we were able to operate split frequency quite satisfactorily. Best DX on this band was W1FZJ/KP4.

Later on, when the second party had arrived, 15m. and 10m. closed down somewhat, and it was decided that a simple ground-plane for 20m. might perform more satisfactorily. After some hasty improvisation, we were rewarded by getting the SWR reading on to the scale of the bridge; as a result, we found that performance into the U.S. had improved a little. The radials presented rather a problem, but we found the aerial worked quite well with them draped over the roof and across the room.

VHF from Snaefell

In any radio club a certain proportion of the members will deny the existence of any form of electro-magnetic radiation below 70 mc, and the C.U.W.S. is no exception. Once again the Ministry of Aviation—now the Board of Trade—had given us permission to operate on VHF from their repeater station right on the summit of Snaefell, 2030 feet above sea level. This year we decided to take gear for 2m. and 70 cm.



During the Easter expedition to the Isle of Man by the Cambridge party, some portable operation was essayed on 20m. The aerial was the ex-Army type that can be operated as a ground-plane. The Tx/Rx was a Swan Transceiver, with DC/PSU, and good results were obtained.

The first party for the GD6UW operation of the C.U.W.S. just before leaving Cambridge on their Easter expedition. Left to right: GI3RCB, G3TGY, G3RUZ, G3SKT, G3SUC—and the Land-Rover, which was found to be an almost indispensable element.

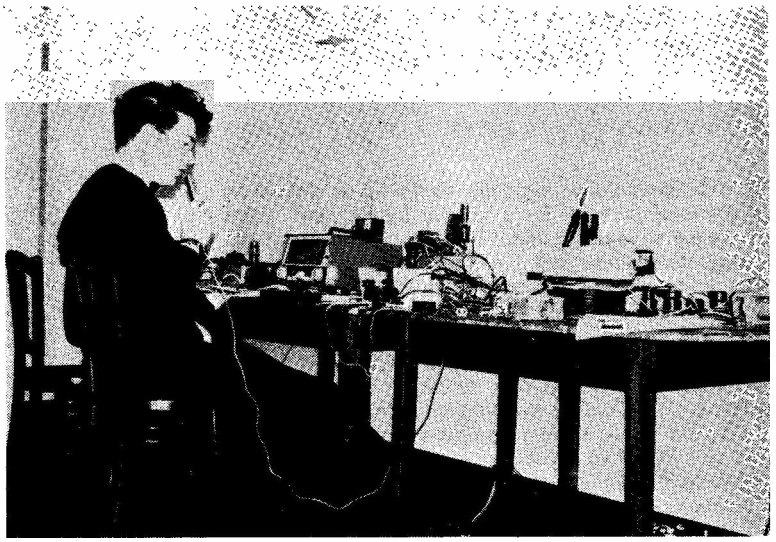
During the winter months there is no public transport to the top of the mountain, but the Ministry runs a small railcar up once or twice a day, to change over their duty officer, and we were able to make use of this.

On the first day, when the time came to put the aerials up, the wind was metered at 60 knots continuously, and we were very lucky in having a ready-made mast to which we could lash our own pole. We decided that the wind was much too severe for us to go out to turn the beams after dark, so we fixed them temporarily to the South-East.

On 2m. we used an 8-element Yagi, and on seventy centimetres a Parabeam, borrowed from J-Beam Engineering Limited. The two-metre transmitter, running a QQV03-20 in the PA, was on loan from the Pye Amateur Radio Society in Cambridge. G3SKT's 2m./70 cm. rig ran about 10 watts RF output from a QQV06-40 tripling on to 70 cm. and also did duty as a standby on two metres. Luckily, we never had to use it as such, and in fact the VHF station was completely free from faults throughout our stay. The 2m. converter used an E88CC in the front end, and the 70 cm. converter an AF139, sharing as a tunable IF a BRT-400K loaned by G.E.C. (Electronics) Limited.

We had a full sked list on VHF bands, with dates almost every 15 minutes from 1930-2230 BST on two metres and from 2230-2345 on 70 cm. We managed to make the vast majority of 2m. skeds first time, and everyone was very helpful in keeping to our standardised procedure. Seventycems was rather surprising: We were getting extremely strong signals from stations up to about 120 miles away—well out of line of sight—but beyond that we worked only four stations, the best being G3LTF in Chelmsford, at 275 miles.

Unfortunately we once again missed working ON4FG on Two, although we did hear a short burst from him on one occasion. Best DX on this band was in fact G3BHW in Margate (322 miles), with G3DAH in Herne Bay just a little closer. Activity was at its peak on the first Monday



The 160-metre station when operated by G3VBL under callsign GD6UW, from Douglas, I.o.M. The gear consisted of a Codar AT-5 and an Eddystone EA-12, with which 370 contacts were made, including W1BB/1, W2EQS and K1PBW.

night we were there, March 20, and we were able to work Home Counties stations with no trouble at all. During the rest of our stay conditions were rather flat, although it was only on a few occasions that the Wrotham beacon was inaudible.

The first party used the call GD3SKT, and made 129 contacts on 2m. and 39 on 70 cm. The other party used GD3STQ and their totals were 34 on two metres and 15 on seventy centimetres.

Out Portable

Down in Douglas the weather could be very different from that on Snaefell, and on several occasions we decided to go out portable. We had an ex-Army " golf-bag " aerial, which was ideal for our purposes, as it can be made to operate either as a ground-plane on 20m. or as a thirty foot whip for 160 metres. We had two portable rigs—a CSE 2A10/2AR combination for Top Band and a Swan transceiver with DC power supply for 20 metres.

For Top Band we went down to a pebble beach on the eastern side of the Island and worked a number of stations on the key. On Twenty we went to Sartfell, high up on the western side, where we found that performance was much the same as from the base location in Douglas.

The total number of contacts made by GD6UW was just over 1250—in addition GD3VBL worked 350 stations in the *CQ* World-Wide SSB Contest.

Acknowledgements

We are indebted once again to the GD's, particularly GD3EGF, for helping us out with all the bits-and-pieces we had forgotten, and also for entertaining us at their Club meeting.

QSL's are being handled by the " Dx-pedition of the Month " organisation, c/o Stuart Meyer, W2GHK, P.O. Box 7388, Newark, N.J., U.S.A., who also lent us the Swan and the vertical aerial assembly.

Our thanks to all the firms who lent us gear: Daystrom Limited, Codar Radio Co., Contactor Switchgear (Electronics) Limited, Eddystone Radio Limited, G.E.C. Limited, J-Beam Engineering Limited. Thanks also to J. B. Lowe, to the Civil Aviation Dept. Staff—and to our landlady Mrs. Teare for tolerating our activities for three weeks.

Plans are already being made for next year's trip, with talk of 20m. beams and 23 cm. We hope it will be as successful as this year's foray.

The first party consisted of G3's: RUZ, SKT, SUC, TGY and UBW, and GI3RCB. The second group were G3's: STQ, UDD, UUY, VBL, VCR and VNQ, and G8AIY.

SUBSCRIBERS AND OVERSEAS READERS—PSE NOTE!

When querying us about any subscription matter *please* give all the information you can. We have 1,000's of direct subscribers, and many 100's of bankers orders that have been running for years—so when someone writes in (from Singapore) to ask " if my subscription has expired " (and signs the letter " Ted "), or from Salford and just says : " Have not had any copies for three months though I pay by banker's order," it can take *hours* of detective work to identify the particular reader concerned and establish his subscription status. But if the fullest details are given—such as name, initials, callsign, full address, any recent change of QTH and (even approximately) when the subscription was started—or if you can only quote your Invoice No. (we issue a large blue-grey document with an AS. number on it to every direct subscriber)—all is made easy and plain sailing. Our indexing system works in two ways, by month of renewal and by name alphabetically (and it is an interesting fact that most *names* are duplicated or even triplicated, so that initials are essential and callsigns a great help). But those letters, from Singapore, signed " Ted," with no QTH . . . ! And if you are sending in a change-of-address for " New QTH's," please do say whether you are or are not a direct subscriber.

FIRST ATTEMPT AT A DX-PEDITION

GUERNSEY, APRIL 5-12, 1967

THIS Dx-pedition originally started as a discussion about where to go for a summer holiday, and whilst discussing this at the local club, a member suggested taking along some gear. A Dx-pedition then evolved and visions of rare countries formed. Since finances were limited Guernsey was chosen—also, none of the team had ever heard of a GC station on Top Band.

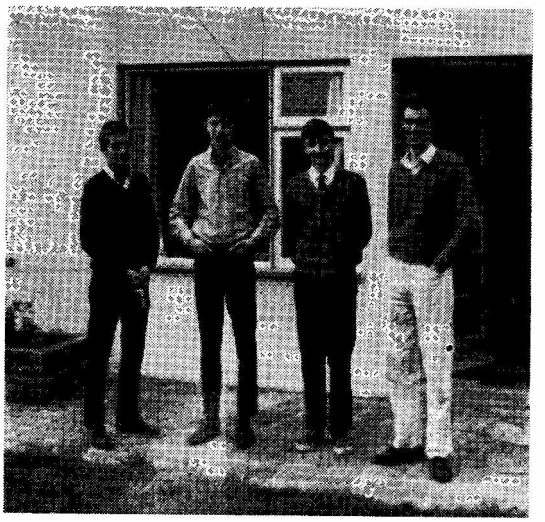
Enquiries were then made by G3VES about accommodation and transport. G3VOK already owned a DX-40U and then it was suggested: Why not activate the Island on all bands? Aerial problems then arose and G3USE's trap vertical was considered but was too big to be flown. An approach was made to Partridge Electronics who were good enough to assist by providing a complete ATU set, Joystick and mast.

Inspired by this success G3USE asked K.W. Electronics about gear. They also were very co-operative in offering a KW-2000, right down to the coax plugs. Hence a complete station was assembled.

On arrival in Guernsey, the owner of our chalet was approached regarding aerial erection, without objection. A 300ft. long-wire was run out into an adjacent field (which was discovered by G3VOK and G3USE to be a marsh). After a change of clothes the Joystick was erected and GC3VES was on the air and receiving 59-plus from Italy on Twenty.

The operators worked on a rota basis using their own callsigns and keeping the station running 24 hours a day for six days—a great credit to the KW-2000, which gave no trouble whatsoever.

An impression of the station run by the Luton boys, who each signed his own call with the GC prefix when taking his turn at operating.



The Luton Lot on the Guernsey trip, left to right: G3VOK, G3VES, G3VMK and G3USE. They had a good time and learnt a lot about DX-peditioning.

The GC prefix was in great demand on 160 metres. Outstanding signals were heard from G3NNY (Dunstable), and GM3SVK in the Shetland Isles, who was worked on practically all bands SSB/CW by all the operators.

Over 600 QSO's were made, 56 countries being worked in the brief stay, including KR6, VK9, VK, PY, HI8, 5T5, CR6, ZL, ZP, XE, 4X4 and EL.

Two interesting contacts were with G3RTH who was running 100 milliwatts and was 569 a good 150 miles away from Guernsey, and TF2WKE, who was worked on 14 mc and reported only slight QSB when the Joystick was removed from the roof and held at shoulder height by GC3VMK.

It is hoped to visit other spots in future years, this effort being by way of an apprenticeship in Dx-peditions.

Grateful thanks are due to the following, without whose help and assistance this adventure would not have been so successful: K.W. Electronics, Ltd.; Partridge Electronics; GC3ONJ and GC3UMX for local co-operation; and Mrs. L. S. Le Conte, The Glen, L'Ancresse, Guernsey, for accommodation and aerial facilities.

G3USE, G3VES, G3VMK, G3VOK

AMENDMENTS AND CORRECTIONS

In the circuit on p.721 of the February issue, G3TWS suggests that it would be better to connect the 6·3v. AC supply across the *whole* of T1 primary, and not as shown. And in the same issue, the valve in the circuit on p.743 should have been identified as V3. On p.747, February, an "earth-return" connection is needed between the base-line of the lower (C4-C6) section and the E-line of the circuitry above.

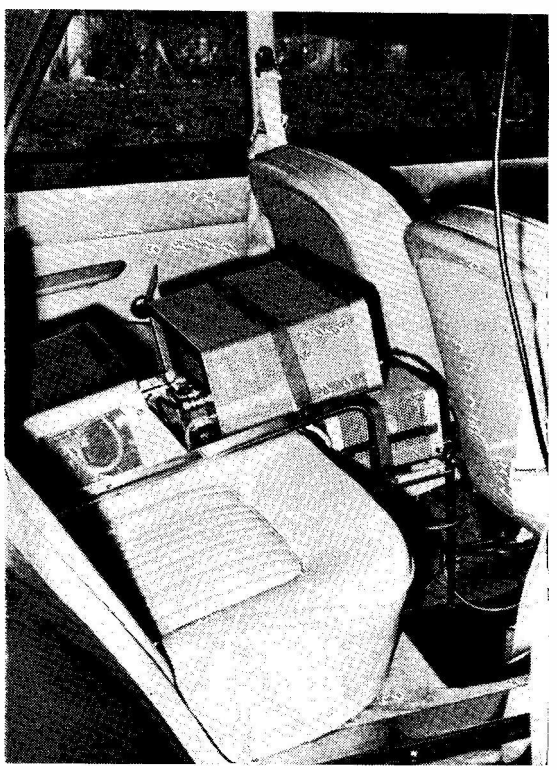
• • • *The Mobile Scene* • • •

SOLO MOBILE EXPEDITION—REPORTS AND PICTURES OF RECENT EVENTS—FUTURE PROGRAMME

OUR Solo Mobile Expedition on April 23 attracted fair attention—but it was one of the worst days for it in terms of Wx, being wet and cold with a threatening forecast. We should have done much better to have picked the previous Sunday! And apart from the weather, Top Band was in a patch of poor propagation conditions.

However, from the reports it seems that about 30 /M's must have been out in the southern part of the country alone, and some good contacts are recorded, with many fixed stations worked not normally heard at the home QTH. G3HBZ/M tried two sites—near Nettlebed on the A.423, and then Winter Hill, Maidenhead—and says that for him and the family the trip was highly successful, even though a lot of time was wasted trying to raise G6FO (!). Incidentally, G3HBZ mentions hearing a number of operators signing "portable-mobile," or "mobile-static," and suggests that the correct suffix must be "G3XYZ mobile."

G3MQT/M went out to a high point near Battle, Sussex, but had no contacts at all, though he tried for an hour. Some stations were heard, including G3VAB/M on Ditchling Beacon. G3MQT writes: "I do not entirely subscribe to the belief that a high location is necessarily a good one for long-range QSO's. I know of marsh land, at or below sea level, that is far better than some of the highest points in Sussex, because there is chalk and



Leslie Cooper, G5LC, of 3 Summer Avenue, East Molesey, Surrey, runs an interesting /M rig in his Rover 2000, capable of full two-way working from 160m. to two metres, using two completely separate sets of equipment. The assembly consists of a TW-2 12-watt Communicator and a KW-2000 giving 90w. p.e.p., with appropriate PSU's, mounted on trays made to fit the seat space, and easily demountable. The whole of the gear can be removed in three minutes. Antennae on the car are a CSE base loaded for Top Band, a Neutronics Hustler for 10-80m. and Withers Mini-Halo for Two. In operation, the equipment is preset for the required frequency range and, when using the KW-2000, searching is done by blind tuning with the left hand, one turn of the tuning knob in either direction giving about 10 kc of Rx search. The send-receive control is a switch on the microphone plate, which is suspended round the neck of the driver. With the gear as shown, results have been consistent and satisfactory, with WAC made and about 60 countries worked, and distances up to about 80 miles on VHF. Due to what G5LC says is "its peculiar body construction," the Rover 2000 proved very difficult to suppress, entailing in the end a visit to the Lucas Labs. in Birmingham. Leslie Cooper is, of course, a very well-known old timer, having started in 1922 with a crystal set, becoming G5LC in 1930. His other callsigns are ON8IZ and EI6BK.

sometimes iron in the hills, where blind spots are encountered. These geological conditions particularly affect the lower frequencies, of course "—with which observations we entirely agree, having experienced exactly the same sort of thing. What it comes to is that one should tour round a bit, looking for a good radio site, perhaps using an MF/BC station on the car radio as an indicator. To do this properly, one would really need a small BC Rx without AVC, and not giving too much audio output. It should then be possible to probe for good radio locations without much difficulty.

G3SXY/M went to the old Aust Ferry slip-way, on the Gloucester side of the Severn Estuary, and in a matter of about four hours logged nearly 20 stations and had nine /M contacts. He runs a Morris Minor, with a centre-loaded whip and home-built Tx, and says: "I had a very pleasant afternoon, and will be glad to support other similar ventures."

So let us try another one—this time on ***Sunday, June 11,*** 1430-1830 clock. The fact that on that day there is also a Rally in the south-eastern part of the country need not affect it. Remember that the object is to work other /M's from a fixed site, operating as a solo "fixed mobile" station. All we want is a brief report on results and experiences, with notes on location, band(s) worked and gear used. Address your report to: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, and mark your letter "Solo Mobile," to arrive by *June 16.*

* * *

Moving the North Midlands Mobile Rally to Drayton Manor Park, near Tamworth, Staffs., left the usual Trentham Wx behind, and gave a bright and sunny start to their function on April 30. The first mobile to arrive came from Plymouth, and other distant visitors were from as far away as Wales, Lancashire, Yorkshire and Scotland. Both the main ball-room and the Cedar Room were used for the trade exhibition, so avoiding the heavy congestion of previous Rallies, since the 7,000 sq. ft. available allowed for much wider gangways. The talk-in stations—G3GBU/A on Top Band, and G3MAR/A (two metres)—were kept very busy working mobiles in to the new venue.

The chairman of the organising committee, Bob Palmer, G5PP, welcomed the gathering, and introduced G3CNX, G3DML and GI3KYP, supported by G5UG and G3PWJ, who were present on RSGB business. Among the visitors was ZD8RB, just back from a tour of duty on Ascension Island.

As well as the local Club and Trade stands, the A.T.C. (with G3COY on 80m. talk-in), the Birmingham Tape Club and Photographic Society and the Model Boat Club were also represented. Catering is reported as being first-class. By 4.0 p.m. the ball-room was packed for the grand draw, for prizes donated by the trade, the Midland Amateur Radio Society and the Stoke-on-Trent Radio Club, the two organisations under whose auspices the Rally was laid on.

In his report on this event, the first of the Rally season, G5PP remarks: "We feel it was a good show, and we were pleased with everything." Well done, again!

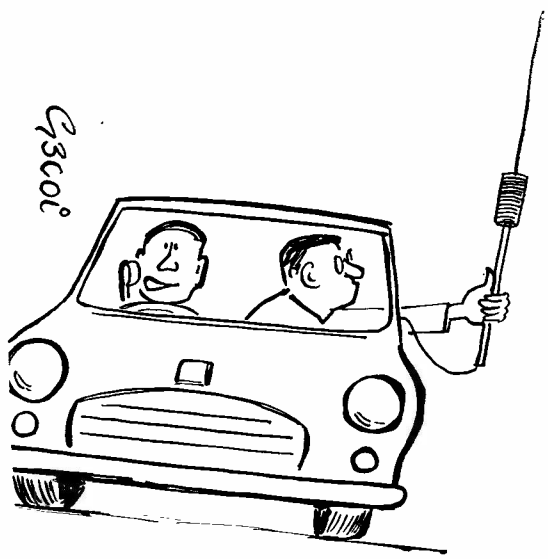
* * *

Also taking place on April 30, the Medway Mobile Rally was held at the British Uralite Works at Higham, Kent. Any Rally arranged so early in the season must take a chance with the weather, so we are glad to be able to record that it went off "in a dry state." The area close to the site was well larded with neat signs, although your correspondent (not being himself operational /M at the time) could have wished for some more signs at the main-road approaches. A separate car park was provided for the mobiles, but the large turn-out (something like 300 people all told), resulted in several of the /M's having to park in the other area, set aside for those who came unequipped.

The catering side must have been immeasurably helped by the facilities of the Uralite canteen building; the tea bar took up one complete wall, and was doing a roaring trade all the afternoon. Along the opposite wall were grouped the three talk-in stations: G2FJA/A, for Top Band; G6CH/A, on 4 metres; and G3VFC/A, two metres. Both the 160m. and 4m. stations found plenty of callers, though it must be admitted that the Top Band mobiles were somewhat handicapped by the power-lines running close to the site, and radiating a high level of sharsh. The two-metre station did not get a great deal of business, and one of its difficulties was QRM from a fixed station.

Also located in the canteen building were the side-shows, including as centre-piece the stand on which the prizes for the draw were laid out, attracting many people to take tickets. In the trade area, K.W. Electronics displayed their KW-2000A Transceiver, KW-201 Rx, and other items—with the covers unbolted, so that you could really see inside. There was also the inevitable Junk Stall, doing good business, as always.

The combination of good weather, to get the troops out; dry Wx during the Rally itself; and a well-organised



". . . Have got it on a temporary mounting at present . . ."

Bob Palmer, G5PP, chairman of the North Midlands Mobile Rally organising committee, at the microphone for the official opening. Left to right on the platform: G3CNX, GI3KYP and G3DNL.

programme, always results in a good show. The Medway event had all these ingredients.

* * *

Sunday, May 7, saw the eighth Rally organised by the Thanet Radio Society, for which they had an attendance of over 40 cars at their cliff-top site overlooking Pegwell Bay, Ramsgate. In spite of a dreary weather forecast, which probably kept the numbers down, there was sunshine and blue skies all day. On Top Band, 22 mobiles were worked in, and another four on two metres, and three on four metres. An early arrival (8.0 p.m. the previous evening) was VK2TX, touring Britain with a motorised caravan and a KW-2000 for keeping breakfast-time skeds with Australia—very nice, too! The prize-winners at the Rally were, for furtherest distance travelled, G3SWT/M; best 160m. contact, also G3SWT/M; most distant four-metre contact, G3VOF/M; and furtherest two-metre contact, G3OIZ/M. A "valve identification" competition was won by G3JKY/M.

Thanet always run an attractive little meeting, at an exceptionally favourable site (when the Wx is decent) and though their attendances seem small in comparison with the big shows, it should be remembered that Ramsgate is a long way east.

Seen at Drayton Manor in April, the occasion of the North Midlands Mobile Rally—the 70-centimetre /M aerial assembly carried by G8AQK/M.

* * *

With four more meetings in the list below, this year's Rally programme is now fuller than in any previous Mobile Season. We look forward to seeing some interesting reports, and Rally organisers are reminded that it is for them to make these available to us, as quickly as possible after the event, with a few good photographs (those that can be used are paid for on publication).

June 10-11: Mobile meeting organised by the Section Manche, R.E.F., at Mont Saint-Michel, at which any U.K. amateurs who happen to be in the St. Malo-Granville district will be very welcome. There is a camping area suitable for caravans, and accommodation can be arranged through: Gerard Blin, F2NX, 52 rue St. Paul, Granville 50, Manche, France.

June 11: Second Solo Mobile Expedition—*see* p.236. (Reports by *June 16*, pse.).

June 11: Mobile Rally at Mote House, Mote Park, Maidstone, Kent, organised by a radio amateur group in the Medway area, with G6NU as chairman of committee. Opening at 12 noon, talk-in stations will be on the air from 10.30 a.m. on 2-4-160m. Big raffle, trade exhibition, and a show of antique radio gear for collectors. Good refreshment facilities, family entertainment, side shows, ample

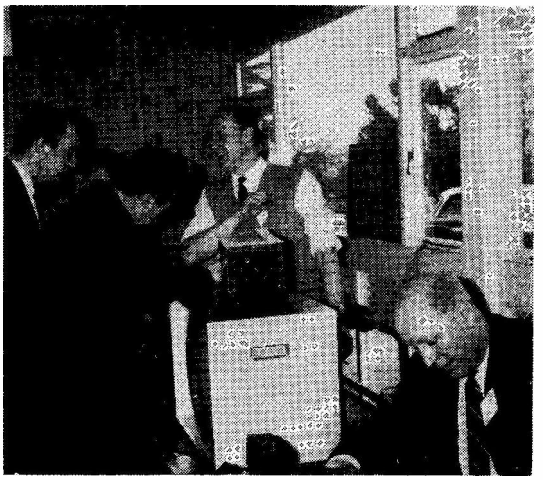
parking space, and shelter for all if it rains. Profits will be in aid of the Home for Muscular Dystrophy. Further information from: W. E. Nutton, G6NU, 42 Richmond Road, Gillingham, Kent.

June 17: Royal Naval Air Day Rally at the R.N. Air Station, Lee-on-Solent, Hants., organised by the Royal Naval Amateur Radio Society. Opening at 12 noon, flying display 2.30 to 6.0 p.m., full programme with modern aircraft and hovercraft. Talk-in stations on Top Band and 70·26 mc for 4m. mobiles. Prizes, children's playground, refreshments. Details from: Hon. secretary, R.N. Amateur Radio Society, H.M.S. *Mercury*, Leydene, Petersfield, Hants.

June 18: Hunstanton (bucket-and-spade) Rally, organised by the local group. Talk-in by G3ANM/P on 1980 kc and G3PMH/P on 145·15 mc.

June 18: Amateur Radio Mobile Society annual Rally at R.A.F. (U.S.A.F.) Station, Alconbury, near Huntingdon, Huntingdonshire. This is an active U.S.A.F. base, which also has a MARS (Military Affiliate) station operating on the HF bands. For visiting mobiles, talk-in will be given on 160m. and two metres. There is ample space for tents and caravans for those wishing to stay over-night, and there will be a dinner (cost 10s. per head, advance bookings with G3KVF, *QTHR*) on the Saturday evening. For the Rally itself, a huge hangar will house the trade show (with G3AGP, *QTHR*, i/c), and catering will be by the AFEX canteen. The usual A.R.M.S. tombola is being arranged, and it is hoped to have an interesting flying demonstration in addition to the static display of operational aircraft. Further details from: N. A. S. Fitch, G3FPK, hon. secretary, A.R.M.S., *QTHR*.

June 25: West of England Mobile Rally, the 10th in the series at Longleat House, near Warminster, Wilts.,



A group caught round the stand of the Lichfield Amateur Radio Society, at the North Midlands Mobile Rally on April 30.

off the A.362, Warminster-Frome road. The Rally area will be beside the lake, near the Lion Reserve, with refreshments available on site. This is a magnificent parkland setting, ideal for family picnics. Talk-in stations will be on the air from 10.0 a.m., on 1980 kc and two metres. Attractions include a trade exhibition and a grand raffle. Further details from: J. Thorn, G3PQE, *QTHR*. (*Tel. Winscombe* 2023).

July 8: (*Saturday*). Gathering of mobiles, organised by Stamford Radio Society, at Casewick Park, near Stamford, Lincs., opening at 2.30 p.m. on the occasion of A Grand Event to raise money for the restoration of the three historic churches of Barholm, Tallington and Uffington. This is a lovely park,

General view of the assembly hall for the Medway Rally on April 30, at Higham, near Rochester, Kent, for which about 80 mobiles were booked in.

General view of the Mobile car park for the North Midlands Rally at Drayton Manor Park, near Tamworth, Staffs., on April 30. There were visitors from as far as Wales and Scotland.

privately owned, and there will be numerous interesting side-shows. Talk-in will be on 1900 kc and 145·65 mc, and a DX-band station will also be set up in the area reserved for the radio amateur attendance. Further details from: J. H. Parrish, G2HOP, The Cottage, Uffington, near Stamford, Lincolnshire.

July 9: South Shields Amateur Radio Club Mobile Rally, at South Shields.

July 9: At Gilwell Park, Chingford, London, E.4, site of the International Scout Training Camp. Talk-in will be given on 2-4-160m. and 80m. SSB. Space for over-night camping and caravans. Trade exhibitions, instant raffle, competitions and tours of the Scout Camp. Information from: N. Miller, G3MVV, Avon, Gardiner's Lane, Crays Hill, Billericay, Essex.

July 16: Mobile Rally organised by the Worcester & District Amateur Radio Club, at Upton-on-Severn, Worcs.

July 16: Reading Amateur Radio Club Mobile Picnic at Childe Beale Trust Pavillion, Lower Basildon, Pangbourne, Berks.

July 16: Colchester Group Mobile Rally, to be held at Colchester Zoo. Talk-in on 2-4-160m. (*details later*).

July 23: Cornish Radio Amateur Club Mobile Rally at Pentire Headland, Newquay, Cornwall. (*details later*).

July 30: Saltash & District Amateur Radio Club annual Mobile Rally, at Calstock, Cornwall.

August 13: Tenth Annual Mobile Rally organised by the Derby & District Amateur Radio Society, at Rykneld Schools, Derby (*details later*).

September 3: Swindon & District Amateur Radio Club Mobile Rally at Lydiard Park, Swindon, Wilts.

September 10: Annual RSGB Mobile Rally at Woburn Abbey, near Luton, Beds., with talk-in on 160-4-2m. and 80m. SSB. All the usual attractions for this popular event.

September 15-17: Third International Amateur Radio Convention and Rally at Knokke, Belgium.

September 24: Harlow & District Radio Society annual Mobile Rally.

Organisers to Note: Reports and Rally arrangements to be covered in the July issue must reach us by June 10, *latest*, addressed: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, marked "Mobile Scene."

THE "NEW QTH" PAGE

This space is available for the publication of new callsign/addresses, or changes of address, for any U.K. amateur (including DL and EI but not overseas) who cares to avail himself of it. All you have to do is to send in your QTH—with name, callsign and address clearly written—on a slip separate from any covering letter, mentioning whether you are or are not a direct subscriber (this is only to save search-time in the office where a subscriber's change of address might be involved). All QTH's we receive are forwarded to the publishers of the American international *Call Book* for inclusion in the quarterly issue in preparation. In other words, if we don't get your QTH, the chances are that it will not appear in the international *Call Book*, for which we are the U.K. agents. While we accept any overseas reader's QTH, it is not actually published in "New QTH's" purely because of space considerations—we get a good many such every month—but *Call Book* action is taken automatically. Note that these QTH-handling facilities are available to any radio amateur, even non-readers of the *Magazine*.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for July Issue: June 9)

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

WE are now coming round to the season of outdoor and competitive events in the calendar of Amateur Radio; it is possibly apposite therefore to consider the question of the group—as opposed to the individual—approach to these things.

It does seem important to your old scribe that the club as a whole should define its attitude to a contest before the start, if only to avoid friction arising as between those who enter solely to see the prize, and the more numerous chaps who are more interested in just having a lot of fun. There is nothing more calculated to make a "win-or-bust" type hopping mad than a crowd of empty-headed old women of both sexes clucking away and drowning out that S1 DX signal—even though those same people are his best friends at any other time. In a rather similar way, the chaps who regard Field Day, for instance, as a fine opportunity to show off the latest YL conquest to the lads tend to be hurt when they are told to go away and stop making a nuisance of themselves in the operating tent.

What is necessary is that if a contest is to be entered by the group, it shall be made with a defined objective, either to win, or to train new operators, or to show off the Club to the public, or just for amusement—and if the latter, it is as well to make sure that the best operators are all put on to the operating roster together, preferably at times when the socialites are as thin on the ground as possible.

Another thing that does matter very much, if the *post-mortem* meeting is not to be one of mutual recriminations, is that there should be a list of the folk who glibly promise to turn up when the site is being set up, and, even more important, when all is over and it only remains to pack up the bits and pieces and go home. It is really quite amazing how many people will run a mile at the sight of a job of work!

A final point to remember is that these events are usually on an annual basis, so you may want to use the site again; and if you leave a mess then chances are both the club and its members will get a bad name. In particular, it is well to remember that the land may be used for grazing, so if maintenance of the gear is found to be necessary, any bits of wire or solder, nuts and bolts or what-have-you must not under any circumstances be allowed to fall to the ground and make a hazard for animals. Copper wire chewed or stuck in a foot can lead to the loss of the animal, which is part of the farmer's living.

ROUND THE CLUBS

Our first this month is from the **Mid-Sussex** crowd, who have an informal on June 7, at Lindfield Primary School, Haywards Heath; but on the 21st, a Portable/Mobile Evening is the matter in hand, the venue for which is to be the Jack and Jill Windmills, Clayton. This is on the B.2036, and the map reference is TQ 303135. These are both slated to start at 8 p.m.

Over at **Reigate,** there seems to be a certain amount of "geeing-up" going on, to judge by the editorial in the current issue of the newsletter. However, at the meeting on June 14, at the George and Dragon in Cromwell Road, Redhill, Mr. A. Browne is to give a lecture on "A Stellar Interferometer," which should ensure a large attendance. An outside activity on the 10th is to be the operation under the Club call, G3REI/A, at the Reigate Grammar School Summer Fair, probably on the Top Band and four metres, which should rake in a few new members.

Sorry to hear that the editor of the **Wirral** sheet has been under the weather, but notwithstanding this the June programme is quite ambitious—a start is made on June 7, at Harding House, Park Road West, Birkenhead, with a *post-mortem* on the NFD event, followed on the 21st by a Fox Hunt, and rounded off nicely by a visit to the Port Radar Station of the Mersey Docks and Harbour Board.

North Liverpool now has a Radio Club, which came formally into being in February this year, although in a less formal manner it had already had a nucleus getting together for several months. They have just moved into new premises in Waterloo, where there is a shack available; every other Friday evening seems to be the form, although we have no details as to the nature of the activities.

In September, **Maidstone** YMCA group will be moving into the new building from their temporary place at Mote House, Mote Park, where they are in session every Wednesday evening. As a result of the projected move, the evenings of June, July and August will be devoted to films and to the construction of small items which will be needed at the new Hq.

At the **Torbay** AGM held recently, the president, G5SY, announced his retirement from the office after 20 years service and 57 years of Amateur Radio activity —a wonderful record indeed.

* * *

Many people feel that one of the nicest things one can do at the club is to listen to a talk by a member or a local chap about his Amateur Radio operation from some exotic DX spot or other. This happened to the lads at **Mansfield** recently when they heard MP4BBA, Phillip Denby, discussing his activities when he visited them. They continue to get together at the New Inn, Westgate, Mansfield, on the first and third Friday in each month.

In a different sense, a similar thing happened to the **Loughton** fellows, when they listened to a tape of a contact between G3JBS and VK6NK, the latter being until recently better known as G3NKX, who was one of the founder members of the Loughton club. Normal meetings in this case also occur fortnightly, at Loughton Hall, under what is described as a "do-it-yourself" policy; a pity we cannot advise which evenings to reserve, but a line to G3TUM at the address in the panel should give the necessary information.

We do not know the venue for the **Guildford** events, but the dates are June 9, programme to be confirmed; and on the 23rd an Evening Out, with the arrangements to be confirmed. A pity, this, but rather forced on them by the fact that they have only just cleared the AGM hurdle and the dates for the new session are not yet filled in by the new committee.

The **Bromsgrove** lads evidently think the world of *their* committee—they have just been re-elected *en bloc!* On April 28, they made what would have been a sentimental journey for your scribe, to visit the Central Automatic Exchange in Birmingham. On July 1, an exhibition station will be set up at the Garden Party of the Ladies Branch of the local British Legion, and on Saturday 8th, an informal at a local hostelry is to be held.

* * *

Several weeks ago, the **Lothians** crew went on a visit to Turnhouse Airport, and more recently this was followed up by a talk on "Aircraft Navigation" by Sandy McWalter, GM3TSZ. For the forthcoming events list and details of the venue, it is suggested that a call be made to the secretary.

"Nothing but the Best" seems to be the **Lichfield** motto—in mid-October they are hoping to have a day trip by air to Belgium from Birmingham Airport, at a cost per head, including meals and sight-seeing tour, of £9 10s. This seems an enterprising idea. For the month of June, there seem to be three sessions laid on; on the 5th they invite all interested to turn up at the Swan Hotel at Lichfield for the well-known Heathkit lecture-demonstration, followed a week later (the 11th) by a Treasure Hunt, and on the 20th a talk at Hq. on the subject of Stabilised Power supplies.

Dutch Week at the **Medway** Towns means that June 17 is set aside by the local group for a station signing G2FJA/A, to be operated from the Riverside Rooms in Chatham, looking for PA's in particular; skeds will be welcomed. Again on July 22, they are out-of-doors, this time at the B.P. (Kent) Ltd. Social Club, Hoo, Rochester, Kent, this time signing GB3BP, and looking out for contacts, especially with any members of the B.P. group staff.

A most unusual event in these hard times is a reduction in the cost of living—and this is what the **Cray Valley** committee have managed to do by reducing the annual Subscription from 25/- to one pound. This sort of economy does not seem to have made the programme any less interesting, and this is clearly demonstrated on June 1, at Eltham Congregational Church Hall, Court Road when the lecture, to be given by Mr. T. N. Morrison, will be entitled "International Telecommunications." At they like to meet twice in the month the alternate meeting will be on the third Thursday, this time at the All Saints Church Hall, Bercta Road, New Eltham, S.E.9.

The last Thursday in the month, at St. Martins Court Ashford, Middx, is the time to look for the

At the 21st Anniversary Dinner of the Grafton Radio Society—one of the best-known and most active Clubs in the London area—they had their founder-member, G2AHB (left) present, with G2CJN (president for the current term) who was also in at the beginning and was hon. secretary for many years. The present hon. sec. is G3SIL (right).

Echelford gang in their lair—but make sure you do not park your car in such a way that ambulances can be held up on their way into St. Martins Court. The June session is to be a special affair, and the lecture is being given by someone hiding behind the title of "Overseas Visitor." We are prepared to gamble that several members will attend just to satisfy their curiosity!

A "letter to the editor" provides the main piece of interest in the current **Wolverhampton** news-sheet; an apologia by an admitted pirate for his activities! Give him his due, he quoted his name and address and did not object to publication; however, the letter only serves to underline the vanity of a man who, pirating while studying for the R.A.E., presumes to explain that there is nothing skilled in electronic circuit design! However, the undaunted members will still foregather at their Neachells Cottage Hq. in Stockwell Road, Tettenhall on June 5 and 19th—on the former date to hear G3RWR discuss a new receiver, and on the latter for the purpose of considering D/F in preparation for a suggested local contest.

Acton, Brentford and Chiswick hold their next affair on Tuesday, June 20, when they will have a *post-mortem* on the R.A.E. paper, and welcome all those who care to attend for the purpose of comparing notes. As usual this one will be taking place at 66 High Road, Chiswick, starting at 7.30.

* * *

Every Thursday evening the Church Hall in High Street, **Shefford** sees a meering of the local group, which kicks off with a 15-minute Morse session starting at 7.45 p.m.; at 8.0 the meeting proper gets under way, and this month we find June 1 devoted to preparation for Field Day and the 8th to a discussion of the result, while on the 15th Part 2 of the series of lectures on Basic Electronics will be given. On the 22nd a session of "Any Questions" should be both amusing and instructive, while at the last meeting, on the 29th, a Junk Sale and general natter rounds out the month nicely.

Local Oscillator is the title of the **Dudley** publication, which points out that the June meetings are at the Art Gallery, Dudley, at eight o'clock on the 2nd, 16th, and 30th. At the time of writing it was not known for certain what the details of the programme would be, owing to both the chaps concerned with this part of the organisation being fully occupied with the business of examinations.

On the other hand **Chester** do not even mention the dates of their meetings for the month, although we gather they recently had a very pleasant annual dinner attended by about 45 people, which included a prize draw and the showing of a film of the Chester DX-pedition to the Isle of Arran.

Severe QRM was caused to the **Southport** chaps by a local station during their recent D/F contest, which was otherwise very much enjoyed. We gather the lads have a pretty good idea where this character is and how to deal with him. Meantime, another D/F event comes off on July 9, and in the interim some lectures are planned but not, at the time of writing, firm.

Chippenham recently held their first AGM, and were able to look back on a very successful first year of operation; it is to be hoped that the new committee is as successful and receives as much support. The name and address of the new secretary is as shown in the Panel.

On now to **Saltash,** who can be found at Burraton Toc H Hall on alternate Fridays; it is pleasant to see how their *Tamar Pegasus* has perked up again after the recent talk about it folding. June 2 is an "Evening Out" operating VHF, while on the 16th at Hq. there will be a natter about the Mobile Rally arrangements. This is to be followed on June 30 by another evening out, this time with a barbecue. Both the outdoor meetings will start from Hq., at 7.15 p.m.

It has on many occasions been said that Amateur Radio is a hobby one can easily become obsessed with—unless one is a member of **Bristol ARC,** who in the past few months have lost the G4UZ Trophy to the Bath group at skittles, and the QSD Cup to Chippenham at darts! In the interim, we notice they do a little Amateur Radio, and in June this means, apart from NFD, a D/F Hunt on the 11th; a station at the Scouts Fete, Arnos Court Park; and on the 25th, a trip to Longleat for the Rally.

Having recently had an AGM, the committee of the **Surrey** Radio Contact Club are busily organising the next year's programme of events, which are to be held at the Blue Anchor in South Croydon. For more details contact the Hon. Sec. at the address in the Panel.

If one is in the area served by the **Verulam** group, the date to reserve is the third Wednesday of each month, when it is possible to get together with the locals at the Cavalier Hall, Watford Road, St. Albans; each month there is something of interest, as for instance, in August G3NOH talking on VHF Transmitters, and in the following month G3DGN lecturing and demonstrating his CW gas laser. Your scribe was amused to note that Verulam want to borrow a sundial for NFD so as to tell the time of their contacts!

RAIBC mention the proposal to set up a tape news section to complement their many other activities, and acknowledge the gift of a Braille Avometer, for which they are arranging that the instructions will be taped; various donations from clubs and individuals; and a mention of the Hamfest at Mote House, the Home for Muscular Dystrophy patients, many of whom are interested in radio.

* * *

Cornwall is a large county, and so the Cornish lads have their meetings in various places. The first Thursday in each month is the main meeting, at the SWEB Club-room, Poole, Camborne, while the second and third Thursdays are, respectively, given over to the SSB

IMPORTANT !

Reports for this feature must reach us by the due date—see head of article every month—and include the full QTH and telephone number (if available) of the honorary secretary, for the Secretaries' Panel. Scribes who undertake regular reporting are asked particularly to watch these points. Reports for "Month with the Clubs" should be addressed: Club Secretary, Short Wave Magazine, Buckingham.

group and the VHF addicts, both these affairs being at the Coach and Horses, Truro. Our note about the sad accident to their secretary, Martin Harvey, brought them in a flood of enquiries as to his well-being. The latest news is to the effect that Martin is now out of hospital, can walk with some assistance, and is also able to carry on a conversation, although he has a long way to go to regain full health. Let us hope he continues to make good progress.

Three meetings are slated for the **Salop** boys in June: On the 8th, when they are to go round Shrewsbury Telephone Exchange; the 22nd is set aside for G6CJ's tape and slide lecture on "The Human Machine as Radio Operator," at the Old Post Office Hotel, Milk Street, Shrewsbury; in addition, on the remaining Thursdays of the month the Club station will be put on the air from the same address.

The **North Kent** crowd seem to devote a lot of their newsletter to the AGM, which will be past by the time this piece sees the light of day, and to advertising the Mote House Rally—which is just about the best reason for this lively lot to omit to mention the programme from the paper—but no doubt a phone call to the hon. sec. (*see* Panel) will reveal something good.

Harlow are still in the Old Barn in First Avenue, where they have sessions each Tuesday and Thursday evening. In addition there are visits to places of interest being laid on, these latter being restricted to paid-up members—a good way of blackmailing people into paying up! Just after this reaches the bookstalls, on May 30, G3KFE will be talking about the tricks involved in getting Shortened Aerials to Radiate.

"Flip-flop" is the intriguing title of one of the feature articles in the **Midland** Amateur Radio Society (MARS) *News Letter*, which contains a useful note on the reasoning which led one local amateur to choose 4m. for his /M activities. As for the programme, this is based on the Midland Institute in Margaret Street, Birmingham 3, where the gang are to be found on the third Tuesday in each month, unless otherwise notified. And as we notice they are putting up a Cup for the best lecture it would seem likely to be well worth a visit!

Challenge is a good name for a magazine, and there can be no argument that the Norfolk crowd have a very good magazine with that title. This time there is a very interesting piece on sunspots, and a thing called Topical Technics which ran the gamut from Philosophy, through Integrated Circuits and Tunnel Diodes to the

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
A.E.R.E. (HARWELL): V. J. Galpin, Building 347.3, A.E.R.E., Harwell, Didcot, Berks.
BEDFORD: K. Hatton, G3VBA, 49 The Briars, Kempston, Bedford.
BRADFORD: E. Barker, G3OTO, 63 Woodcot Avenue, Baildon, Yorks. (*Shipley 58269*).
BRIGHTON TECHNICAL COLLEGE: R. A. Bravery, G3SKI, 7 Copse Hill, Brighton (*506418*), 5.
BRISTOL: E. J. Davis, G3SXY, 72 North View, Westbury Park, Bristol 6.
BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
BROMSGROVE: J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.
CHESTER: P. J. Holland, G3TZO, Field House, 19 Kingsley Road, Gt. Boughton, Chester.
CHIPPENHAM: N. Cutter, G3PQG, 1 Fosseway Close, Colerne, Chippenham, Wilts.
CORNISH: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.
CRAWLEY: R. G. B. Vaughan, G3FRV, Tralee, 5 Filbert Crescent, Gossops Green, Crawley (*23359*), Sussex.
CRAY VALLEY: C. W. A. Davis, 6 Braemar Gardens, Sidcup, Kent (*FOOtscray 5077*).
DORKING: N. Blackmore, G8ARH, 39 Dorking Road, Gt. Bookham, Surrey.
DUDLEY: R. Fisher, G3PWJ, 63, Swan Crescent, Langley, Oldbury, nr. Birmingham.
ECHELFORD: D. Walmsley, G3HZL, 153 Worple Road, Isleworth, Middlesex (*POPesgrove 3239*).
EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middlesex.
FARNBOROUGH: D. G. Arigho, G3NVM, 6 Frensham Close, Yateley (*2174*), Camberley, Surrey.
GRAFTON: E. A. Rudolph, G3SIL, 29 Pangbourne Drive, Stanmore, Middlesex.
GUILDFORD: A. Wilkes, G3SLH, Schiehallion, Hookley Lane, Elstead, Godalming, Surrey.
HEMEL HEMPSTEAD: J. B. Adams, 8 Lindlings, Long Chaulden, Hemel Hempstead, Herts.
LICHFIELD: A. N. Heeley, G3PFT, 39 Somerset Avenue, Rugeley (*2930*), Staffs.
LOTHIANS: A. J. Masson, GM3PSP, 20 Merchiston Park, Edinburgh, 10.
LOUGHTON: J. M. Stuart, G3TUM, 10 Stewards Close, Epping, Essex.
MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (*20107*), Berks.
MAIDSTONE: R. E. Oxley, 1 Elm Grove, Maidstone (*58182*), Kent.
MANSFIELD: F. N. F. Bewley, G8HX, 116 Westfield Lane, Mansfield, Notts.
MEDWAY: P. Carey, G3UXH, 29 Miskin Road, Hoo, Rochester, Kent.
MIDLAND: C. J. Haycock, G3JDJ, 29a Wellington Road, Handsworth, Birmingham.
MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
NORFOLK: W. Higgins, G3PNR, 13 Falcon Road East, Norwich, Norfolk, NOR.88R.
NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath (*8655*), Kent.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (*64239*).
PLYMOUTH: G. Clark, 19 Beverston Way, Widewell, Roborough, Plymouth.
PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey CR4-6DB.
R.A.I.B.C.: Mrs. Frances Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
REIGATE: D. Thom, G3NKS, 12 Willow Road, Redhill, Surrey (*Reigate 45033*).
R.A.F.A.R.S.: *Secretary's Name and Address Wanted.*
SALOP: W. Lindsay-Smith, 22 Kingswood Crescent, Copthorne, Shrewsbury.
SALTASH: D. Bowers, 95 Grenfell Avenue, Saltash, Cornwall.
SHEFFORD: D. A. Pike, G3VMI, 11 Hazel Grove, Stotfold, Beds.
SOUTH LONDON MOBILE: C. Malcolm, G3UYN, 41A Cambrai Road, Balham, S.W.12.
SOUTHPORT: N. K. Waring, 33 Chestnut Street, Southport, Lancs.
SOUTH SHIELDS: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, nr. Leeds (*Batley 3925*).
STOURBRIDGE: R. A. MacIntosh, 50 Field Lane, Oldswinford, Stourbridge, Worcs.
SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon, Surrey CRO-7HS (*ADDiscombe 5982*).
SUTTON COLDFIELD: J. E. Symes, G3LNN, 20 Plantsbrook Road, Walmley, Sutton Coldfield, Warwickshire.
TORBAY: D. T. Hind, G3VNG, 46 Thurlow Road, Torquay, Devon.
VERULAM: J. Thomas, G3RXA, 9 Highland Drive, Hemel Hempstead (*55136*), Herts.
WESTMORLAND: N. Stanley, G3UEC, 9 Castle View, Sedgwick, Kendal, Westmorland.
WIMBLEDON: K. Alexander, 23 Pepys Road, West Wimbledon, London, S.W.20.
WIRRAL: J. J. M. Phillips, G3PXX, 52 Allans Meadow, Neston, Wirral, Cheshire.
WOLVERHAMPTON: J. P. H. Burden, 28 Coalway Road, Wolverhampton.

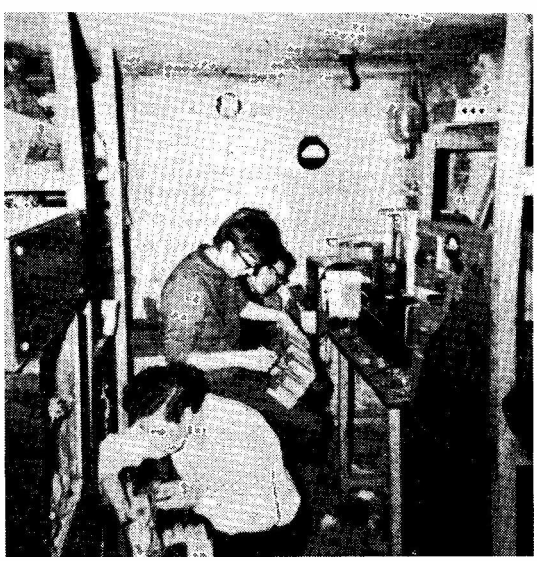
very useful concept of Duality. Perhaps the fact that the Norfolk publication only comes out every few months has something to do with it, but the editor is certainly to be congratulated. Meetings appear to be held each Friday at Old Lakenham Hall, Norwich, the 5th being given over to the NFD *post-mortem*, and the 19th to a Junk Sale, the intervening Fridays being informal.

Now to SARA, the association of South London Mobile Club, Purley and Wimbledon. Taking **Purley** first, we find them on the first and third Friday of each month, at the Railwaymen's Hall, Whytecliffe Road, Purley; thus on June 2 there is an informal Natter Nite and discussion of arrangements for NFD, and on June 16 the very important matter of the AGM. In addition there is a trip to the A.R.M.S. Mobile Rally at Alconbury organised for the weekend of June 18. **South London Mobile** also have been through the Annual General Meeting, and as a result do not as yet know in detail the arrangements; but they are in no doubt that they will be in session on the second Saturday at the Clapham Manor Baths. As for **Wimbledon,** they give us no detail at all this time, and so we have to refer you to the Panel.

* * *

Plymouth are yet another group who have just been through the Annual General Reshuffle, as the Panel shows; thus, yet again, the programme is not quite decided, but the indications and hints dropped in the hon. sec.'s note sound very fine indeed.

June in **Edgware** implies that in addition to Field Day, a station is to be put on in the same weekend at the Colindale Hospital Fete—someone *likes* punishment!—as well as the normal affairs which occur on 12th and 26th of June.



An impression of the shack of Southampton University Radio Club, G3KMI, with G3WEA and G3WFN, assisted by SWL Washington, hard at work dismantling some surplus equipment. Tx/Rx gear for G3KMI includes a K.W. Viceroy, an AR88D and a 10w. rig for 80/160m. They can get their aerials high, to about 160ft. above ground level, and some good DX has been worked, including HI8XAL and W/VE on Top Band.

New reporters to this piece are the **Hemel Hempstead** crowd, who have their meetings every other Friday as and from April 21, in the Puckles Lane Hall, Hemel Hempstead; thus the 2nd and 16th of June are normal sessions and the 30th is set aside for yet another AGM (your scribe will have to renew the letters A, G, and M on his typewriter soon at this rate!).

A Hair-Raising Experience has befallen the **Northern Heights** gang—G3IKS talked about Lightning—and it is said that never has the lecturer been heard out in such an awed silence. G3MDW has been " lumbered " with the job of secretary-treasurer once again, and Mary, G3OMM, likewise takes on the task of keeping the minutes. On June 7 Manchester Club is to be visited, while the 10th is set aside for a station to be run at Halifax Charity Gala. This is no sooner done than they are off on the following day to visit Skelton Transmitting Station near Penrith; a ragchew rounds things off on the 21st.

Last month we knew them as the Kendal Club, but this month we pay respects to the **Westmorland** Radio Society; this change of name is aimed at getting hold of the rest of the types in the county as members. The first and third Friday at the Annexe to the Allen Technical College, Sandes Avenue, Kendal, is the venue, and all are welcomed.

Got One?

Our recent notes as to the said difficulties with their transport of the **Dorking** chaps has a sequel. They managed also to crack a cylinder-head and are now on the lookout for a replacement; this is the 1946-1953 type 2050 c.c. engine as fitted in the Type LC Morris van. *Not*, we hasten to add, the B.M.C. engined device which looks rather similar. Any assistance will be appreciated.

The father-and-mother of all Junk Sales was recently held at **Crawley;** but this month they turn to the matter of Top Band DX, by way of the W1BB Tape-and-Slide Lecture, booked for June 28. Visitors are always welcome, and should contact the hon. sec. for up-to-date details.

A nice thought appears in the **Farnborough** note this month. They have a club project in hand for a transistorised GDO, and say that anyone can obtain an Initial Design Board for this on request at meetings, or by letter to the Secretary. They foregather on June 13 to hear Mr. J. H. Giffard talk about the Pye Radio-Telephone gear, at the Model Railway Enthusiasts' Society, 310 Farnborough Road, Farnborough, the time being 7.30 p.m.

Tuesday, June 6, at Longlands School, Brook Street, **Stourbridge,** is the place to meet the chaps in the local group, and to hear Frank Bills, G3CLG, and the hon. sec. together talking about " Odds and Ends."

G3OTO is Secretary of the **Bradford** group, as a result of a certain amount of brainwashing at the recent AGM when he was persuaded to stay in office. The June programme includes " an inquest over the corpse of the NFD entry " (we hope not!) on the 13th, and a visit to the Greenside Woolcombing Company works in Bradford, which is arranged for the 27th.

The Spen Valley Amateur Radio Society annual dinner took place on April 15, with about 60 people present. Left to right are: N. Pride (hon. secretary, a job he's been holding down for as long as we can remember); G3HPD, the president; G6LD, engineer i/c Emley Moor TV station, the guest speaker; and L. Metcalfe (hon. treasurer, Spen Valley A.R.S.).

Celebrations

Our note about the **Grafton** 21st Anniversary Party, in the April issue, was followed up by a letter from G3SIL which indicated that things went with a swing, and that the founder-members present, and indeed all who were there, look forward to the next twenty-one years of successful operation, and to the next Party to celebrate it! It you want to know a group with probably the best record of sustained success in the country, look them up at Montem School, Hornsey Road, London, N.7, each Friday evening in Room 35. And while we are on the subject your old conductor boobed last month in that he mentioned other meetings each week, which are in fact set aside for the R.A.E. class and the Morse session. As the programme details, these are usually mentioned during the course of the Grafton Top Band Net, each Wednesday evening at ten, around 1970-1980 kc, with G2CJN in the chair.

Another anniversary is also celebrated, this being the 10th year of the **South Shields** *Spectrum*, who mark it in a suitably modest fashion by turning the duplicator " skin " on its side and thus making it look different—but if this issue is anything to go by it doesn't need any artificial boosting! The affairs for June are given due prominence by being put in a nice big " box " to catch the eye, and from this we gather that apart from Field Day, there is to be an inquest on the Contest on Friday, June 9, and a session on the 16th, for which the programme is still to be finalised.

* * *

How nice to know that someone reads this piece—**Sutton Coldfield** gained three new members as a result of the note in the April issue, who promptly took the hon. sec. to task for not giving us the time of kick-off! John is quite sure this time though—Monday, June 12, at 8 p.m., the venue being the " Fox " at Walmley, and the lecture, by G3JZF, being on the subject of Closed Circuit Television.

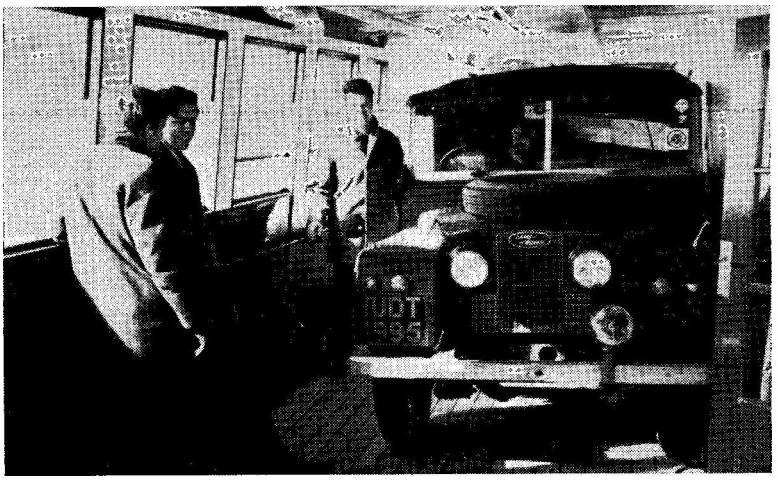
Tale of woe from the **Bedford** crew—having got and decorated a fine new Hq., they find themselves down on support, with only 14 turning up out of 40 on the books. Arranged are a Junk Sale on June 1; a talk on Radio Control on the 8th; " Switching " on the 15th; and a session on Instrument Landing Systems slated for the 22nd. In between these there is a group visit to the Alconbury Rally, and in addition we have advance notice that the Bedford Treasure Hunt is to be repeated on July 1. If they don't all turn up for a programme like that it'll need a *bomb* to do the trick!

A very successful year is reported by the **Brighton Technical College** hon. sec., G3SKI. The whole of the summer term will be used this year, with sessions on every other Thursday, starting June 8, and a series of interesting activities is being fixed up. Incidentally, it is nice to note that the chairman is Richard Canning, G6YJ, a real OT, and still very active.

From South to North, to **Spen Valley** in fact, where the season ends on June 15, and is followed by the AGM on the 29th to inaugurate the 21st Anniversary Year. This is a group that, like Grafton, has been consistently successful over the years, and we hope they go on for many more years in the same manner.

Has anyone got a crowbar? This is in essence the plea of SWL Gray, the Secretary of the **British Rail** A.R.S. who needs one to lever the British Railways licensed amateurs and SWL's out of their shells, and get them to fill in their membership forms. Offers, please, and also those forms, to the hon. sec.—*see* Panel.

This month's copy of *QAV*, the news-letter of the **A.E.R.E. (Harwell)** club has a thought provoking editorial once again, this time on the subject of DX-chasing, an activity which seems to be on the upswing at Harwell. G2HIF wonders whether there is any amateur, anywhere, who has been licensed since, say, the middle-fifties, who has not been bitten by the DX-chasing bug at some time or other. Of course Cliff is grinding an axe; they have a project to buy a KW-2000 for the Club



Some of the party on the recent Cambridge University Wireless Society expedition to the Isle of Man, with their Land-Rover on the crossing from Liverpool. Left to right, G3RUZ, G3SKT and G3TGY. Others were G3SUC and GI3RCB.

Shack, and what better reason for axegrinding *could* there be?

The *Newsletter* from the **Royal Air Force A.R.S.** Hq. which is always of interest, has a note this time on the progress being made by the joint Services Expedition to Central Australia, and its amateur station, G3POX /VK8OX, from which we gather the KW-2000 has been giving good service, not one of the scheduled contacts having been missed.

Maidenhead come in, almost too late (again!), to report the success of their May junk sale, when extraordinary things made unbelievable prices! A BCC transceiver, to be modified for 4m., and a Canadian RA-1B Rx have been acquired, and a Top Band Tx is being built, while there is also the promise of some 2m. gear being available—so the next move is to apply for the Club's own licence. Meetings during June will be on the first Monday and third Thursday, 7.30 p.m. at the Victory Hall, Cox Green, Maidenhead.

Deadline

And that's about the lot for this time; it only remains for us to mention the deadline for next month, which is **first post June 9**—meaning, in most parts of the country, posting by noon the previous day. And to ask all concerned to try and avoid duplicating your letters (surprising how many groups have two chaps sending us the same gen. and it can get us all-of-a-twist at this end!). The address, as always, is to: Club Secretary, SHORT WAVE MAGAZINE, BUCKINGHAM.

SPECIALLY ON THE AIR

This space is available for those groups putting on an amateur-band station for some public occasion. Please send details set out in the form shown here.

GB3RED, May 29: For the Redbourn Annual Fair, on Redbourn Common, Herts. (off the A.5), arranged by the local group at the special request of the Redbourn Association. Bands worked are to be 160m., AM/CW, and CW/SSB on HF. Skeds will be welcomed, and a special QSL card is being printed. Arrangements with: L S. Duffy, G3TXP, 60 Snatchup, Redbourn (*493*), St. Albans, Herts.

GB2DSF, June 3: From the Dartford Scout Fair, Central Park, Dartford, Kent, 1200-1900 BST, on 10-15-20m., using SSB. QSL's and enquiries: T. Biddlecombe, G3WAO, 39 Portland Avenue, Gravesend, Kent.

GB3SBF, June 5-10: In conjunction with the Scarborough Benelux Festival Week, from the North Bay promenade, running 10-18m. with a KW-2000, CW/SSB. For further details, skeds and QSL's: R E. Barker, G3KEE, 12 Pinewood Drive, Woodland Park, Scarborough, Yorkshire.

GB3IIF, June 21-30: Arranged by the Isle of Wight Radio Society for the Island Industries Fair, Ryde Airport, I.o.W., operating on all bands, AM/SSB, including two metres and using beams for HF/VHF. Hon. secretary I.o.W. R.S.: M. A. Cooley, 13 Hazely Coombe, Arreton, Newport, Isle of Wight.

THE OTHER MAN'S STATION

We are always glad to see offerings for this feature, which has appeared regularly in SHORT WAVE MAGAZINE ever since pre-war days. All we need is a good, clear photograph (or two) with full details, and such personal information as is acceptable for publication. If you can write it up as an article yourself, so much the better. If not, we produce the story from the material you provide.

STAGGERING STATISTIC

The latest return from the GPO shows that there are now nearly 14 million sound/TV licences in issue in the U.K. Fewer than 2½ million receivers are licensed for sound-only, and of these 717,263 are for car radio.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, 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.

G3TGH, C. Watson (*ex-5Z4BM*), 14 Greystoke Road, Cambridge.

G3UIQ, M. Yates, 8 St. Marychurch Road, Milber, Newton Abbot, Devon.

G3VFR, P. Dewhirst, 80 Ley Fleaks Road, Idle, Bradford, Yorkshire.

G3VZN, J. B. Butcher (*G3LAS*), o/b/o Enfield College of Technology, Queensway, Enfield, Middlesex.

G3WCJ, P. F. Hackett, 23 Vectis Road, Alverstoke, Gosport, Hants.

G3WCN, E. W. G. Evans, 33 Atherton Street, St. Helens, Lancs.

G3WDX, P. A. Hickey, 58 Mill Farm Close, Pinner, Middlesex. (*Tel. 01-866-4011.*)

G3WEX, A. L. Wragg, 29 Eastern Road, Sutton Coldfield, Warks.

GM3WFH, D. H. Morris, 47 Thornly Park Avenue, Paisley, Renfrewshire.

G3WFT, D. C. Holland, 7 Alcester Road, Sale, Cheshire.

G3WFW, K. M. Hampson, 21 Mellington Avenue, East Didsbury, Manchester, 20.

G3WFZ, F. G. Lloyd, The Caravan, Alpine Cottage, Clee Hill, Ludlow, Shropshire.

G3WGI, D. V. Williams, 33 Bankside Road, East Didsbury, Manchester, 20.

G3WGO, G. E. Bingley, 7 Uplands Avenue, Littleover, Derby.

G3WGR, J. A. Robinson, 5 New George Street, Bury, Lancs.

G3WGW, M. S. Gaunt, 1 Woodlands Court, Pudsey, Yorkshire.

G3WHC, D. G. Lovelock, Markfield, Caldbec Hill, Battle, Sussex. (*Tel. Battle 3267.*)

G3WHH, W. H. Hodgson, 69 Sherwood Grove, Acomb, York.

G3WHL, J. Darrington, 182 Thorne Road, Doncaster, Yorkshire.

G3WID, J. P. Dickenson, 139 Haregate Road, Leek, Staffs. (*Tel. Leek 4268.*)

GM3WIG, G. Shankie, 8 Ettrick Terrace, Hawick, Roxburghshire.

G8AWR, M. J. Probert, 62 Bevere Close South, Worcester. (*Tel. Worcester 21056.*)

G8AYL, R. W. R. Jones, 9 Ilex Walk, Hayling Island, Hants.

CHANGE OF ADDRESS

G2ABK, N. T. Hodgson, 53 Main Road, Hundleby, Spilsby, Lincs.

G2HFI, F. L. Hodkinson, 18 Newlands, Langton Green, Tunbridge Wells, Kent. (*Tel. Langton 2647.*)

G3DAQ, R. Braithwaite, 60 Oakfield Avenue, Birstall, Leicester. (*Tel. Leicester 813449.*)

GI3HNM, C. E. Davies, 11 Willisfield Gardens, Finaghy Road South, Belfast, 10.

G3IRD, D. Willett, 34 Upland Drive, Markfield, Leics. (*Tel. Markfield 2723.*)

G3JAG, J. A. Crux, 16 Wiltshire Close, Bedworth, Nuneaton, Warks.

G3JPQ, M. G. D. Hutchins, 33 Sandhurst, Yate, Bristol.

G3LIQ, D. L. Fell, 45 Delius Close, Anlaby Park Road North, Hull, Yorkshire, E.R.

G3LPT, G. Woods, 44 Manor Crescent, Newport, Isle of Wight.

G3MAE, A. E. Wilson, 50 Raby Road, Framwellgate Moor, Durham.

G3MES, A. V. Tillin, 11 Great Ellshams, Banstead, Surrey. (*Tel. Burgh Heath 56095.*)

G3MQU, R. M. W. Rash, The Croft, Croft Lane, Diss, Norfolk. (*Tel. Diss 2875.*)

G3NDK, R. K. Webb, 30 Tedder Drive, Waddington, Lincoln, Lincs.

G3NMZ, G. N. Bath, 9 Chalton Heights, Chalton, Luton, Beds. (*Tel. Fancott 487.*)

G3NNW, K. Taylor, 31 Birch Hill Crescent, Rochdale, Lancs.

G3PER, W. E. Delamere, 18 Silverdale Avenue, Heysham, Morecambe, Lancs.

G3PKA, E. C. Harris, 21 Mill Road, Hartford, Huntingdon.

G3PWK, J. B. W. Braithwaite (*ex-GM3PWK/DL2PW*), 48 Manor Road, Rothwell, Leeds, Yorkshire.

G3PWK/A, J. B. W. Braithwaite, 131 Indep. Para. Sqdn. R.E. (V), Honeypot Lane, Kingsbury, London.

G3RGE, K. G. King, 129 Chatsworth Road, Hazel Grove, Cheshire.

G3RHJ, L. G. Fish, 10 Hillcrest Road, Sudbury, Suffolk.

G3RND, C. J. Berden, Bridgecourt Farmhouse, Godshill, Isle of Wight.

G3RPV, T. J. Venn (*ZD8TV*), Mansells, Dunkeswell, Honiton, Devon.

G3SMM, W. M. Furness, 16 Coniston Avenue, Brooklands, Sale, Cheshire. (*Tel. 061-973-6676.*)

G3SSU, D. W. Ryan, 62 Woodplumpton Lane, Woodplumpton, Preston, Lancs.

G3TCG, M. Trundle, 16 Stephens Crescent, Horndon-on-the-Hill, Essex.

G3TXE, T. Parker, 11 Marlow Road, Ipswich, Suffolk.

G3TZY, J. M. Colbert, 60 Glebe Avenue, Bocking, Braintree, Essex.

G3UAO, A. L. Gilham, Liddesdale, Langford, Bristol, Somerset.

GI3UHL, T. M. McKeown, 2 Hanover Place, Coleraine, Co. Londonderry.

G3VAD, R. A. Sinclair, c/o 96 Little Grove Field, Harlow, Essex.

G3VPR, R. Harrison, 38 Park Avenue, Spalding, Lincs.

G6AAR/T, C. J. Berden, Bridgecourt Farmhouse, Godshill, Isle of Wight.

G8APX, W. H. Jarvis, Burwood House, The Avenue, Bushey, Herts. (*Tel. Watford 23938.*)

For anything radio you may want to buy, sell or exchange — use the Readers' Small Advertisement section in "Short Wave Magazine" — See pp.249-256

K.W. Corner

Dartford, Kent

Dear OM,

As I write this, summer seems to have arrived with a rush—makes one think of new antennas and towers, N.F.D., Rallies, portable and mobile operation. It may be of interest to know we carry a large stock of Mosley and Hy-Gain Beams and Verticals, also the Hustler Vertical which I mentioned a couple of months ago. We had very satisfactory results from this antenna on all bands using no radials—only a 6ft. earth stake driven 4ft. into the ground, the top 2ft. being used for the antenna base mounting clamps. The outer of the 52 ohm co-ax cable is connected to the stake and the centre conductor to the antenna feedpoint. In the assembly instructions, details are given on how to make wire radials and these were also tried with a very slight improvement in the performance. Of course ground conductivity plays an important part in the performance of any vertical antenna. The Hustler 4-BTV covers 10 to 40 metres and with the top loading section extends the range to 80 metres and the overall height of this would be approximately 25ft. The cost of both sections is about the same as the Hy-Gain and 18 AVQ which is well-known for its 10 to 80 metre performance. Then there is the 3 BX1 Tower which we can supply for mounting your beam antennas and CDR rotators. CDR have been in the rotator business longer than most in the U.S.A. and I was interested to read recently of comparisons done with the AR22 model with two other popular brands in the same price range.

One fact impressed me was the figure for stall torque where 525in. lbs. was quoted for the AR22 against 115in. lbs. for the nearest competitor. There is also the design factor where CDR use a weatherproof bell casing. The weather sealings on the others were, on tests, found to be doubtful. The degree of ruggedness is impressive in the CDR model especially in the heavy spur and pinion gear arrangement. It is also interesting to note that CDR have a range of four models from the "Ham-M" priced at £61 to TR11A at £12 and it is important that the right type of rotator be used for the job. We should be pleased to advise on these matters.

In the range of mobile whips, we stock Webster, Hustler and Hy-Gain, also the British made G3FIF. There is only one U.S.A. made whip which covers 160 metres and this is the Webster "Big-K." In the case of the Big-K and G3FIF, separate loading coils are necessary for each brand. For those of you who are interested in portable operations, have you thought of purchasing a second mobile whip to make a horizontal rotorable dipole? The two whips both fitted with, for example, 20 metre loading coils can easily be mounted horizontally on a small "T" piece and erected on a length of tubing. The feed impedance for such an arrangement would be approximately 75 ohms.

Another point of interest this month is that we have made alternative arrangements with a Finance Company for better H.P. terms and these are particularly reflected in smaller amounts borrowed, that is below about £80. Also we can now offer credit sale terms which require only 10% deposit followed by nine monthly payments. This arrangement may suit some readers where funds for the larger H.P. deposit are not available.

We now have a new linear amplifier in production, the K.W.1000 which although primarily designed for the North American market looks like becoming popular in many European countries and other places. This is being offered in addition to the popular K.W.600, another batch of which is being made right now. We are also putting into production a K.W. Vespa Mark II which will be very competitively priced for its 220 watts P.E.P. rating. Another batch of the standard model K.W. Vespa is also being made at our Works and it is our intention to carry on making both models. Other equipment is under development and I shall keep you informed of our activities.

Yours faithfully,

ROWLEY SHEARS (Sgd.)

KW ELECTRONICS LIMITED,
Dartford, Kent.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

9d. per word, minimum charge 12/-. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SITUATION OFFERED

ENGINEER required for Saturday or other part-time work by retailer located in Birmingham. Applicant should preferably be active licensed Amateur with good knowledge of modern techniques and above all must be first-class practical man with ability to service and recondition all types of amateur-band equipment. Apply in strictest confidence.—Box No. 4498, Short Wave Magazine, Ltd., 55 Victoria Street, London S.W.1

TRADE

FOR SSB Products, Sphinx, Cannonball, Napoleon, Delta, Eddystone, Joystick, Codar, Sinclair, Martins, Eagle.—S. May, 12 Churchgate, Leicester

WANTED: Amateur-band Equipment. — Jim Fish, G4MH, 18 Town End, Golcar, Huddersfield (52653), Yorkshire.

WANTED: Special valves, such as klystrons, etc., especially types 723A/B, 2K25, 4C35, 845, CV1547 and CV429.—Z & I Aero Services, Ltd., 44A Westbourne Grove, London, W.2. (Tel. PARk 5641).

MOECAN Offers: Eddystone S.888A, with S-meter. DX-100U kit, £70. Mohican receiver. Green TMR-5. NCX/D power supply. Command receiver, 1·5 to 3·0 mc, with dynamotor. Solartron D-300 'Scope. Brown's standard F-type headphones. K.W. LP filters. Grampian DP4/L and GR1/L microphones. Heath RG-1 receiver. All items mint and carriage paid. Enquiries (no s.a.e. wanted). Part Exchanges welcomed.

MOECAN Requires: Communication Receivers. Write or phone.—Moecan, Westbury Road, Cheltenham (24217).

QSL CARDS: Attractive two-colour designs, best available at 42s. per 500, or £3 3s. 0d. for 1,000. Samples.—ARA PRESS, 68 Banks Road, Coventry, Warwickshire.

QSL CARDS: Attractive two-colour designs, 25s. per 100. Send s.a.e. for samples. — G3OYI, 16 Banks, Honley, Huddersfield, Yorkshire.

HUNDRED-PAGE Illustrated Catalogue No. 17 of Government and Manufacturers' electronic and mechanical surplus, including a completely new section covering the latest semiconductors and miniature components, with a credit voucher worth 2s. 6d. Send for your copy now, price 3s. post free. The reading alone is worth the money!—Arthur Sallis (Radio Control), Ltd., 93 North Road, Brighton, Sussex.

QSL Cards and Log Books, GPO approved, cheapest and best. Prompt delivery. — Samples from: Atkinson Bros., Printers, Looe, Cornwall.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

ILLNESS Compels reluctant sale of **AR88LF** in lovely condition, with S-meter and calibrated BFO, price £32 10s. Also a **Lafayette** 320 general-coverage Rx, with bandspread over amateur bands, as new, £20. And an R.107, with S-meter, working well, at £10. All near offer, buyers test and collect.—Haddleton, 15 Waterloo Avenue, Pontefract. Yorkshire.

WANTED: Eddystone Type 770R VHF/AM receiver. Must be in good condition.—Dodd, 1 Nansen Street, Bulwell, Nottingham.

FOR SALE: Heathkit RA-1 receiver, in immaculate condition, professionally aligned, not 12 months old and hardly used. Price £35.—G3UTK, QTHR.

REQUIRED: Urgently, home-built Rx/Tx, coax change-over relay, suitable for 500 watts p.e.p. (Nottingham district).—Box No. 4490, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: TW-2, £14. TW Mains PSU and Control Unit, £6. TW two-metre converter, tuned IF 28-30 mc, £4. Twomobile, £15. Mobile 12v. PSU, £4. Take £40 for The Lot.—Eley, G3GHB, 14 Warmington Road, Hollywood, Birmingham.

SALE: Heathkit RA-1 amateur band receiver, professionally built and aligned and in excellent condition. Price £30 or near offer, buyer to collect. —Gorrill, 30a Langdale Road, Hove 3, Sussex.

SELLING: Receiver **Marconi R.220,** modified for 4m. price 70s. Home-built **Top Band Rx,** running EF85 RF, ECH81 mixer, EF85 IF, ECL80 o/p, EF91 BFO, built in speaker and PSU, buyer to see and collect, 90s. **SSB Xtal Filters,** FT-241 455 kc type, with osc., 30s. each, or £3 matched pair. **SCR-522** Tx chassis, complete but less 832's, 20s. **WANTED:** BC-453 suitable for two-metre tunable IF; also 4-metre converter, IF between 3-6 mc. **Write** with **s.a.e.**—Ballard, G3UTT, 27 Taylor Street, Southborough, Tunbridge Wells, Kent.

FOR SALE: Frequency meter BC-221, with charts and modulation, price £13 10s.—Court, 48 West Cromwell Road, London, S.W.5. (Tel: 01-373-5388).

WANTED: Waters Q-Multiplier/Notch Filter, Model 337-M2 or 340A, for Collins KWM-2. (Cambridge area).—Box No. 4491, Short Wave Magazine Ltd., 55, Victoria Street, London, S.W.1.

OWNER Emigrating: Hallcrafters SX-110 Rx, 550 kc to 34 mc, with amateur bandspread, and including manual, £45 or offer. BC-454, 520 to 1500 kc, also BC-453 Q'Fiver, £3 each. Many copies "Short Wave Magazine," RSGB "Bulletin" and "QST," also valves, components, bits-and-pieces.—Whitemore, 7 Belgrave Place, Bath. (Tel: Bath 60363, evenings).

WANTED: Terminal Unit Type FSY-1-1, or FSR-1-1X, preferably with FSR-1-2 PSU. Any condition, state your price. Also require 45-baud shunt governor for Creed 7B.—Knight, 44 Putteridge Road, Stopsley, Luton, Beds.

SALE: Geloso VFO with dial, 90s. Woden UM1 mod. xformer, 30s. AR88 cabinet, 30s. Mains xformer, rated 1000-0-1000v. at 500 mA, 35s. Many other chokes, transformers, etc., s.a.e. for list. (Sussex area).—Box No. 4496, Short Wave Magazine, Ltd., 55, Victoria Street, London, S.W.1.

VHF Aerial system complete, for sale, comprising 16ft. rotatable mast, cowl-gill motor, magslip, mounting brackets, couplings, etc., with two-metre 5-ele wide-spaced Yagi and 6/6 skeleton slot for 70 centimetres, with coax cable. Price £15, offers, or will split.—Ring Kiddle, LIBerty 3875.

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: In mint condition, Eddystone 940, with matching Eddystone speaker, unused Eddystone mains filter unit, spare set unused valves, and manual, price £80. Buyer to collect Manchester. Ring MOSs Side 2763, evenings, or write.—Box No. 4493, Short Wave Magazine. Ltd., 55 Victoria Street, London S.W.1.

FOR SALE: Eagle RX-60N receiver, minus aerial, price £11; also R.107 Rx, at £11. Accept £20 for the two. Carriage extra.—Patterson, 13 Mauldeth Road, West, Withington, Manchester 20.

WANTED: Hallicrafters S.27 receiver; also modern "low-band" radiotelephones.—Box No. 4494, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Pye Ranger, ready for use on 4 metres, with xtals and positive earth. Also FT-243 xtals in 7 mc range. All letters answered.—Box No. 4495, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BARGAIN! Viceroy Mk. IIIA SSB/CW transmitter, with double half-lattice filter, built-in PSU, Vox-Mox operation, 200 watts p.e.p., with circuitry and manual. £110 or offer? KW-77/SSB receiver, triple conversion, with switchable sidebands, slot filter, fast/slow AVC, crystal front end, 100 kc crystal calibrator, with circuit and manual, gift at £80 (or offers).—Ring Perks, G3SVH, Cheslyn Hay 708 (Walsall).

FOR SALE: Eddystone 840C in excellent condition. Best offer over £35 secures. Buyer collects or pays carriage.—Henbrey, 1 Perrymans, Northiam, Rye, Sussex.

WANTED: LP Filter, Shure 444 microphone, SB-200 Linear Amplifier.—S/Sgt. Worrall, DL2AH, 1 Arty Bde. Hq. & Signal Sqdn., BFPO 33.

WANTED: Good receiver having continuous coverage 1·6 to 32 mc. Sideband preferred. BRT models welcomed.—Parker, G3KH, 133 Station Road, Cropston, Leicester.

WANTED: Prop-pitch motor. Would take two if price right.—Bright, G3JW, 8 Webley Road, St. Thomas, Exeter, Devon.

WANTED: A Mosley TA-33Jr. beam array and AR-22 rotator, or similar.—Chambers, G2FYT, 25 The Crescent, Henleaze, Bristol.

WANTED: Details and prices of Collins SSB Transceivers, also Swan transceivers. Must be of recent vintage. Will pay cash.—Hill, 19 Station Road. Tadcaster (2253), Yorkshire.

OWNER GOING Abroad. Sale: Two 12v. DC to 230v. AC rotary converters by Lancashire Dynamo, rated 120 watts, in silence cabinets and with smoothing, price £3 each. Hartley Oscilloscope, with spare tube, £20. AR88D with Q-multiplier and S-meter, £30. Geloso VFO unit, with PSU, £6. Hallicrafters KT-40 Tx, with 230/110v. mains transformer, £22. Heathkit Balun unit, and ex-W.D. Signal Generator, both for £4. No. 19 Set, with ATU, 40s. Two de luxe Xtal Mikes, with stands, £4. Two 30ft. poles, straight and strong, 40s. each. One 4ft. Goodmans horn speaker, 40s. All the above in good condition. Discount of 10 per cent will be given to any purchases on behalf of Radio Clubs. Buyers to collect, as prices so cheap no margin for carriage.—Hill, 19 Station Road, Tadcaster (2253), Yorkshire.

FOR SALE: R.209 Mk. II, price £12. R.220 Rx, with crystals for 70·0 and 70·2 mc. £3 10s. RF Amplifier No. 2 for 19 Set, has 4/807's, 50s. High-speed Bridge, Type 12/D2, £3. All carriage extra.—Box No. 4497, Short Wave Magazine, Ltd., 55 Victoria Street, London. S.W.1.

WHAT Offers? Minimitter MR-44/II Rx; Codar PR-30X Preselector; Heathkit OS-1 'Scope; Marconi/BCC 20-valve VHF transceiver. All in first-class condition with fixed/mobile PSU's, handbooks, circuitry, etc.—Ralph. 59 Church Road, Earley, Reading (61262), Berks.

SMALL ADVERTISEMENTS, READERS—*continued*

MUST SELL: Heathkit Mohican Communications Receiver, almost brand new, in good condition, price £30 including carriage.—Taylor, Airwork Services Training, Perth Aerodrome, Perth, Scotland.

SALE: Six/Six two-metre J-Beam, in good condition, 40s. or near offer?—Ginder, G3NAS, 222 Whetstone Road, Aldridge (53718), Staffs.

OFFERING: K.W. Vanguard Mk. II Tx, coverage 10 to 80 metres, factory built 1965, and in mint condition, original cost £70, going at £42 or near offer?—G3TAQ, QTHR.

WANTED: Sideband Engineers Model SB-34 Transceiver; earlier Model SB-33 considered.—Henderson, Rydene, Moor End Lane, Radwell, near Bedford, Beds.

FOR SALE: A Good Eddystone S.640 Rx, with speaker and S-meter, at £22 or near offer? Would consider exchange for an HRO.—Cole, 4 Baldwin Street, Hawcoat, Barrow-in-Furness, Lancs.

SALE: R.1155 Rx with PSU; Joystick de luxe; Marconi ATU; RF-27 for 4 metres; RF-24 converter; BBC/ITV TV set with 70 cm. tuner and Band III DX/TV converter; all in perfect working order; price £25. Extras include 1155 chassis, 38 Set, Rx for 80m., also meters, speakers, magazines, etc. Buyer collects, or will deliver to 25 miles.—Thompson, 1 Church Road, East Molesey (4503), Surrey.

FOR SALE: Creed 7B Teleprinter with PSU and FSR-1-1X unit, £20. Mobile Tx/Rx for 160 metres, with whip aerial, £20.—Harrison, G3NJU, 3 Rostherne Road, Wilmslow (24665), Cheshire.

SELLING: Two-metre AM Tx, 150 watts, 4X150A PA, at £100 or near offer? HRO-5T, with two bandspread coils, in very good condition, £25 or offer? Two 4X150A, with bases, 60s. each. 4CX250B, £5. Converters for two metres and 23 centimetres, offers? Numerous bits and pieces; callers only.—G3SIC, QTHR.

SALE: Labgear LG.50 Transmitter, £35. CR-100 receiver, £12.—Frizzell, G3LFQ, 15 Widey View, Hartley, Plymouth, Devon.

WANTED: Urgently, Command receiver BC-453, or similar, for 160 metres. Condition unimportant.—Sellers, G3VOE, 180 Rose Street, Edinburgh, 2.

EXCHANGE, or Sell at £85 (or offer?) an Eddystone 940 receiver, surplus to requirements. Would consider a Sailing Dinghy in part exchange, if suitable. Enquiries s.a.e.—Vallance, G8AHU, 12 Chestfield Close, Rainham, Gillingham, Kent.

IT IS NOT Too Late to book for your share of Mediterranean sunshine! Brand-new holiday villa on the Island of Minorca is still free for some weeks. Situated in a British development area near a secluded cove, the villa is completely equipped for four people. Cheap air fares can be arranged. No reciprocal licensiug yet but receiving conditions are excellent! Full description and details on application.—Box No. 4492, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HOME Wanted by July 1st for Hammarlund HQ-120 receiver, coverage 550 kc to 30 mc, with separate bandspread and amateur ranges calibrated. Also a Codar PR-30X preselector, Codar RQ-10 Q-multiplier, and quantity copies "Practical Wireless," RSGB "Bulletins," and "CQ." First reasonable offer takes The Lot.—Box No. 4499, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: R.206 receiver, 550 kc to 30 mc, £15. Eddystone 840C, £30. Eddystone EC-10, £30. Codar AT-5 Tx with microphone and mains PSU, £15. Petrol-electronic generator, 12v. electric start, 230v. output, £15. Carriage extra. — Ring Exeter 75994, 9.0 a.m. to 5.0 p.m.

SELLING: KW-77 receiver, late model, £74; buyer collects or can deliver to 60 miles. Also K.W. low-pass filter, 45s., and BC-453. with 6v. valves, £3 10s. — Stead, 2 Cliff Road Gardens, Leeds 6, Yorkshire.

SMALL ADVERTISEMENTS. READERS—*continued*

WANTED: Eddystone S.640, or similar receiver. Selling Woden UM1 mod. xformer, 30s.—Haley, 93 Heights Way, Armley, Leeds 12, Yorkshire.

SALE: FT-241A crystals—1/Ch.53, 5/Ch.337, 4/Ch.339, 2/Ch.350, 4/Ch.351, 3/Ch.353. 12s. 6d. each, or £10 the lot.—Lush, G3TGY, Queens' College, Cambridge.

SELLING: KW-77 Rx, with speaker (not K.W.), £75. DX-100U kit, opened only to check, £50. SB-10U Sideband Adaptor, built but unused, £30. AR88D, £22. Minimitter Top 2-7 Tx, £20. Minimitter MC-8 converter, three GC bands with bandspread over five amateur bands, IF output 1·5 mc, mains PSU built in, provision for 12v. supply, £8. Marconi 52 Set, with mains PSU, £6. Olympic loaded Z-match ATU, rated 150 watts, £5. Complete tape recorder/playback amplifier for Collaro studio deck, £5. All items have been properly stored for 18 months. Sensible offers considered, as must dispose.—Ellis, G3PJR, 53 Grantley Street, Grantham, Lincolnshire (or via C.B. QTH).

TRANSISTOR TESTER: Beulah model D-909, 200/240v. AC, tests both PNP and NPN transistors in situ, checks AC gain, DC gain, leakage. Also provides smoothed DC power-supply, continuously variable 0-25v. up to 25mA, centre-tapped. 5½ x 3 x 2½ inches, complete with leads, and mint condition. Offers?—Watts, 62 Belmore Road, Norwich. NOR. 72-T.

REMEMBER That with the July issue due out on June 30, we should have single-copy orders (4s. post free) by Wednesday 28th latest.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: HW-12 in mint condition, £40 or reasonable offer. Wanted a Hamscan.—Worthington, G3COI, Foxhills, Orton Lane, Penn, Wolverhampton, Staffs.

SALE: In mint condition, Trio 9R-59 receiver, bandspread, coverage 535 kc to 30 mc, suitable SSB, with Codar preselector, Q-multiplier, PSU, headphones and manual, price £25.—Chandler, 21 Harvard Mansions, St. John's Hill, Wandsworth, London, S.W.11.

SALE: Type 53 transmitter, Mk.1/1-2A, 1·2 to 17·5 mc, hardly used, beautifully rack-mounted, with all associated meters and connectors, £43 or near offer.—Ring Phillips, Roydon (Essex) 2217.

WANTED: Urgently, copy of AP.1186, Vol. 1, Section 5, Chap. 20, Appendix 2, relating to W.1191A Wavemeter calibration. — Box No. 4500, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: **Geloso two-metre VFO**, new and unused, with dial, escutcheon and valves, £5. Two-metre converter, 4 to 6 mc IF, 30s. Hunts R/C Analyser, mains powered, 15s. Modulation transformer for P/P 807's, 12s. 6d. **Walter Tape Recorder, 3¾/7½ i.p.s., £10.** Cadenza ribbon microphone, 90s.—Dale, G3PZF, 18 Lezayre Road, Orpington, Kent.

SALE: Mosley V4/6 Vertical for 10-40m., can be base-loaded for 80 metres, price £6, carriage free.—Dickenson, 103 Foxcroft Drive, Hayes Lane, Wimborne, Dorset.

SELLING: Eddystone 888A, grey finish, with S-meter and speaker to match, mounting blocks and new PMI tuner unit, with manual, property of an SWL and unmarked, price £70.—Ring Theobald, Bournemouth 50462, after 6.0 p.m. or over weekends.

SALE: Zenith 1000 all-Transistor short-wave receiver, in excellent condition, complete with headphones, leather case and phono-jack, price £60 or near offer.—Phone Court, FREmantle 5388 (London).

WANTED: Matching speaker for a KW-77. **Sale:** Copies "QST," complete for 1965, 1966, 25s. per year, post paid. **Also** one G.E. type 12DQ7 valve, unobtainable in the U.K., 35s.; and two PL-500 valves, 10s. each.—Michaelson, G3RDG, QTHR, **or ring 01-455 8831.**

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Two 12in. TV's; one 9in. TV; BC radio; three ITA tuners; BC radio chassis; TV EHT pack; TV optical box with NW6/2; TV RF chassis; AC gramophone motor; R/C Bridge; headphones, RF-24 unit; speakers, chokes and transformers; VCR-97 CRT. Valves at 3d. each; 210VPA, 215P, PM2A, 2A2, PM1HF, VP2B, '30, VP210, DH, QP22B, LD210; at 6d. each; VR65, ARP34, VR65, ARP12, ARP26, VU111, VU120A, VT127, SP61, SP41, VR101, VP133, HL42DD, EBC3, ECH21, T31, ECC31, AC/TP, CBL1, SP4, VP4B, CL4, 6U7G, 6K25, W142, DL92, 9D2, TH41, T41, N16, EL32, AC2/HL, VR136, 1E79, EC52, KTW61, 20A1, VR99, C1C, TDD13C, DL94, EA50, W77, 1S4, N17. At 1s. each; CV18, EB34, H63, PL33, 6A8, U33, CV6, EF42, ECH42, 1622, 50CD6. All carriage extra.—Davis, G3LXL, 76 Wendover Dive, Aspley, Nottingham.

WANTED: Components for G2DAF Mk. II Tx, including Kokusai mechanical filter.—Cox, G3PLP, 59 Berkeley Road, Shirley, Solihull, Warwickshire.

EXCHANGE: New and boxed Miranda Automex S.L.R., with accessories and books, cost £109 FOR Communications receiver. All letters answered.—Edwards, Spring Cottage, Dowlish Wake, Ilminster, Somerset.

WANTED: Army Type 33 Tx, or similar large transmitter. All letters answered—Bentley, 5 Farrant House, Winstanley Road, London, S.W.11.

FOR SALE: AR88LF, in excellent condition, £35. RX-60N receiver, 550 kc to 30 mc, new, £14. Nashton VTVM, case slightly damaged, good up to 300 mc, £12. AVO Signal Generator, covering 90 kc to 80 mc, £8. Advance Type E1 Signal Generator, covers 100 kc to 60 mc, £10. Class D-Wavemeter, £3. Cossor 339 DB 'Scope, requires some attention, together with wobbulator, in working condition, £10. CT-52 miniature oscilloscope, mains input, as new, £16. Oscilloscope Type 13A, £15—Lord, G3PHN, Newfield House, Moira, Burton-on-Trent, Staffs. (Tel: Swadlincote 7537).

SELLING: Nombrex transistorised RF signal generator, £5. R.109 receiver and 6-volt accumulator, £6. R.1475 Rx, coverage 2-20 mc, £8. Also valves, resistors, etc. and copies RSGB "Bulletin" and "Short Wave Magazine"—offers? Buyer collects or carriage extra; inspection welcome evenings.—Kerby, 9 Seal Road, Selsey, Chichester, Sussex.

SALE: Trio 9R-59 receiver, 540 kc to 30 mc, bandspread on all amateur ranges, with S-meter, Q-multiplier, BFO, noise limiter, manual, etc., new condition, £30.—Treece, 51 Grove Avenue, Chilwell, Beeston, Notts. (Tel: Nottingham 257197).

FOR SALE: Eddystone S.740 receiver, with speaker and S-meter, in mint condition after manufacturer's overhaul, price £30. Geloso converter, for 10 to 80m., price £10. Truvox two-way tape deck, unused, £10.—Gannicott, G3VLV, 17 Highfield Road, Stratford-on-Avon, Warwickshire.

SALE: Two Cossor Type 1039 double-beam 'Scopes, £22. G2DAF Rx, all components Electroniques, Eddystone, Philpott, but really needs rebuild, £20. T.W. Nuvistor two-metre converter, IF 2-4 mc, with PSU, £7 10s.—Fentham. G3TON. QTHR.

GOING ABROAD: AR88, no case, blue front, good performance; also Heathkit DX-40U/VF-1U, £45 together, or would split. Deliver locally or carriage extra.—Peters, G3VMJ, 3 Lacey Street, Longhoughton, Alnwick, Northumberland.

FOR SALE: Army 19 Set Mk III, new 1960, with PSU, ATU and microphone, in very good condition, £12, or offer. Woden UM1 modulation transformer, never used, 70s. or offer.—Hammersley, 4 Chesterfield Drive, Burton Joyce, Nottingham.

SALE: Eagle STR-908 100-milliwatt transceiver, 28-5 mc, as new, £17. Geloso Rx front-end tuning capacitor, 90s.—Constantine, G3UGF, QTHR.

CONVERT Your Mosley TA-32Jr beam to a TA-33Jr. Conversion kit, £6 carriage paid.—Denman, G3MEW, 17 Testcombe Road, Gosport, Hants.

SMALL ADVERTISEMENTS, READERS—*continued*

NOTICE: The 25-watt **four-metre** Tx described on p.61, March issue is now open to **any** offer over £15, or would consider **exchange** for a Heathkit DX-40U, or a good receiver. Anything reasonable considered, cash adjustment either way as necessary.—Adkins, G3SEV, 72 Courtenay Avenue, Harrow, Middlesex.

SELLING: National NC-100 receiver, coverage 500 kc to 30 mc, in fair condition, with speaker, cabinet and internal PSU, £15. Also an R.1155, less valves, suitable for spares, 20s.—Shaw, 2 Fairford Crescent, Swindon, Wilts.

FOR SALE: Receivers R.1475, coverage 2·0 to 20 mc, complete with PSU, £12 10s., carriage 12s. 6d. Without power pack and in working order, £8 10s., carriage 10s. Money order only, please.—Goble, 115 Dyas Road, Great Barr, Birmingham 22A.

SALE: T.W. Electronics Twomobile two-metre transistor receiver, price £20.—Badger, G3OHC, 23 Aulton Road, Four Oaks, Sutton Coldfield, Warwickshire (Tel. 021-308 4858).

SELLING: Eddystone S.750 Rx, with matching S-meter, speaker, and mounting blocks, in mint condition, £35. T.W. two-metre nuvistor converter, IF 24 to 26 mc, £10. LM-14 frequency meter (similar BC-221), with PSU, £25. Woden UM3 mod. xformer, 70s. Redifon RTTY terminal unit, 455 kc IF, £5. Coaxial relay, 12v. actuation, 40s. Mobile Tx, 2E26 PA, coverage 10-160m., 10 x 7 x 6in., commercial appearance, £10. Tilt-over tower, 30ft., with rotator, indicator, power supplies, 50ft. of control cable, and 4/4 slot-fed beam for two metres, price £30. Buyer collects, or carriage extra.—Foggo, G2COP, Lovely Cottage, Wichenford (301), near Worcester.

WANTED: Eddystone EC-10 with PSU, or 840C, late model and must be in mint condition. Pse include s.a.e. with offers.—Goldsworthy, 5 Labworth Road, Canvey Island, Essex.

FOR SALE: Heathkit SB-10U SSB Unit, £25. B.46, £5. Also 4X150's, 4CX250's, with bases, QQV06-40A, 5B/254M, offers with s.a.e. WANTED: Heathkit RA-1, and 6146B's.—Box No. 4501, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eagle SR-165, new communication Rx, with its guarantee. advertised at £48, offered at £27 10s. Kokusai filter, £7.—Reynolds, G3IDW, Orchard Cottage, Hook, Swindon, Wilts.

SELL: BC-221AJ frequency meter, in excellent condition, £20. Also 36ft. 2in. dia. Dural mast, 2/15ft. and 1/6ft. sections, with rotary guy rings, guys clamps and Mosley TA-31Jr. rotary dipole. £12.—Gooch, 77 Halsbury Road East, Northolt, Middlesex.

SHACK Clearance: Room wanted, so offers invited for (buyer to collect) Hallicrafters S.20R Rx, in fair condition; HRO with PSU and coil packs; Lavoie frequency meters; Panda Cub Tx; K.W. Vanguard Tx; R.T.S. Oscilloscope; 8-over-8 70 cm. beam; Black & Decker two-speed drill. All in good condition.—Bartlett, G5QA, QTHR.

CORNWALL: Holiday accommodation, in modern bungalow, within minutes beach; bed and breakfast, evening meal optional. Car space. Terms.—Chapman, G6AY, Lohengrin, Swanpool, Falmouth, Cornwall.

SELLING: Collins 32V-3 table-top Tx, 150w. CW, 120w. AM, price £70. Olympic Z-Match for 10-80m., rated 600 watts, with SWR indicator incorporated, £10. And a Wilcox-Gay VFO at £7 10s. All little used and in perfect condition.—Ussher, GD3TIU, Ballacotch Manor, Crosby, Isle of Man.

FOR SALE: 'Scope tube type 3BP1, with base, 2X2 rectifier, pair 2 mF 1000v. condensers, 45s. Xtals 2360, 11851 and 12991 kc, 10s. 6d. Ferranti 30 mA meter, 12s. 6d. Panels, 19in. by 7in. and 3½in., 7s. 6d. Silver-plated tank lines for 144 mc, 5s.—7 Dinmore Avenue, Northfield, Birmingham, 31.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE : Eddystone 6in. slow-motion dial, unused; 3/100 mmF variables; five octal Rx valves; 16in. black cabinet; one 1·6 mc IFT, all at £3. Copies "Short Wave Magazine," 1962-'63 (one missing), 20s. Transformer 7·5v., 10s.—7 Dinmore Avenue, Northfield, Birmingham, 31.

WANTED: Dynamotors, 24v. to 300v./600v. H.T.; also marine radiotelephones in any condition; and xtals 2182, 2381, 2527, etc.—Cain, G3DVF, 18 Oaky Balks, Alnwick (2487), Northumberland.

SALE : Mosley Commando/SSB transmitter, £75. Labgear Topbander AM/CW Tx, £18. Green TMR-5, with speaker unit, £30. Green Mk. V two-metre converter, £8. All items immaculate. Offers considered.—Spence, 23 Mill Street, Oakham, Rutland.

FOR SALE : National HRO-MX, in mint condition, professionally aligned (invoice produced), with four BS and three GC coil packs, PSU fitted console, clock and including manual, £31.—Beal, 31 Churchfields, South Woodford, London E.18.

COMPLETE HEATHKIT Station for Sale : DX-100U with aerial change-over relay plus microphone. RA-1 Rx with QRM-16 Q-multiplier, CL-1 calibrator and matching speaker. All 18 months old, unmodified and unmarked, complete station with all manuals. Price £95 or near offer ; will negotiate for items separately.—Heape, G3SZH, Lanchester Hall, College of Aeronautics, Cranfield, Beds.

SELLING : KW-2000 and AC/PSU in as-new condition, at £140 or near offer.—Burnett, G3OLW, 34 The Ridgeway, South Shields, Co. Durham.

WANTED : Good amateur-band Rx, for AM/CW/SSB, about £60 maximum offered.—Little, 28 Fitzgerald Road. Bristol, 3.

AVAILABLE : New p.t.f.e. B7A-type valveholders for QQV06-40A, etc. Also ceramic chimneys for 4X150 types. Offers ?—Fenn, G3RTF, QTHR.

EXCHANGE : Camera 35 mm. with enlarger and dark-room equipment, all excellent make and condition FOR a mint HRO, late CR-100, R-206, R-216 or similar receiver ; must be in perfect condition.—Ring Thorne, Romford 49260.

SELLING : K.W. Viceroy Mk.III, £120. KW-77 receiver, price £80. K.W. Vanguard, 10 to 160 metres, £60. All these items in mint condition. Nearest offers considered. Also R.1392 and ZC1 Mk.II, both in good condition—offers ?—Matthews, G3SAH, QTHR.

FOR SALE : Lafayette HE-80 receiver, 550 kc to 30 mc, 142 to 148 mc. with bandspread, BFO, Q-multiplier, RF gain, calibrator, ANL, etc., and as new, £45 or near offer.—Ruscoe, 79b Mill Street, Crewe, Cheshire.

OFFERING Marconi 52 Rx, price £7 10s., and PSU, 40s. Both in new condition. Buyer to collect.—Conway, 44 Trafford Grove, Stretford, Manchester. (Tel. : LON. 1536).

SALE : K.W. Vanguard Mk.II, coverage 10 to 80m. with xtal-mixer VFO, in excellent condition, first offer over £40 secures.—Tompkins, G3SWV, QTHR or ring SPR 1579 after 8.00 p.m.

HEATHKIT

The World's most advanced Amateur Radio Equipment

FILTER-TYPE SINGLE BAND SSB TRANSCEIVER, MODELS. For the 80 or 20 metre bands. 200 W. P.E.P. input TX. 1 μV sensitivity RX. Employs easy-to-build printed board techniques, with pre-aligned circuits. Power Req.: 800v. D.C. at 250 mA., 250v. D.C. at 100 mA.—125v. D.C. at 5 mA, 12v. A.C. or D.C. at 3·75A. Dimensions : 12¼"w. x 6¼"h. x 10" deep.

Models HW-12A (80m.) **£53 . 10 . 0** Kit
HW-32A (20m.) **£53 . 10 . 0** Kit
GH12. Push Talk Microphone **£3 . 10 . 0** Assembled

THE WORLD'S SMALLEST KILOWATT LINEAR. The Heathkit, Model HA-14. 80-10m. Provides 1000 W. P.E.P. input power. ALC output to exciter. Built-in SWR meter. Size : only 3 3/16" x 12 3/16" x 10 "deep. Weight 9lb. Power supply available. **£49 . 10 . 0** Kit

AMATEUR BANDS 80-10m. RECEIVER, Model SB-301E. This de-luxe receiver offers unsurpassed value to the Radio Amateur. Of advanced concept, employing up-to-date design and construction techniques, its ultimate specification ensures unparalleled performance. Full specification and details on request. Weight : 22lb. Power Req.: 115/230v. A.C. 50/60 c/s. 50 watt. Size : 17⅞" x 6⅝" x 13⅜". **£125 . 0 . 0** Kit (*Less speaker*)

Kit SBA–301–1 Optional AM Crystal Filter **£10 . 10 . 0**
Kit SBA–301–2 Optional CW Crystal Filter **£10 . 10 . 0**
Kit SBA–300–4 2 metre Converter **£10 . 10 . 0**
Kit SB–600 Matching Speaker Unit **£9 . 0 . 0**

AMATEUR TRANSMITTER, Model SB-401E. This transmitter is designed for " lock-in " facility with the SB-301E. A self-powered filter type Tx covering the " Amateur " bands, 80 to 10 m. with a P.E.P. of 180 watts. Weight : 33lb. Power Req.: 115/230v. A.C. 50/60 c/s. Size : 14⅝" x 6⅝" x 13⅜". **£140 . 0 . 0** Kit
Crystal Pack SBA-401-1 **£15 . 5 . 0** extra

2 METRE TRANSCEIVER, HW-30. For fixed, portable, or mobile use. Ideal for Local and RAEN purposes. Input 5 watts c.c. tunable regenerative Rx. Size only (including handle) : 9¾"w. x 8"h. x 6" deep. (For 230v. op. if req.) **£23 . 10 . 0** Kit

Power supply. GP-11 operates from 6 or 12v. D.C. **£9 . 10 . 0** Kit

GENERAL COVERAGE RECEIVER, Model GC-1U. Powerful 10 transistor, 5 diode circuit. Tunes 580 to 1550 Kc/s. and 1·69 to 30 Mc/s. in 5 bands. Four piezo-electric Transfilters. Pre-assembled and aligned " front end." Built-in speaker.
£37 . 17 . 6 Kit **£45 . 17 . 6** Assembled

Suitable Battery Eliminator, Model UBE-1 **£2 . 17 . 6** Kit

HIGH SENSITIVITY GENERAL RECEIVER, Model RG-1. A high performance, low cost receiver for the discriminating short-wave listener. Frequency coverage from 600 Kc/s. to 1·5 Mc/s. and 1·7 Mc/s. to 32 Mc/s. Send for details. **£39 . 16 . 0** Kit
£53 . 0 . 0 Assembled

AMATEUR BANDS RECEIVER, Model RA-1. Covers all amateur bands 10-160 metres. Half-lattice crystal filter at 1·6 Mc/s. I.F. Provision for fixed, portable or mobile uses. Switched USB and LSB for SSB. **£39 . 6 . 6** Kit **£52 . 10 . 0** Assembled

OPTIONAL EXTRAS. Crystal Calibrator CL-1 **£4 . 12 . 0** Kit
Loudspeaker Cabinet SG-4 **£1 . 9 . 6.** Loudspeaker **£1 . 4 . 5** incl. P.T.

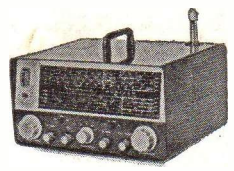
Single Band Transceivers HW-12A and HW-32A

1 kW Linear HA-14

SSB Receiver SB-301E

SSB Transmitter SB-401E

2 Metre AM Transceiver HW-30



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