

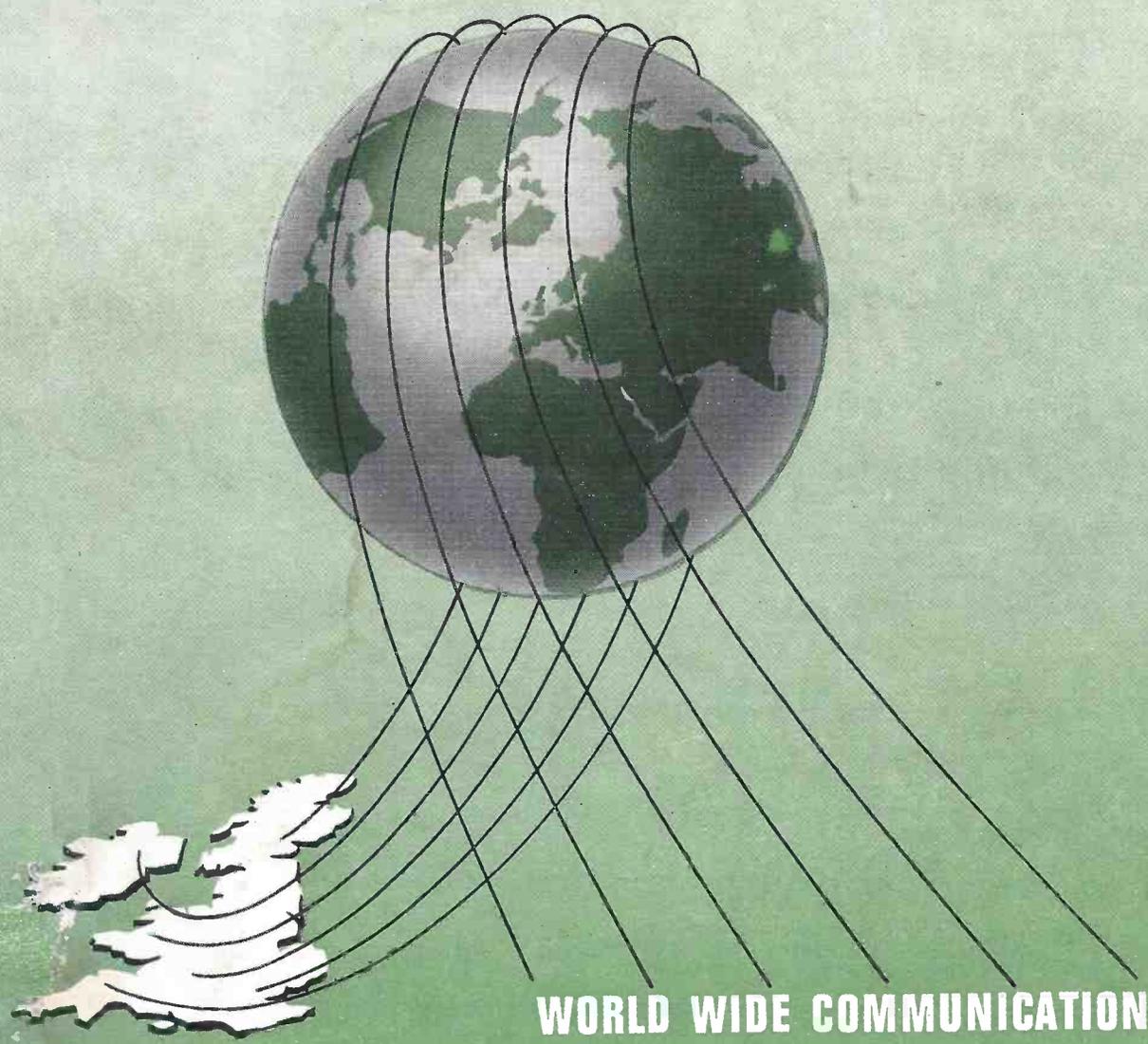
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The
SHORT WAVE
Magazine

VOL. XXVIII

JANUARY, 1971

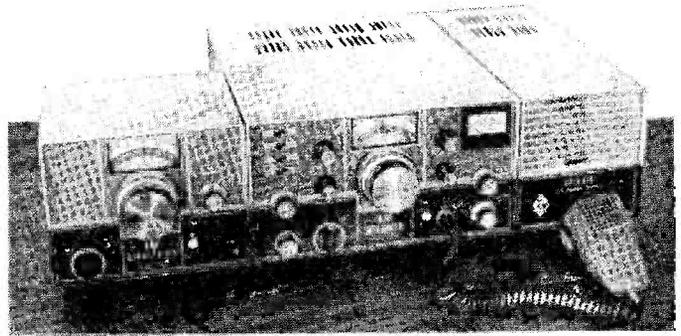
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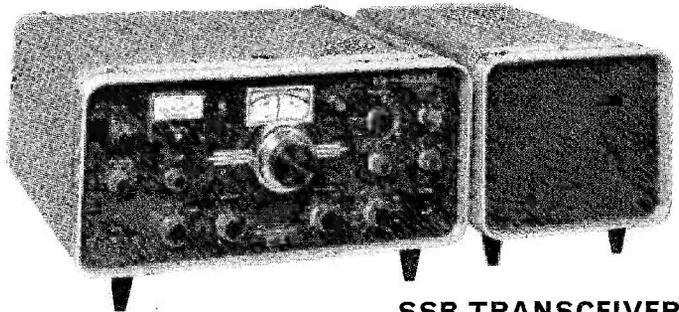
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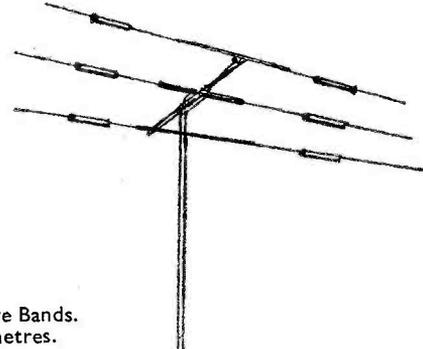
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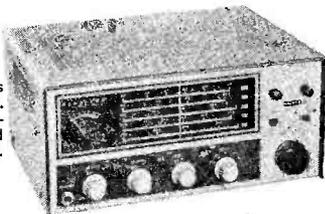
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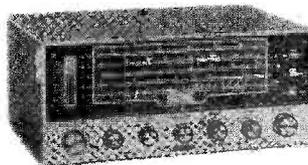
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7 valve superhet includes RF stage. AM/SSB/CWV. Half lattice xtal filter, pre-assembled and aligned coil pack. 110-240v. A.C. Green and grey finish.



Kit K/HR-10B £44.00 Carriage 60p

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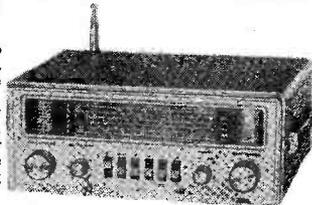
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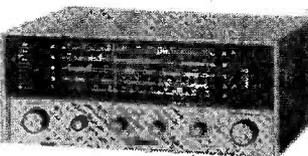
Tunes from 190 kHz to 30 MHz in six bands. Double conversion above 18 MHz. AM/CW/SSB. Nickel Cadmium Battery charges from 240v. A.C. or 12-15v. D.C. Modular construction. Durable charcoal and matching finish.



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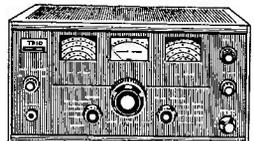
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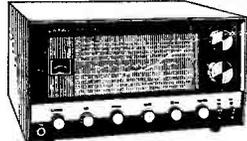
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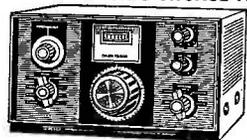
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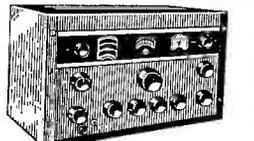
5 Band AM/CW/SSB amateur and short wave 50 Kc/s.-400 Kc/s. and 550 Kc/s.-30 Mc/s. F.E.T. front end. 2 Mechanical filters. Huge Dial. Product detector. Variable BFO. Noise limiter. S Meter. 24" Bandsread. 230v. A.C./12v. D.C. Neg. earth operation. RF gain control. Size: 15" x 9 1/2" x 8 1/2". Wt. 18 lbs. Exceptional value, £45. Carr. 10/-.

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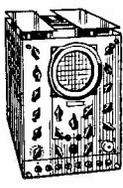
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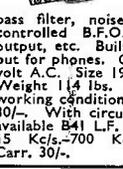
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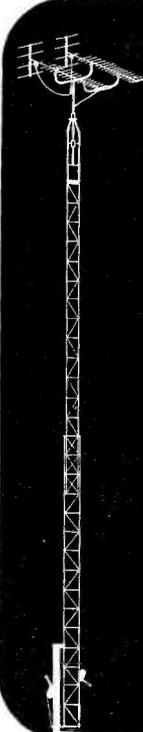
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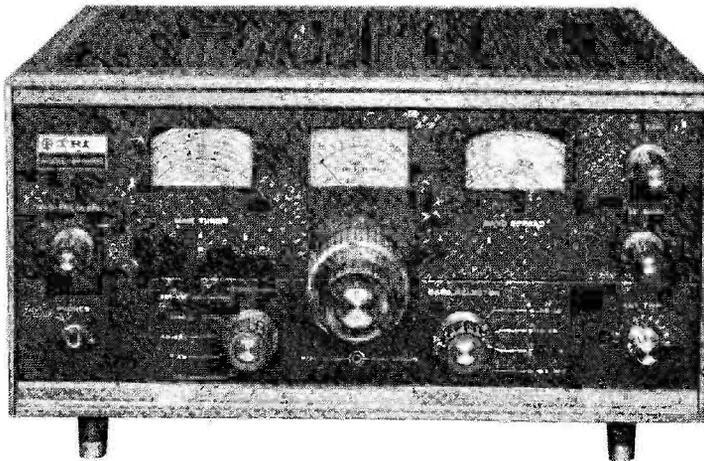
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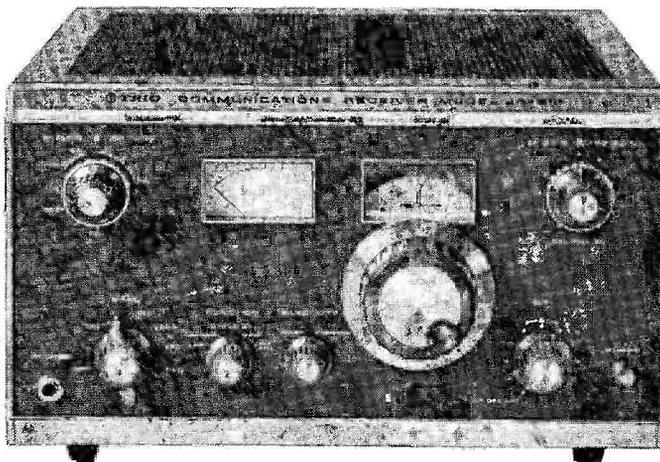
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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The
SHORT-WAVE
Magazine

E D I T O R I A L

Variation *This issue appears in a slightly changed format, the reason being to achieve more economical production. As explained last month, the price revision will barely meet the extra costs with which we are now faced, hence all our operations must be planned with the cost-efficiency factor very much in mind.*

Of course, there will be no significant change in the general content of the MAGAZINE, nor in its scope or objectives—which are to further the interests of radio amateurs and maintain the principles of Amateur Radio. Readers who have been with us since the early days will know that these have remained our guide-lines consistently for the last 25 years.

* * * *

Though this piece is being written at a time of some turmoil and dislocation in the affairs of the Nation—which means us all—these difficulties will be overcome. So once again we are glad to have the opportunity of wishing all who see this page a Happy and Prosperous New Year—or, as we might otherwise put it, “HNY es 73”.

*Austin Foxgk,
96FO.*

WORLD-WIDE COMMUNICATION

THE TRIO JR-310 RECEIVER

REPORTING ON AN ADDITION
TO THE WELL-KNOWN RANGE —
WITH SOME IDEAS AND
SUGGESTIONS

G. J. BENNETT, B.Sc., Ph.D (G3DNF)

THE JR-310 is a fairly recent addition to the range of "low cost" receivers suitable for amateur use. It is designed primarily for SSB reception on the LF and HF amateur bands. Since its appearance on the U.K. scene towards the end of 1969, it has received a good deal of publicity. The specifications and appearance are attractive, but these alone may not suffice to convince the prospective purchaser.

The following remarks will be of interest both to those who are considering the JR-310 as a possible purchase and to those who have already got one. It cannot be claimed that a comprehensive evaluation has been carried out but these notes, based on the writer's experience with one receiver of this type, include the results not only of giving it a full trial on the air over a period of several months, but also the results of certain tests which can be carried out with the minimum of test gear. (It is assumed that the reader has a copy of the Trio specifications and has seen one of the many illustrated advertisements of this receiver.)

Description of the Equipment

This receiver employs dual conversion on all bands. These are 3.5-4.1, 7.0-7.6, 14.0-14.6 21.0-21.6, 28.0-28.6, 28.5-29.1, 29.1-29.7 MHz, with 15.41-14.81 MHz for reception on WWV on 15 MHz (this is an "image" band, with reversed tuning). There is also a blank position on the band selector switch, which allows optional addition of a suitable coil and crystal (e.g. for Top Band). A pair of concentric knobs provide RF tuning and 1st IF tuning (5.955-5.355 MHz). For the second conversion a variable local oscillator is used. This is the "solid state linear VFO" to which is connected the main tuning dial. The VFO tunes 5.5 to 4.9 MHz, corresponding to readings of 0 and 600 (kHz) on the main dial which is calibrated at equally spaced intervals of 25 (kHz). Each interval represents one turn of the tuning knob which has a calibrated adjustable skirt from which actual frequency can be interpolated. The 25 kHz marks on the main dial are spaced approximately 5 mm. apart, while the 1 kHz marks on the calibrated knob are about 10 mm. apart (there are intermediate 500 Hz marks also).

Incremental tuning (± 4 kHz) can be switched in if required by means of a calibrated control which varies the voltage on a varicap diode in the VFO.

AF and RF gains are controlled separately by a pair of concentric knobs of which the inner (AF) also actuates a pull/on switch for a crystal calibrator (which is not provided as part of the basic receiver).

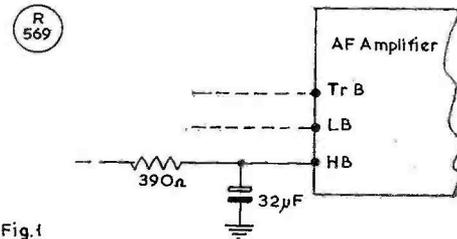


Fig. 1

Fig. 1. Additional smoothing for hum elimination in the audio stage—see text.

The remaining controls are the function switch giving, in clockwise order, LSB, USB/CW, Standby, AM, and AM with noise limiter.

The selectivity switch has two positions, "wide" and "narrow." In the basic receiver only the wide selectivity is operational. Facilities are provided on the rear apron for aerial and earth connection, S meter adjustment, muting (requires $-100v.$), speaker connection, etc. Because the receiver was designed for optional working as a transceiver with its companion TX-310 (a QRP Tx which is not available in U.K.) a variety of other useful connections can be made at the rear, including anti-trip and VFO outlet.

The JR-310 is styled in matt grey with "silver" metal trim (satin finish), grey knobs and white lettering. Main dial calibration marks are red and black against a silver/grey background. A well-written and comprehensive handbook is supplied with the receiver.

General Comments

The layout of the front panel has clearly been given a good deal of thought, and the controls come easily to hand. The receiver seems reasonably "ambidextrous" in fact, and the only inconvenience to left-handed users (such as the writer) is the phone jack which is situated at the lower left hand corner.

First switch-on revealed nothing amiss, and the only untoward incident subsequently was the sudden failure of the 6BM8/ECL82 output valve after about 100 hours. This was due to an inter-electrode short circuit which heavily overloaded the HT supply but caused no damage as the receiver was switched off at once. The 2A mains fuse did not blow and it was therefore replaced by a 1A fuse when a new valve had been fitted.

If headphones are used with this receiver, it is important that they should have the correct impedance (8 ohms). The Trio HS4 earphones are specified and are very comfortable. When using other headphones of higher (though still "low") impedance, it may be found necessary to reduce mismatch by fitting them with a shunt resistor. This has negligible effect on output, and checks a tendency for audio oscillation to occur when at "standby."

It was also found that when using headphones mains hum, though not excessive, was objectionable. This was traced to residual ripple of a few volts

on the HT supply to the anode of the output valve. A cure was effected by providing extra smoothing in the form of a 390-ohm/1 watt resistor and a 32 μ F/250 volt electrolytic capacitor (Fig. 1). This had the incidental effect of reducing the anode voltage from 235 to 220 volts which is closer to the design value of 210 volts. Space can be found for the extra resistor on a tagboard near the mains transformer, whilst the capacitor can be a miniature type which needs no support other than its wires.

Selectivity

Trio express the selectivity in rather non-committal terms as "more than 50 dB at ± 6 kHz off-tuning." The 6 dB figures are not quoted. It is also stated that a "mechanical filter" provides this selectivity. This is a matter of definition or perhaps of translation, for the bandwidth of the 2nd IF is controlled by a small device which appears to be a ceramic transfilter. With an oscilloscope and wobulator, the 6 dB bandwidth was found to be approximately 4 kHz, and the 50 dB bandwidth about 12 kHz. Further tests were carried out by observing S-meter readings when tuning through a strong, steady carrier. Comparison of the results obtained in USB and LSB modes confirmed a suspicion that the passband of the "mechanical filter" was off centre. Its centre frequency was found to be 456.5 kHz. This degraded the resolution of USB, and produced a rather "toppy" effect on LSB. Efficient resolution of both LSB and USB depends on the 2nd IF passband having a centre-frequency of 455 kHz midway between the BFO frequencies of 453.5 and 456.5 kHz. The passband was also somewhat asymmetrical, and no improvement could be effected by adjustment of the IF transformers.

If use is to be made of "narrow" selectivity, a special mechanical filter (genuine!) can be fitted. This can be obtained from some Trio agents, and the handbook contains instructions for fitting it. The vacant position on the circuit board is clearly marked, and the job is simple. However, the purchase of this filter leaves little change out of £20. Receivers in which it has already been fitted can be purchased at about £25 above the basic price. There is an alternative for those who fancy their skill with the soldering iron. That is to construct a filter using Brush Clevite "do it yourself" Identical Resonators (see Appendix).

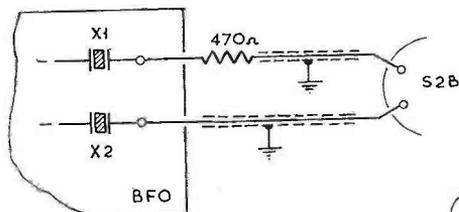


Fig. 2

Fig. 2. As explained in the article by G3DNF, an anti-parasitic resistor is desirable to eliminate "birdies" that may be produced by the BFO in some production models. This is how it can be fitted.

The image rejection of this receiver is good, and cross modulation is not noticeable under normal operating conditions. However, the RF gain and tuning need careful adjustment for the best results to be obtained on 7 MHz. This is nowadays usual with most modern receivers.

Sensitivity

No cause has been found to argue with the maker's specification of "Less than 1 μ V for a signal-to-noise ratio of 10 dB." The receiver gives the impression of liveness combined with low noise factor, but no measurements were made.

Stability

Drift was found to lie easily within the specification of "2 kHz in the first hour after switching on, subsequently 100 Hz per half hour."

Rate of drift depends to some extent upon the dial setting, but at worst was no more than 200 Hz in the first hour, and 70 Hz per half hour subsequently. These values were carefully checked "on the test bench" and subsequent use confirmed that this amount of drift is not noticeable during the course of normal operation on the air. The effect of extremes of temperature was not determined, all tests being performed at a comfortable room temperature in the range 15-20°C.

Mechanical stability is excellent and backlash could not be detected.

Calibration

The use of a crystal calibrator (see Appendix) revealed that the main dial calibration had an offset error of about 5 kHz throughout its range (on all bands). This made accurate interpolation with the calibrated main knob rather troublesome. The error

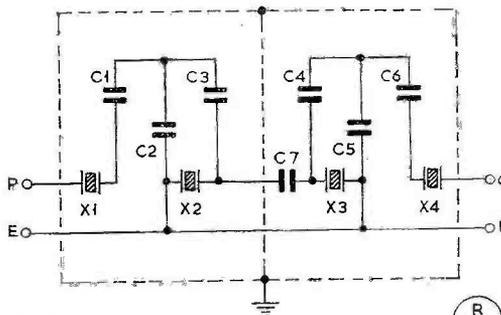


Fig. 3

Fig. 3. Circuitry of a 2 kHz filter for the 455 kHz IF of the Trio JR-310—see text p.656 for discussion.

Table of Values

Fig. 3. 2 kHz Filter for 455 kHz IF

C1, C3	= 270 pF	X1, X2,	
C4, C6	= 2,200 pF	X3, X4	= Clevite "Identical Resonators" Type TF 04-442
C2, C5	= 2,200 pF		
C7	= 18 pF		

NOTE: All capacitors are silver/mica or polystyrene/foil

was corrected by adjusting a trimmer in the VFO. As this is a sealed unit for which no circuit is available, care is needed here. Postpone action if the guarantee is still valid! The trimmer can be reached by carefully peeling back the "rear" end of the seal (a strip of sticky, metallised, "once only" tape) until a hole in the lid of the VFO box is exposed. An insulated trimming tool with a 5 mm. screwdriver end can then be inserted until it mates with the slotted spindle of the trimmer. A minute adjustment was all that was needed to get the calibration right.

Linearity of the VFO calibration was found to be very accurate, with an error of only ± 1 kHz throughout its entire range, taking the mid point (300) as datum.

Setting error when switching from one band to another was also ± 1 kHz. Both of these errors can be compensated by means of the adjustable knob calibration.

The main dial is calibrated anti-clockwise. This is not too great an inconvenience, though one may wonder why it is necessary.

Birdies

In general, spurious signals are not a problem with this receiver. Some occur, but are not troublesome. For the record it is worth identifying those that could be found. Only two strong (S7) birdies occurred, both well outside amateur bands, being due to heterodyning of a 1st local oscillator crystal frequency (9.455 MHz) with the 2nd harmonic of the VFO frequency (4.955 MHz) giving a difference frequency (455 kHz) which fell within the 2nd IF passband. They occurred at a dial reading of 545 corresponding to 4.045 MHz in the 3.5-4.1 MHz band, and 14.865 MHz in the WWV band.

All other birdies were about S1 and passed unnoticed in the normal course of operation. They included a 4th harmonic of the 2nd local oscillator which comes out at 21.200 MHz. The 12th harmonics of the LSB and USB BFO crystals fall within the 2nd IF passband and could be detected as weak signals at dial readings of 60 and 24 respectively on all bands.

When the receiver was first tested, a cluster of weak birdies was found on all bands between dial readings of 0 and 100, when the BFO was switched to LSB. These birdies were spaced at 18 kHz intervals and were traced to a parasitic oscillation in the BFO. A complete cure was effected by wiring a 470-ohm resistor in series with the LSB crystal. This value was selected by trial and error as the lowest that would have the required effect. It is unlikely that this modification will be required on every JR-310 but if it should be found necessary, there is a convenient terminal on the circuit board to which the resistor can be wired (Fig. 2, p.655).

APPENDIX

A Do-it-Yourself 2 kHz Filter for the JR-310: Complete description of the construction of this filter would require a number of diagrams and is hardly necessary in any case. There is plenty of scope for

variation of layout to suit the dimensions of components used. It is, however, essential to get the overall dimensions right so that the leads emerge at the correct places, and the filter can be soldered into its position on the circuit board.

The resonators can be obtained from *Amatronics* (4 for 30s.) with helpful notes on filter construction and a *Clevite* data sheet for good measure. Details are given for constructing filters of wider bandwidth. Suitable matching transformers can be obtained as part of a miniature set, e.g. Type C10 from *Henry's Radio*. A standard type of interstage IF transformer on a 5 pin 7 mm. x 7 mm. square base, with 10 mm. x 10 mm. square can is required.

By using "sandwich" construction between small pieces of 0.1 inch matrix *Veroboard*, a compact layout can be achieved — Fig. 3 on p.655 is an attempt to express the layout and circuit in one diagram. Terminals are labelled in the same way as the Trio filter. The lower board was 45 mm. x 15 mm., the metal strips running lengthwise whilst the upper board was somewhat shorter, with strips running across it. The filter was fitted with a small screening can made of tin-plate. This must be carefully formed. Internal clearance should not be excessive or the can may be found too large to fit between the matching transformers on the circuit board. Metal tabs at the sides of the can must be provided as a means of anchoring the filter to the circuit board. The internal screen can be a small piece of tin-plate soldered to supporting wires on terminal pins. Unused segments of copper strip on the pieces of *Veroboard* must also be earthed, and care should be taken that edges and ends of the strips not earthed cannot come into contact with the can. Some strips of p.v.c. insulation tape may be used to line the can at those places where there is danger of contact.

The filter was found to perform exactly as expected. Reception of SSB and CW was greatly improved. Stop band rejection was outstanding. Centre frequency was found to be 455 kHz with 2 kHz bandwidth at the 6 dB point. Insertion loss was about 4 dB relative to the "wide" filter. This gave encouragement for the eventual replacement of the unsatisfactory "wide" filter by a home-made 3.7 kHz filter.

Crystal Calibrator: So far as is known, the Trio crystal calibrator for the JR-310 is not available in the U.K. However, the circuit is published in the receiver handbook and its duplication should give little difficulty to the average constructor. It employs a 100 kHz crystal oscillator and buffer amplifier to lock a 25 kHz multivibrator. Harmonics are generated which correspond to the main dial divisions.

The writer used a simplified version (Fig. 4) in which a 25 kHz multivibrator is locked to a 250 kHz crystal oscillator. The circuit was assembled on a piece of laminate. Use of discrete semiconductors was decided upon after several fruitless attempts to achieve stable locking of an IC multivibrator by means of a crystal used as a feedback element.

Adjustment of the calibrator is quite simple. The crystal is removed so that the free-running multi-

Fig. 4. A simplified marker unit for fitting into the Trio JR-310.

Table of Values

Fig. 4. Simplified Marker Unit

C1, C6	= .01 μ F, disc	R3	= 4,700 ohms
C7, C8	= .01 μ F, disc	R4	= 39,000 ohms
C2	= 220 pF s/mica	R5, R9	= 1,000 ohms
C3	= 5 pF Phillips	R6	= 10,000 ohms, pre-set
C4	= 50 pF Phillips	R7	= 3,300 ohms
C5	= 27 pF s/mica	R10	= see below
C9	= 2 pF s/mica		
R1, R2	= 3,300 ohms		

vibrator can be set on 25 kHz by adjusting R6. Oscillation is smooth enough for the eighth harmonic to be checked against Droitwich on 200 kHz. Insertion of the crystal, followed by adjustment of the feedback capacitor C3 to get the crystal oscillating in the correct mode, should produce stable harmonics up to the HF bands. Some readjustments of R6 may be needed for maximum stability. Finally, C4 can be trimmed to obtain zero beat with WWV on 15 MHz.

The marker was mounted in the space provided below the chassis. Power was obtained from the 150 volt rail via a dropper (R10). Current consumption, about 6mA was about the same as that taken by the Trio marker unit.

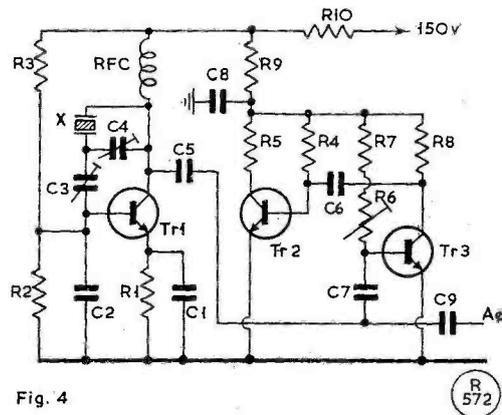


Fig. 4

R 572

Conclusions

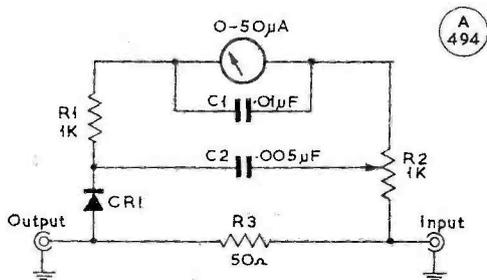
The JR-310 is a good bargain at its price of £77 10s. It has numerous excellent features, and a few shortcomings which can be overcome without difficulty. To get the best out of this receiver, it is necessary to improve selectivity by way of modifications for which Trio have thoughtfully made provision.

THE ANTENNASCOPE

USEFUL TEST INSTRUMENT

THIS instrument can be regarded as unique on the grounds of simplicity, cheapness and, more particularly, usefulness. It is indispensable to anyone intending to do any serious work on antennae of any variety—Quads, Yagis, dipoles, verticals (including whips) or whatever. The circuit is in any recent edition of *The Radio Handbook*, but is included here for reader convenience.

To calibrate the Antennascope, connect the output over one or more of a string of resistors wired in series in the following order: 10-10-10-10-50-100-100-100, 100-500, and adjust for zero reading on



Circuit of the Antennascope, a simple but very useful aerial test item. C1, C2 should be disc ceramic; R1 is 1/2-watt, R2 linear carbon, non-inductive, and R3 carbon, rated at least one watt. Rectifier CR1 can be 1N34 or similar and the meter could be 0-100 μ A or higher—see text.

the meter, using a GDO. Frequency is immaterial at this stage as you are not feeding a resonant circuit. Calibration points at 10, 20, 30, 40, 50, 60, 70, 100, 200, 300, 500, 600 and 1000 ohms will be adequate. The calibrating resistors should be selected from a good stock, and checked for accuracy. Find the setting of R2 that gives a minimum (zero or near) reading on the meter—this is then the scale reading of R2 for that value of impedance. Repeat for the series of resistors, noting in each case the R2 setting for minimum, this potentiometer being of course provided with a pointer knob moving round a scale, which could be a paper strip marked with the impedance values as found.

In operation, the output socket of the Antennascope is connected to the aerial feeder and the GDO linked to the input to provide RF power. The settings of R2 and the GDO against one another will then show the input impedance of the load at the set frequency when the meter reading is brought as nearly as possible to zero.

The calibration accuracy of the Antennascope can be proved by checking it against an existing system known to be working correctly, e.g., a dipole resonant at 14.1 MHz showing an SWR of 1:1.1, or better, and fed with 70-ohm line. The instrument should then show an impedance of 70 ohms at a GDO frequency of near-enough 14.1 MHz. In practice, the Antennascope is used mainly to measure impedances at the actual feed-point of whatever aerial system is being checked.

The "Handbook" recommends a 0-200 μ A meter. However, a 0-50 μ A meter is preferable for sensitivity, but one must take care not to over-drive the instrument if this grade of meter is used.

SELECTIVITY FOR CW RECEPTION

GETTING REALLY SHARP PERFORMANCE

I. E. HILL (G6HL)

IN the days before the last War amateur communication modes were AM or CW. The ultimate in receivers had single conversion to 455 kHz IF aligned to give a 6 kHz band pass for AM. The first IF stage contained a single crystal filter with a phasing control which could be switched in for CW working to give a condition proclaimed as "single-signal reception." Certainly, a condition of narrow-band peaked selectivity was achieved but an awful lot of unwanted signal remained in the poor skirt of the filter response and ringing was pronounced.

Immediately after the war, CW activity rapidly reached a high level and interest centred round Q5'sers of various types and shapes, the most popular involving the 85 kHz IF of an American airborne receiver readily available on the surplus market. A number of other designs appeared for low frequency IF converters going down in frequency to 50 kHz. One in particular (appearing in *QST*) used a multitude of 50 kHz stagger-tuned circuits to give narrow band USB or LSB reception. A number of ideas were cribbed from this design; the frequency was dropped to 30 kHz and a very effective CW unit produced.

In one form or another the writer has for many years used very low intermediate frequency to obtain ultimate CW selectivity and has not yet found a system to better it. The unit at present in use operates at 18 kHz and will be described, but first it is worth considering the actual requirements for satisfactory reception of CW—still the most effective and refined method of amateur communication.

Human Considerations

At the end of the line we have a pair of ears conveying information to the operator's brain, probably the most effective filter of the lot. But brain and ear do not respond well to ill-treatment and have likes and dislikes which differ between individuals. It is worth checking one's own response by coupling a pair of wide dynamic range headphones or a loud speaker to an audio generator and finding the frequency range one can hear and also identifying the frequency most comfortable to copy. Around 16 Hz is often quoted as the lowest audible sound to which the human ear will respond but the writer has difficulty up to 30 or 40 Hz, and at the other end of the scale anything above about 13 kHz is inaudible. The familiar "1000-cycle tone" is generally accepted as the optimum audio frequency for CW working and is particularly so for younger people. As one ages, the frequency seems to drop and 850 Hz was clearly identifiable as the writer's optimum frequency, frequencies above this tending to give a ringing effect and after a time causing some discomfort.

Audio Filters

So much for the audio objective, now defined as to produce a signal of 850 Hz, attenuating all others. This can be done in the audio stages using an AF filter—but if the filter is designed to give a narrow-band response of, say, 250 Hz it has a rather unpleasant effect on the general background, tending to make noise and signal ring, not a pleasant background for continuous listening. It is perhaps interesting to note that commercial filters are more generally used to *attenuate* rather than peak a small section of the band width, or alternatively take the form of high-pass or low-pass filters used separately or together.

In many ways it is attractive to have an AF stage which has some attenuation of the lower frequencies up to 300 Hz and attenuation of all frequencies above 3.3 kHz the maximum required for intelligible speech. This restricts the audio bandwidth to 3 kHz and gives a reasonably comfortable background on which to super-

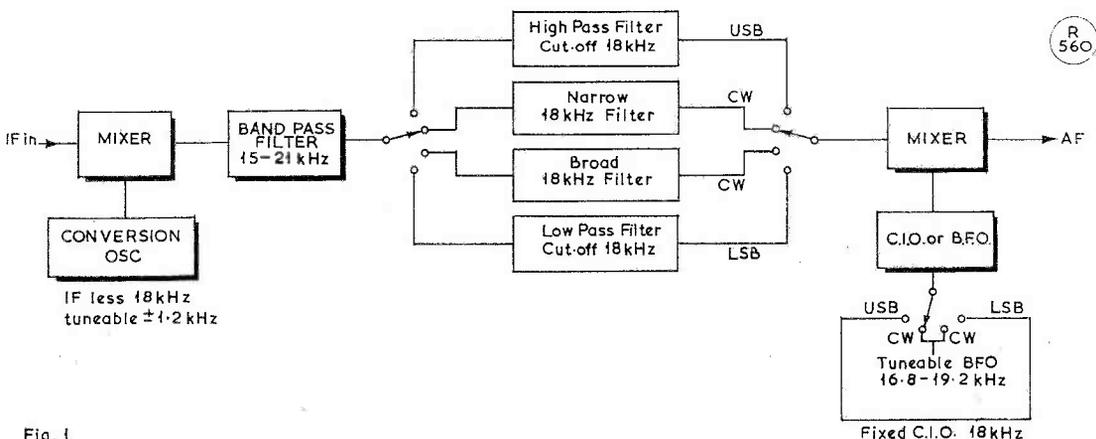


Fig. 1

Fig. 1. Configuration for modified 18 kHz unit—see text for discussion.

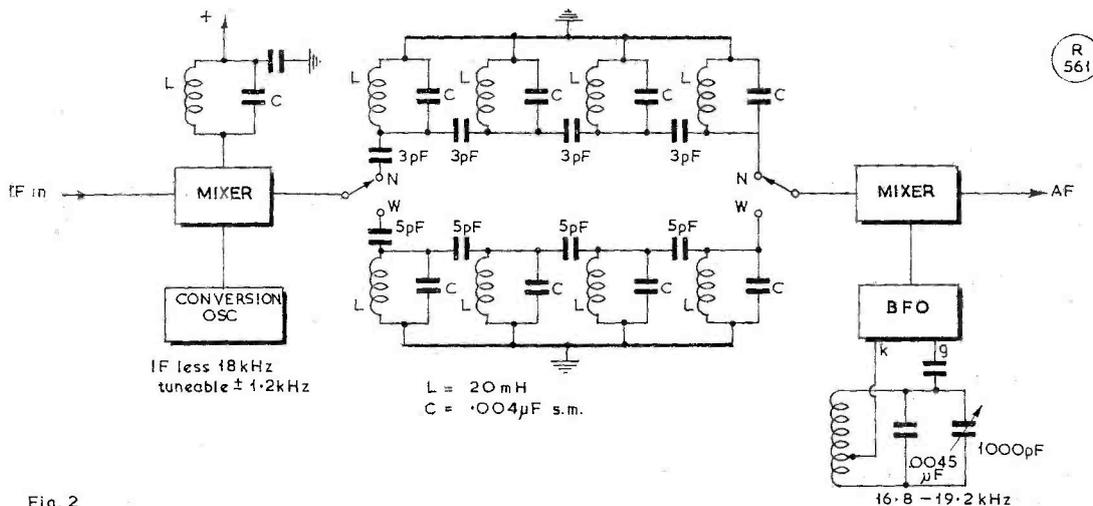


Fig. 2

Fig. 2. Essential circuitry to reproduce narrow filters for CW reception—see text. The BFO coil can be Mullard LA80, of 265 turns of 34g, with the cathode tap at the 241st turn.

impose the CW tone 850 Hz.

Input Selectivity

Now we go to the other end of the receiver and consider how selectivity can be obtained. At 30 MHz the problem is to select an IF which is low enough to enable one to produce narrow IF filters but at the same time is high enough to avoid second-channel problems. This difficulty persists throughout the receiver chain and necessitates a compromise with a frequency ratio not exceeding six-to-one at each stage. Every conversion means another local oscillator to cause trouble and unwanted spurious conversion products, so the number of steps must be minimised. For SSB working it is easy enough to produce crystal filters giving 3 kHz bandwidth 6 dB down and reasonable shape factor even as high as 10 MHz. If necessary, several half-lattice filters can be cascaded, or additional crystals introduced to improve the shape and minimise out-of-band response. Current practice is to make the first conversion tunable at about 5 MHz and then convert to 1.6 MHz or 455 kHz, at which entirely satisfactory 3 kHz bandwidth filters are available. The SSB receiver is therefore quite a simple problem!

CW Bandwidth

For CW working a much narrower filter is required and for "nose" selectivity at 1.6 MHz a 250 Hz bandwidth is attainable using a half-lattice filter with crystals spaced 150 Hz. Unfortunately, the skirt will rapidly widen out. This means that although the wanted signal tuned on the filter nose is enhanced and other signals are attenuated, strong unwanted signals can still get through if they appear in the filter skirt area. In a bad case a weak signal on the nose may be no better than a very strong signal in the skirt! The response of the filter can be improved by careful phasing and/or cascading

two half-lattice filters but as more crystals are used in a narrow band filter so the tendency to ringing increases.

A solution is to use 455 kHz or make a further conversion to say 100 kHz, at which one has the choice of either narrow-band crystal filters or an LC filter, although it will be difficult to improve on 1 kHz bandwidth for the latter.

VLF Conversion

In the earlier days of SSB working and before the availability of satisfactory 3 kHz bandwidth crystal filters it was common commercial practice to do sideband selection at VLF. For reception, this meant converting from the last receiver IF to 18 kHz, through a 6 kHz wide bandpass filter centred on 18 kHz, and then isolating the wanted sidebands by use of high-pass or low-pass filters with cut-off at 18 kHz. Block diagram at Fig. 1. There are still lots of these units about and they can occasionally be picked up surplus for a song. There must be many more destined to appear as surplus in the not too distant future as they complete their normal commercial life.

If it is projected to use 18 kHz final conversion one must make certain that the bandpass of the preceding IF stage is narrow enough at the skirts to ensure no second-channel problems. For example, if the preceding IF were at 1.6 MHz the conversion oscillator would be on 1.582 MHz and a signal in the IF at 1.564 MHz would also produce 18 kHz. A reasonable target is to reduce the width of any skirt response in the preceding IF to not more than 20% of the frequency of the following stage.

On this basis, conversion to 18 kHz from 1.6 MHz will necessitate careful examination of filter skirt response. Conversion from 455 kHz or 100 kHz should present no problems. In the writer's case 100 kHz is used and a single half-lattice filter with 150 Hz crystal separation is

switched into circuit when converting to 18 kHz for CW.

VLF Conversion for CW

If obtainable, the 18 kHz units referred earlier are worth considering for SSB reception. However, the attraction in the present case was to produce a 18 kHz final IF stage which could be added to the existing receiver for CW working. Instead of feeding the bandpass output to the high- or low-pass filters two additional switch positions were included which permit selection of narrow-band LC filters and at the same time replace the fixed capacitor in the CIO to make it a tunable BFO. The result is very satisfactory. The receiver just doesn't respond to signals outside the 250 Hz passband of the 100 kHz IF filter and gives truly single-signal reception. There is one snag—chirpy blurps are no longer readable, but perhaps that is no great loss!

Construction

For those who may wish to make their own 18 kHz CW converter, essential circuitry is as Fig. 2, p.659. It is *not* recommended that the amateur should attempt the more complex filters unnecessary for the SSB section shown in Fig. 1. Today it is much easier, cheaper and just as effective to make 3 kHz band-pass crystal filters for use at the receiver main IF.

The 18 kHz filters are easy enough to make and can be varied from the values given if other materials are available, the requirement being to resonate LC at 18 kHz. Coils wound with Vinkor LA2532 and 188 turns of 33g on SS Delrin bobbins will give 20 mH which, with a fixed silver-mica capacitor of about .004 μ F in parallel, will resonate at 18 kHz. If other coils of near value and reasonably high Q are available they can be used, adjusting the value of parallel capacitor to resonate at 18 kHz and to allow some tuning adjustment by means of the Vinkor slug. Alternatively, adjustment can be by a parallel trimmer capacitor but this will need to be fairly large. The compression mica types should be avoided.

If maximum selectivity is required from the narrow filter, 3 μ F should be adequate coupling capacity but this can be increased if necessary. The wide (or not so narrow) filter should have the same coils and parallel capacitors as the narrow filter but the coupling capacitor will be approximately doubled.

Alignment

Filter alignment is quite simple. First the tuned circuit in the mixer plate is adjusted to exactly 18 kHz. Then switching to narrow filter, each LC in the filter is peaked to resonate at 18 kHz. Then switch to wide filter and stagger tune, setting alternate tuned circuits to slightly above and slightly below 18 kHz. The degree of staggering will depend on the band width required; 200 Hz each way will give a band width of 500 Hz which is the widest required for CW. If 500 Hz is selected it should of course be possible to switch the receiver main IF to a comparable or greater pass band.

Calibration

The two oscillators in this unit are at quite low frequency and can be made very stable. It is therefore worth

fitting relatively large control knobs and calibrated dials. The unit in use has been calibrated in 100 Hz steps using a counter and both conversion oscillator and BFO cover ± 1.2 kHz. This facility is often very useful for frequency checks, noting transmitter drift (other people's of course!) and so forth.

Finally, a warning to would-be constructors. Inevitably, use of 18 kHz at the end of the receiver chain will mean more than the usual number of conversions; effective interstage screening and decoupling must receive careful attention or results may be disappointing in terms of unwanted birdies. It is always difficult to attain the perfect result!

"RTTY—A-to-Z"

We now have in stock a new handbook on RTTY, radio amateur communication by teleprinter, written from the professional-amateur point of view—meaning that is good reading and a very useful reference for either—covering the subject in considerable detail. It runs 15 chapters and more than 200 pages, fully indexed; includes various types of machine (all American, mainly the products of the Teletype Corp.); covering also the principles of radio reception by T/P; converter and terminal units; polar relays and all about them; testing and test equipment; tape printers and readers; pulse-code modulation and data processing; special RTTY circuits, and ideas; and the setting-up of a complete amateur RTTY station. The book, by W5VU, is published by Cowan in their *CQ Technical Series*, is very well illustrated throughout, and costs 44s. post free, of our Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. (As this is rather a specialised manual, only a comparatively small stock is held but we should have enough to satisfy all who are seriously interested in RTTY).



"... number eight thousand nine hundred and sixty three — last time I'll go on a DX-pedition ..."

MOD. FOR THE A.T.5

TANK-TAPPING FOR BETTER TWO-BAND WORKING

A. S. CARPENTER (G3TYJ)

THE CODAR AT5 is an excellent little transmitter for Top Band and 80-metre CW/AM working and does when adjusted in conjunction with a good ATU emit surprisingly potent signals of good quality. The VFO runs at the same frequency on both bands but when the bandswitch is placed for Eighty an additional coil, associated with the EF80 buffer/double stage, is brought into circuit—see Fig. 1. The tank coil, L4, is not usually switched and it is thus necessary to be careful when tuning up to select the correct anode current dip for the band required since two dips may be found over the “Tune” range.

Not particularly liking this compromise two-band tank system, the AT5 was carefully examined whereupon it was soon found possible to modify the rig to make the PA coil switchable for 80m. simultaneously with the buffer/doubler switching.

The AT5 bandswitch was found to be an SPST slide-type and inspection revealed it possible to substitute a physically identical DPDT item.

The modification—which in no way cannibalises the transmitter—allows one section of the new switch to actuate the EF80 doubler coil L3, as before, the other section controlling the tank circuit.

Mechanical Points

The mechanical problems were most simply overcome by adopting the following logical procedure, enabling the transmitter to be back on the air in less than an hour.

The four plastic feet were first removed and the outer case withdrawn. The VFO tuning capacitor was then rotated until the vanes were fully enmeshed, whereupon a fine pencil mark was made on the VFO dial as an aid to subsequent correct replacements. With the “Tune” and “Load” controls set fully anti-clockwise grub screws and knobs can be removed. The two grub screws on the VFO epicyclic

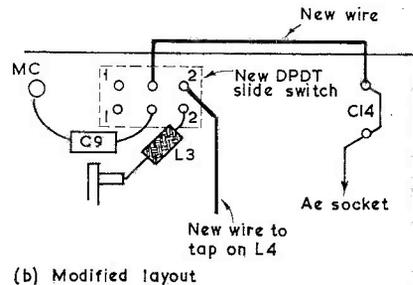
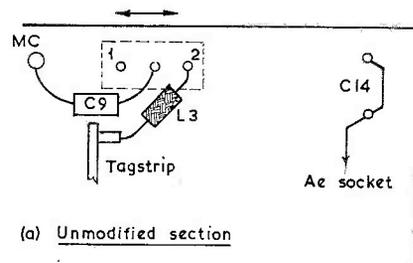


Fig 2

T 582

drive are also loosened.

By removing the four self-tapping screws from the underside of the base-plate the chassis can be gently withdrawn about an inch from the panel, after which the red and blue meter leads are taken off by extracting the appropriate screws.

The main chassis, held now to the panel only by the leads to the neon, can then be turned upside down.

Replacement of the existing bandswitch with a miniature DPDT slide-type from the *Eagle* range was found to be but a simple wiring job—though use of a heat shunt when dealing with the miniature ferrite-cored 80-metre coil is recommended. Wiring changes are indicated in Fig. 2, above.

Tapping the PA coil centrally on top of the chassis to accept the new lead from the switch needs to be done carefully lest the coil be damaged. After a little thought this was neatly accomplished by first inserting a ¼-in. wide strip of card through the coil on either side of the winding to be tapped. The single turn displayed between the card sections was then filed clean and a good connection made using an iron with a pencil bit. When the joint cooled off the card was pulled out slightly and the parts blackened by the iron snipped off, the remainder being left *in situ*.

Re-assembly is of course merely a reversal of the dismantling procedure—although before refitting the outer case the VFO dial should be correctly set frequency-wise after a warming up period against the station receiver, in conjunction with a crystal calibrator.

Subsequent dummy load and on-the-air tests then proved the worth of this simple modification, which leaves the transmitter looking exactly as it did before!

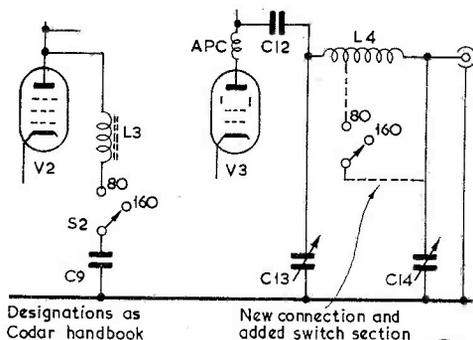


Fig. 1

T 581

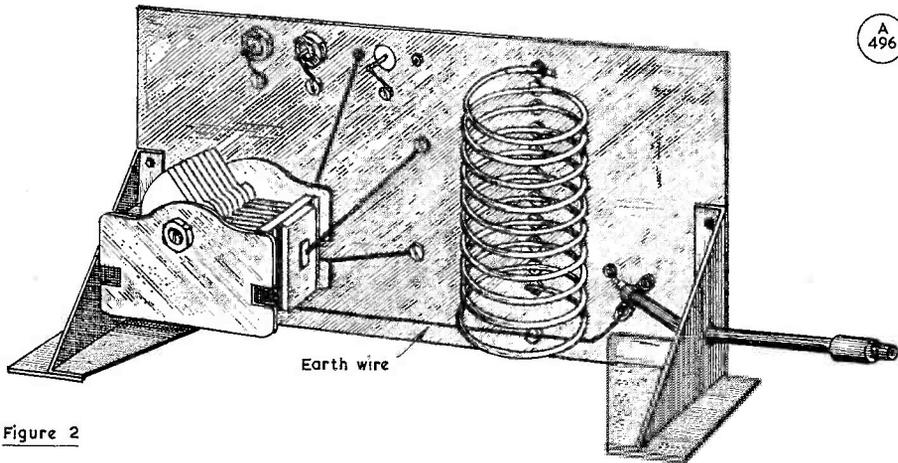


Figure 2

Fig. 2. General layout of the ATU, on its insulated panel. For outdoor operation, the unit should be enclosed in a protecting cover.

EXPERIMENTAL AERIAL TUNING UNIT

FOR THE HF BANDS

H. COLE (G3OHK)

THE drawings herewith, which are largely self-explanatory, illustrate the author's experimental ATU for the 10-15-20m. bands. The general arrangement is, of course, equally applicable to SWL use over these bands.

Different circuit configurations can be quickly arranged simply by using loose insulated wires terminated in croc. clips to link up the coil and tuning capacitor.

At G3OHK, his ATU is at present serving as the matching unit at the base of a 22ft. vertical rod aerial (Fig. 4)—but obviously it has many other applications, both transmitting and receiver-wise. In Tx service and used with an SWR bridge and field-strength indicator, experiment will soon show when a good match is obtained between aerial and transmitter. In SWL service (meaning where the ATU is used for reception only) adjustments can be made on a steady signal mid-band while watching the Rx S-meter.

The diagrams show the general construction. For the coil, make it 10 turns of 16g. tinned copper wire to a diameter of 1½ in. With this coil size, the variable capacitor can be 150 µµF rated for Tx service. For an SWL station, these ratings could be reduced—but in fact 16g. is a convenient gauge for a self-supporting coil, though the tuning condenser could be

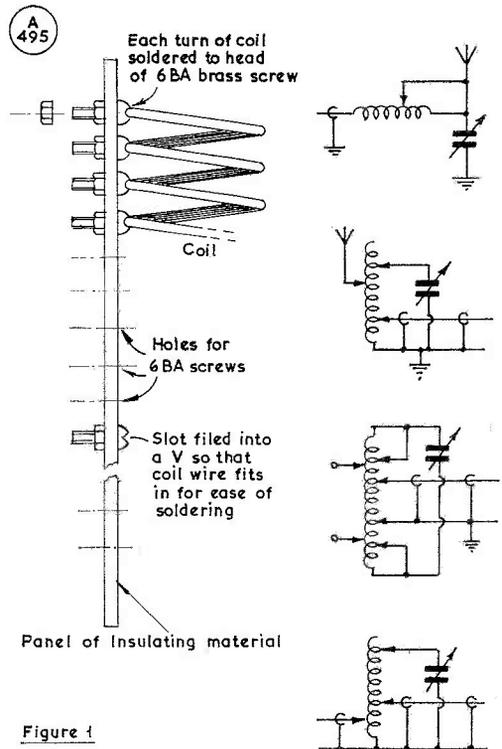


Figure 1

Fig. 1. Coil construction details and possible circuit variations for the ATU described in the article. The coil must be mounted on a panel of good insulating material.

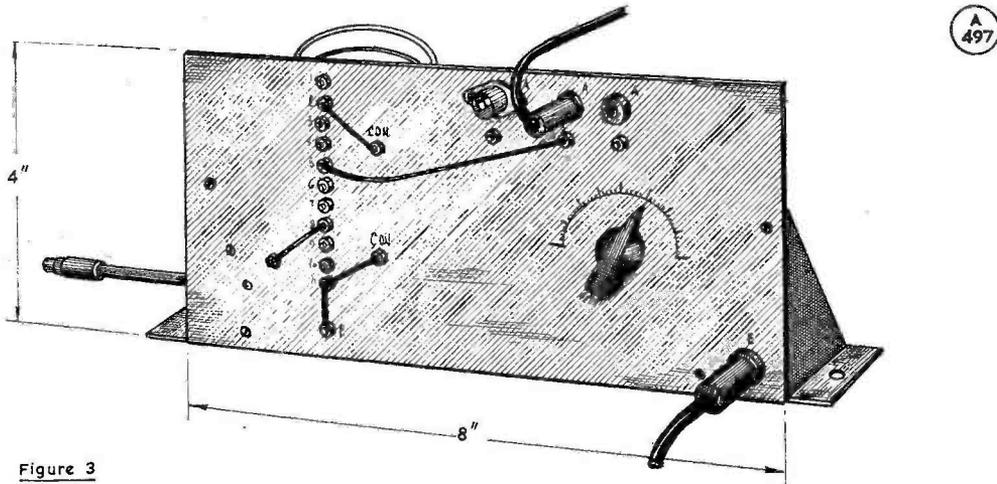


Figure 3

Fig. 3. Front panel layout of the ATU. Loose insulated leads terminated in crocodile clips can be used for the connections. A good earth lead should be provided.

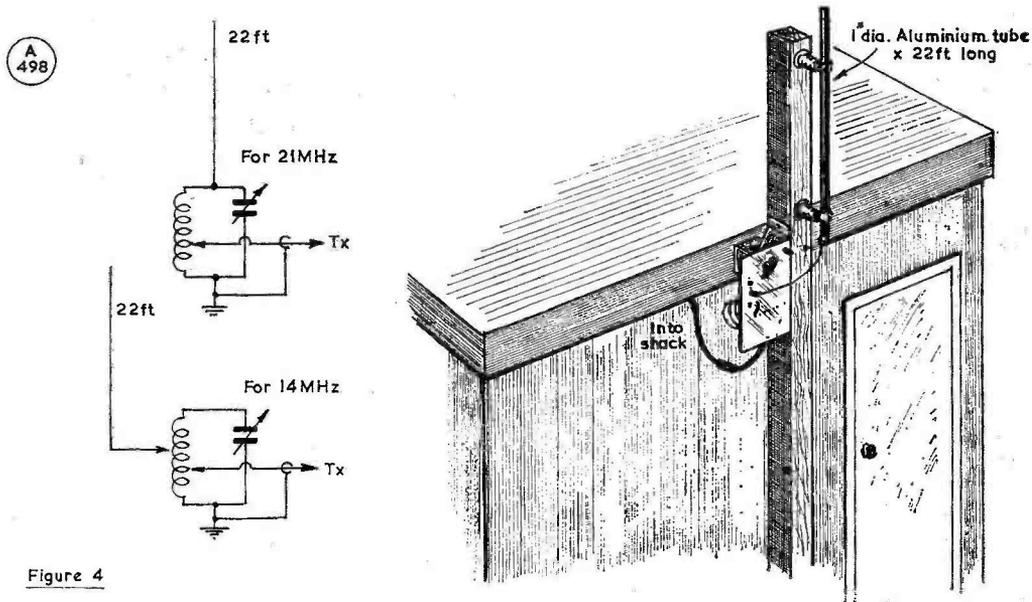


Figure 4

Fig. 4. Possible exterior arrangement using the ATU with a 22-foot tube as aerial. The tuning configurations for two bands are shown inset.

ordinary low-loss receiver type. No slow-motion drive is required because all adjustments will normally tend to be "coarse," or broad-band. You just "feel for resonance."

It should be noted, however, that in Tx service a tuner of this sort can be very "hot" in the RF sense, so should not be adjusted or touched with transmitter power on.

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EXTENDING USE OF BEAMS

MODIFICATION METHODS FOR MULTI-BAND OPERATION

J. D. WARD (VK5WD)

Basically, the suggestion of this article is that by making some simple changes to a beam at its feed point it can—by use of an ATU and an appropriate length of balanced feeder—be made to radiate on other bands essentially as a "plain aerial," perhaps with some properties of gain and directivity. Yet operation on the band(s) for which the beam is designed will not be affected.—Editor.

MANY amateurs who own single or dual band beam antennae of the Yagi variety would like to be able to use them on the three popular HF bands of 20, 15 and 10m. Likewise, many owners of trap-type multi-band beams would like to be able to use them on 40m, thus saving the erection of a separate aerial for this band—an important consideration with the ever decreasing size of the average garden space available.

It is not generally known that all of these things can readily be achieved at very little cost. The penalty?—an antenna tuning unit and a length of transmission line.

How is it done? First, let us take the case of a station with a 2 or 3-element single-band beam designed for 20 metres and who wishes to use it on as many other bands as possible. The first step is to remove the standard co-axial feed line and balun, if any, and to connect to the radiating element a length of 300-ohm circular type feed line, making sure that the connection is weather-proofed. Open-wire line is *not* recommended due to rotation problems and, whilst the standard flat 300-ohm ribbon can be used, it is more weather sensitive. If the beam is fed with a gamma match, it should be modified so that the driven element can be insulated from the boom and split in the centre allowing it to be fed with a balanced line. (This would not apply to beams of the ZL Special type or those with several driven elements).

By connecting the free end of the new feed line to an antenna tuning unit it will now be possible to use the beam in the conventional manner on 20m. However, on 15 and 10m. the ATU and *tuned line* enables the dipole radiator for the array to act as an extended element radiator which exhibits some gain over a dipole and will also show directional characteristics. The antenna will also work on 40m. and, when used in this condition, the radiator is operating as a half-size dipole at fairly good overall efficiency. In fact, by rotating the antenna some measure of rejection will be applied to unwanted QRM which would have to be tolerated with a conventional aerial.

In every case when the beam is used on bands for which it was not originally designed, the parasitic elements will not absorb very much energy from the radiating element because they will not be resonant—in effect the beam becomes a type of rotating dipole,

or extended dipole radiator.

If additional gain is required on 15 or 10m., extra parasitic elements resonant to the required band can be added. Alternatively, a trap-type multi-band director or reflector can be attached to the antenna.

Trapped-Beam Modification

Users of conventional three-band trap beams can also use them on 40m. by adopting the same principle of substituting the co-axial cable feed line for a length of 300-ohm tuned line. The antenna will function normally on the bands it was designed for and the only drawback to this is the necessity to readjust the ATU when changing bands.

The use of the ATU will help to reduce harmonic radiation from the transmitter reaching the antenna and, due to the use of 300-ohm transmission line, the system is balanced on all bands. The conventional Z-match coupler will generally suffice as the ATU, but to avoid high excursions of voltage or current values at the unit itself, it is recommended that the total length of feeder plus one half of the length of the radiator should equal approximately 75 feet.

The writer recommends Telcon type KA36 tubular transmission line as a suitable feeder for power levels up to about 400 watts p.e.p. The line should be spaced symmetrically away from metal objects and kept clear of pipes and gutting by at least a couple of inches. Allowance should be made for enough free line at the beam itself to allow for full rotation of the antenna in the normal manner.

The flexibility and low cost of this system will allow many owners of simple beams to enjoy the advantages of multi-band working while still retaining the specifications of their antennae on the bands for which they were designed.

POINTS OF INTEREST

If you heard or worked JA3XPO, this was the official amateur station at the 1970 Exposition, Osaka, Japan. About 18,000 contacts were made in more than 120 countries and the station had over 6,000 licensed-amateur visitors.

* * *

The price of the standard Log Book we advertise is now 10s., post paid. It has a durable glossy cover.

* * *

For those particularly interested in working U.S. stations, our *Radio Amateur Map of North America* is a good buy at 12s. It covers from the northern part of South America up into the Arctic regions, shows all state boundaries and capitals with their prefixes, and includes some way-out information, like the regional (FCC) frequency allocations for most services and the licensed amateur population of each State—the easy first being California with nearly 40,000! This map is a nice size for wall-mounting.

* * *

In his last year at sea operating /MM in H.M. Ships, G3JFF served in three warships and two Fleet Auxiliaries. From them, he made over 4,400 amateur-band contacts, all but a few of which have been QSL'd.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

BY the time this comes to the reader, Christmas will be all over, and for the GM's the New Year celebration also; comes also a time for the making of New Year Resolutions, and our hobby is surely in these days a fit subject for these intentions.

One of the first would obviously be to call and work and QSL all the people with bad signals, and write clearly on the QSL card that the note was horrible, with clicks, chirps, whiskers and all carefully mentioned on the front of the card. A second would be for all DX-minded operators to let it be known at the Club that they are good for a talk on the subject—and then use the time to try and show why bad operating practices result in a lack of contacts—not to mention the QRM which results from useless CQ calls.

On the more personal side, one could resolve to have a try, however distasteful it may seem, at diversification. To try Phone is a great leveller for the CW man, and so is CW for the Phone merchant—but it is, if nothing more, a good way of finding how the other bloke copes with his problems, and maybe his ploy can be adapted to your favourite mode. Perhaps most important of all is to try and help the newcomer to Amateur Radio who has not "served his time" as an SWL, to make up for that lost knowledge for becoming a good and competent operator. These chaps in many cases only buy a receiver when the R.A.E. pass-slip comes through, and often become content to be just across-the-town natterers on Top Band or VHF on the assumption that to work

DX is a cut above their abilities or equipment. Pretty well anyone can get on Forty with a few watts of CW, properly driven, and get QSO's to DX, as this piece shows so clearly each month, and there is virtually no chance of severe TVI unless the rig is not adjusted correctly or something silly is going on. The Phone man on the same band can also be sure of DX QSO's if he uses his ears—and the pleasure of the first DX contact is often greater than the thrill of the initial QSO with old Joe up the road.

The Broad Picture

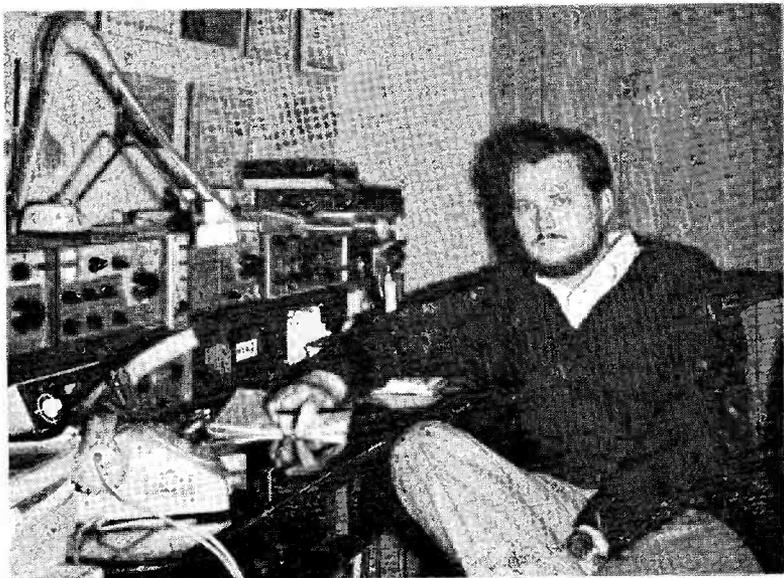
Not unnaturally for this time of the year, winter-time conditions seem to have set in; a state of affairs which is not exactly aided by the imposition of Beastly Summer Time, which means that most of us are hard at it in the salt mine before the morning awakening of the bands to DX. However, there is one

consolation, which is that the whole ridiculous experiment is to be dropped next year at the end of the trial period of three years.

However, given that proviso, there seems to have been a bit of something for all tastes, from Ten right round to Top Band, with the additional savour of trying to wangle things so you get a look at your favourite band when it is open.

Eighty Metres

G3SED (Portsmouth) deserted his usual stamping grounds on Top Band in favour of a little dabble on Eighty. Mike had been brought up, like all good R.A.E. candidates, to regard 80m. as either rather like Top Band but more prone to TVI, or alternatively as a sink into which all the more half-baked varieties of local natter were tipped. During the first week of December an awakening came for him, by way of SSB QSO's at remarkable strength with such as HK6BRK,



During the week November 28-December 6, Klaus Weighardt, OA4LM/OB4LM, was one of the operators on the special-activity station 4T40, on the air for the Peruvian group "Radio Club Peruano". The QTH for OA4LM himself is: Hermilio Hernandez 160, Lima 27, Peru.

HK3ALN, KZ5MU, 9Y4MM, VO1XQ and VE3YN. Oh, well—it's never too late to learn!

Not a lot of time spent on the band, reports G2DC (Ringwood) who found himself working the same few ZL and W stations daily during the morning period; Jack wonders why more of the ZL's do not give Eighty a whirl as the few who are on are most consistent signals. Jack worked, on CW, CT3/DJ1QP, FPØCA, OY6FRA, PJØFC, ZB2AV, ZLIASZ, 5Z4LW, 4Z4HF, 4M5ANT, W1-5, W7-Ø, and VE1-3.

On to G2HKU (Sheppey) who tried his Sideband out to book in LA8YB/4W, ZB2A and 9H1BL.

Here and There

The trouble G3IDG related with his UV4 non-QSO touched off quite a few comments, some funny, some unprintable but funnier, and some words of wisdom here and there. G3ATU (Sunderland), who has been out of orbit for ten years, suggests that the correct cure is to park on the offender's frequency, and make with a—preferably lengthy—"CQ Africa," thus raising replies from every Eastern bloc country. To which G3KFE would add—then leave 'em all to fight it out! On a more serious note, Stan points out that the poor chap may well have been in one of these U.S.S.R.-only shindigs which are not advertised in the West, or even just not wanting to talk to "foreigners," in which latter case he deserves our heartfelt sympathy in the matter of his eardrums.

Talking of eardrums brings us to G3WP (Chelmsford) who recounts hearing UC2WP on Fifteen calling "CQ Test" in the CQ WW battle, who was 578 on 21200 kHz, but simultaneously 598 on 21050! A call to him to report his dual transmission bought only a "R, QRU, VA" in return. Later the chap was much worse with T1 parasitics over a large part of the band. G3WP even goes to the extent of thinking that they specialise—the UA's being the key-clicks experts, the HA's the exponents of dirty notes, and the RA, RB, stations on Ten doing a

project of their own, with jelly-board VFO's fed with raw AC!

On the same tack G3IDG (Basingstoke) reckons some of them do not understand the meaning of the T report, or the suffixes K, C, or QRH tacked on the end. Allan wonders what their National Societies or even the licensing authorities feel about the way their country is held up to ridicule because of the technical incompetence of so many of these operators on the air. With a quick change of subject, G3IDG recounts an incident in the CQ WW Contest, in which he tail-ended an RA3, failed to raise him but got in his place "G3IDG 59921 BK." G3IDG gave 55914 to which the reply was "QSL QRZ?"

Thus the QSO ended with Allan not even knowing who he had worked — this information was gleaned by hanging around for a while until the chap signed EP2BQ.

Twenty Metres

"Never a dull moment" as someone at the club expressed it on hearing of G3KFE's adventures with some tangled radials in pitch darkness. As if that were not enough there have been some super-interesting notes emanating from the receiver which owed more to the lack of enthusiasm of the power supply than to anything at the far end; not even to consider the difficulty in groping

SIX-BAND DX TABLE

(All-Time Post War)

Station	Countries	28 MHz	21 MHz	14 MHz	7 HMz	3.5 MHz	1.8 MHz
W6AM	349	149	161	349	145	119	7
G3DO	339	212	249	332	90	83	9
G2DC	338	181	311	329	169	116	20
G3NOF	320	201	231	309	38	60	4
G3LZQ	265	140	156	215	72	38	8
G3KMA	261	206	201	192	140	58	11
G3IGW	212	129	153	169	136	107	47
9H1BL	202	117	129	143	74	57	8
G3WTV	196	125	124	157	70	74	—
G4RS	187	84	118	128	59	42	13
G3RJB	177	80	58	164	60	37	8
G3XBY	167	110	124	107	74	57	8
G3PQF	165	106	52	105	84	56	13
G3VPS	147	58	54	122	61	40	14
G3YDX	131	69	77	47	54	39	9
G3IDG	131	77	97	55	27	18	12
G3DCS	119	10	79	61	19	19	6
G3XAP	109	44	56	47	74	31	13
G3WPO	105	36	24	66	49	31	24
G3VLX	60	7	14	31	8	28	19

Note: Placings this month are based on the "Countries" column. Claims must be made at least every three months to retain a place.

one's way out of a junk-filled shack in total darkness when a power cut put not only the shack off but the street lights on which one was wont to navigate back to the house. And then the lost QSO's—always DX, of course!

A letter from SWL Bob Scase (Woking) comments on a QSL received from JW5NM. It seems this station is one of a group of eight Norwegians wintering at the invaluable Aeronautical and Met. Station set up for the benefit of aircraft flying over the Pole or North Atlantic. The population is given on the card as "8 men, 5 dogs, and several icebears!" Two of the staff are licensed amateurs, JW5NM himself and JW8MI, with JW7UH at Ny-Aalesund and JW9QH at Long-year-City also active. SWL reports are QSL'd provided IRC's are enclosed (2 for Europe, 3 for others) and the card may go either to JW5NM direct at N-9172 Isfjord Radio/Aeradio, Svalbard, via Tromsø, Norway, or through the LA Bureau. The IRC's are wanted either way, as by July (when they QRT) they will have to fork out for between 7 and 10 thousand cards from their own pockets. Thanks to SWL Scase for passing on the message, and thanks to these JW lads for making it clear they are prepared to encourage proper SWL reporting in this way.

That Joystick at G3DCS (Ipswich) is still hard at work, and during the period under review raised all W call areas except W5, also PJØFC, PY4AP, PY2BGL, KV4FZ, 4Z4HF, OX3AX, ZS3AW, UWØIN, CR6AJ, VO2AF, VE's, VY5BZ, 3B8CR, OY6NRA, OY6FRA, OA4ZP and ZFIAN; by comparison the long-wire tackled and brought down FB8XX and 4M5ANT. Most of this crop came to the surface during the CQ WW Contest, as the bands were dead by the time Enver got into the shack after work during the week, but no special effort was made to seek DX; it was just called when something interesting showed up, or answered if it called G3DCS.

G3NOF (Yeovil) sadly remarks that the DX doesn't usually show



John Wilson, G3MCF, 4 St. Augustine's Grove, Bridlington, Yorkshire, started in 1957 with the T.1154/R.1155 combination (of hallowed memory) modified for AM on the amateur bands. The rig shown here is a Chinese copy of the Swan-350, the PA being a QQV06-40A, covering all bands 10-160m. His aerial is a trap dipole and main interest rag-chewing on the LF bands.

up till long after the McLean nose has been pressed to the grindstone, although the ZL/ZM signals have on occasion come in, all mixed up with JA's, FK8 and KS6, around 0730, sometimes followed by the VK's, who usually are going out by 0900. W's are about from 1200z, generally East Coast, but with VE7 and W7 in around 1700 to 1800, the time that a few ZS's and ZM's have shown up with the beam looking the other way. 9J, 5Z, and 9Q also made their bow about this time. Heard but not worked was the category in which FK8AZ, FK8DD, FR7AF, FR7AG and TR8VW fell, but QSO's were logged with FB8XX, FB8YY, JA1KFQ, KH6DQ, KH6BZF, KH6HCF/TF, OHØAA, VE7EL, VK's, W7GOC, W7VUG, WA7NIN (Nevada), ZD5B, ZD7SD, ZS1JP, ZS2MI and 3B8CR.

"Conditions about normal" seems to be the theme for G2DC in his consideration of Twenty, with the VK and ZL signals coming in much later and not many of them workable during that favourite period from 0700 to 0800z, although they are better a little later in the day. Jack raised CE3CF, CE8CF, EL2CB,

HC1PR, H18LC, KC6CT, OD5LX, TA2TQ, UAØCF, UAØFQ, UL7HV, ZFIAN, 5U7AR, ZS3AW, all W call areas, VE1-7 and VK2-7—all, of course, on CW.

That daily 14 MHz sked, run for so long by G2HKU has been in trouble at this time of the year ever since the advent of BST, has broken down again; so Ted will have to wait for a couple of months till the lighter mornings bring ZL3SE back again.

QSL Matters

We note from the Nigerian ARS News Letter that 5N2ABG is now handling the outgoing 5N2 cards, and that that side of their Bureau was completely cleared on November 10, 1970. Cards for 5N2 stations from other bureaux should still go, as ever, to PO Box 2873, Lagos. Incidentally, the Newsletter notes that batches of cards for 5N2's from several countries have been very slow in clearing their own bureau, notably Ireland, Chile, Denmark, Finland, and Belgium, all of whom included cards in their batches to Lagos which they had been sitting on for four years or more! The Belgian one, incident-

Reporting the HF Bands

ally, was *not* UBA, let it be noted. All this must make us G's bless the quality of the QSL Bureaux we have, and it is a certain bet that if cards are held up here in U.K. it is either bad handwriting or the absence of an envelope to put it in for the last stage of the journey, neither of which is their fault.

Talking of QSL Bureaux and their difficulties brings us to a long letter from ZC4IM, who doubles as QSL manager and Awards king for the Cyprus Amateur Radio Society. As there seems little hope of a restoration of the 5B4 licences, the club has dwindled until it contains only the ZC4's and a few stalwart ex-5B4's. With the fall in numbers comes a fall in the finances, and so they are, with regret, winding-up the Cyprus Award as from March 1971. At the time of his letter, ZC4IM had for various very good reasons, a backlog of application going back to December 1969, but it was hoped that all would be up to date before the end of November '70. Reverting to the QSL bureau situation in Cyprus, ZC4IM notes that delays can occur when ZC4's have given the Bureau as a direct QSL address, because the cards then have to be handled through the normal Bureau procedure. Cards for QSO's over three years old may not reach their destination, and as the Bureau has no outgoing facility may end up in the dead-letter office unless it has IRC's enclosed, in which case ZC4IM uses them to write, returning the cards to sender and advising of the situation. All this problem directly stems from lack of funds and dwindling numbers. Let us hope the authorities will soon be a little more encouraging to the ex-5B4 chaps so their numbers build up again.

Ten and Fifteen

Lumped together this time, as both are usually dead at times

when Joe Average can get on, due to work and TVI—which is the bigger curse? Which is not to say these bands have not been at least trying their best during the daylight hours.

Poor old Don! W6AM (Long Beach), having stacked up the necessary requirements for his 5BDXCC, went through the cards and found himself two short for Ten on account of small things like inaccuracies, omissions or wrong dates on the QSL cards; so, thanks to some other Clot and his slipshod work when writing out the card, W6AM finds himself back at the QSL-writing chore until he can scratch up the necessary couple of replacements.

At G3DCS the theme generally has been one of aerials and their antics; putting up a long-wire seems to have broken the pole of the Joystick, thanks to an over-enthusiastic tug to pull the span out of an interfering tree. Once the L/W was up, and attention being turned to putting the Joystick back, the Heavens opened—and if Ipswich weather is anything like the current Bishops Stortford kind, the heavenly stop-cock seems to have jammed open! The end result is that Enver spent more time dodging the rain in the attempt to get the aerial farm back into a "Go" condition than he did operating, apart from the *CQ WW* weekend. As far as Ten was concerned, it netted him OH2PB, 4Z4HF and VK2AHM, all on the long-wire.

Ten seems to have been quite fair, apart from its late opening habit, in the view of G3NOF. VK's started to show up about 0900 and were often around till as late as 1300z, and at the latter time the signals from JA and KR6 have sometimes been good. Little or nothing has been heard of ZS, although a sked with ZS1KZ at 1630 has clicked five times in seven, albeit only S2, even though mostly R5. Other

SSB contacts included AX3DY, CT2BB, KR6IL, VS6BC, VE's, W's in all areas apart from W7, ZD3P and a few ZS's. Looking at 21 MHz, Don found it opening up to VK about an hour earlier than Ten, changing from long-path to short around 0900, although the KR's peak about 1030. The W's start to break through about 1200z but soon get tired and do not stay up late in (our) evenings, the band usually being dead by 2000z. SSB, again, linked G3NOF with AX2AU, AX2AVT, AX2FA, JA's, TZ2AB, VK1BH, VK2ADX, VK2AGW, VK3TG, VS6BE, VS6DA and ZM1AJU.

By and large, Fifteen was better last month, says G2DC, as the result of the filling-in of that dead spell in the early afternoon. Usually Jack found the band fading out around 2100, if one was

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
G2HKU	98	98
G13WSS	96	97
G3XTJ	96	98
G3ADH	96	96
G3WPO	95	98
G3VLX	95	98
G3XDY	88	96
G8HX	86	89
G3YMH	67	92
G3LXD	64	79
G3KFE	61	85
G3XIV	?	63
<i>Phone only</i>		
G2NJ	98	98
G3PQF	97	98
G3WPO	91	98
G3VGB	91	97
G3XTJ	81	94
G3XDY	72	89
G13WSS	62	81

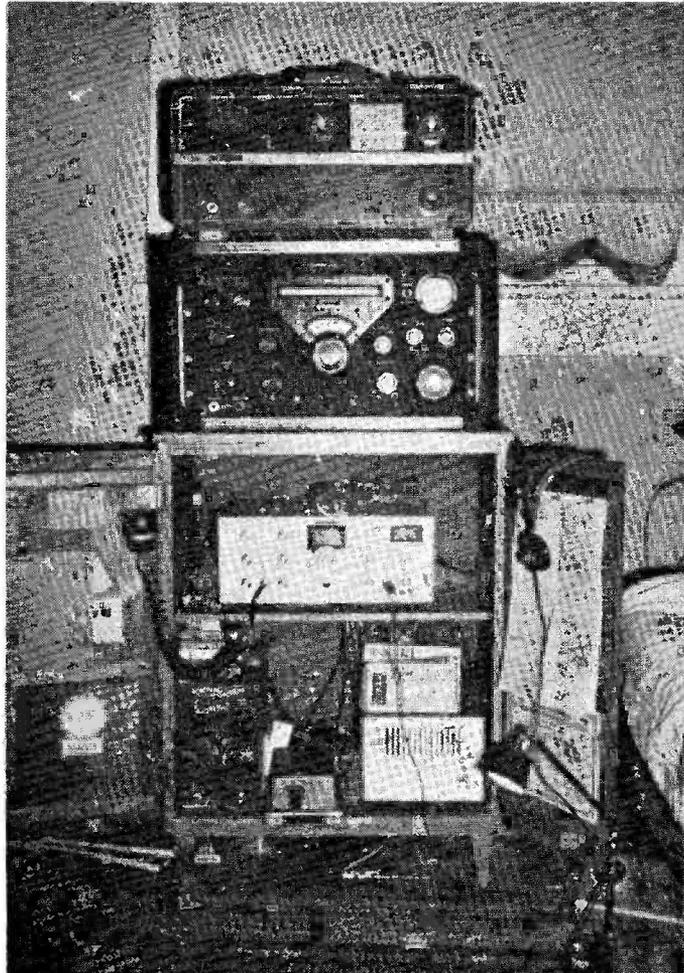
(Failure to report for three months entails deletion from this Table. Claims may be made at any time. Six months of "Nil" reports will also result in deletion.)

looking for W's, but swinging the beam a little to the South would often yield some nice South Americans not smothered beneath the QRM. CW yielded AX2EO, AX4ES, AX6OV, AX6HD, CO2BB, CX1JM, CE1JF, KH6RS, KH6IG, KL7MF, LU5AES, LU8FAN, OA3Y, OA3X, PJ2RB, TJ1AW, UM8FM, VR4FT, ZM3ABN and ZS5WN. Ten, G2DC thinks, has been the best band for a quiet sniff round for DX, as those raucous Eastern Europeans usually drift right off the frequency before the QSO is lost altogether under them! About 1000z many of the VK's are noticeable as having quite a pronounced echo, reported also on one's own signals; the echo is tending to disappear by 1100 and by 1200z good clean copy is peaking from them. A new one for the 10-metre band turned up in the shape of ZD9BM, and other CW QSO's included AX2EO, AX3XB, AX6HD, CR7IZ, CR7FM, EP2BQ, ET3USA, G3LZQ/ZS4, VU2IRA, UAØBL, UL7JF, UH8CB, XW8BP, ZF1AN, 4Z4HF, 5Z4LW and all W call areas.

Now Forty

As always, pretty rackety during the TV-hours of the evening, but even then, with all the European QRM out in strength, once in a while something turns up. Oddly enough, while most of us tend to think (perhaps unfairly) of U.S.S.R. callsigns in terms of QRM and bad signals, it has to be said that once in a while one comes up against a signal of superb quality and very well driven, particularly on CW, from that part of the world, which just goes to show that many of these lads *do* know what they are about—one can only compliment them and wish some of the others would copy.

G2HKU was a little selective, and only mentioned LA8YB/4W, ZB2A, PY7GAI and ZC4JW in his list, all except the first on SSB. G3XAP (Stowmarket) comes in at this point with news of his aerial-farming activities for Forty operation. Phil had hoped to have the tubing to make up his two extra verticals for the three-



Set-up operated by Elliot Blalze, W5TVW, 600 Deckbar Avenue New Orleans 70121, Louisiana. Though he runs QRO with Hallcrafters and Collins gear, he also operates /P and mobile using a small solid-state 5-watt rig. Of particular interest is the fact that W5TVW is active on Top Band, 1803-1822 kHz and would appreciate skeds with Europe and Africa.

element steerable array he intended to get up before Christmas, but, alas, at the time of writing it was still in the pipeline. To pass the time away, however, G3XAP made himself a two-element Quad and with its boom up at the lordly height of 20ft. the first QSO on it was with ZM1AKY—SSB at that, which is unusual for G3XAP. Back to Forty and the list comes in two parts, exotic and ordinary; in the first category are 4X4BR, W7RM, PJØFC, KP4DKX, W6RR, K6RU, K6OS, W5CMQ/6,

K6NA, W7JLU/7, JA1FLT, JA3NFJ, PY7BHL, AX3DNP, AX3APN, UK8JAA, UAØBX, UF6OAA, UD6FA, UO5DN, OY6FRA, SM6CMU/MM (in Zone 8), ZL1AIR, VE7BD, VE8RX, YV1AD, KZ5WJ, KV4CI, 4S7NG, 6Y5GB, CM3LN, UL7GW, UH8CS, LU3EX, and AX4IO. Total of countries worked in November on Forty—fifty-five, no less!

The call of GM3ZDH (Glasgow) may seem a little unusual in this bit of the piece, but it appears because Bob is now

separated—but not divorced, we gather—from his home station by his work at Glasgow College of Nautical Studies. However, at the latter establishment there is a call sign and a Sommerkamp FT-250 to play with when time permits, the call being GM3ZRI, and operations mainly Forty and Fifteen on Tuesday lunchtime, and occasionally on Fridays at the same period.

G8HX (Mansfield) kicks off with his congratulations to GM3JDR on his wonderful collection; it seems they get under each others' feet occasionally on the band, but keep it on a friendly basis, with the odd QSO at times. Frank has been playing Forty since August and has rolled up all W call areas, AX, HI and HH, and 23 W states. However, the aerial doesn't seem to be getting out too well to DX in the Eastward direction, making it difficult to sort out the DX from the QRM and in particular that awful, badly modulated, "thing" which infests 7010 kHz in the early evening. Harking back a bit it may be recalled that some seven months ago G8HX was having a little bother with TVI (on Rediffusion). Frank closed down for a month during peak TV hours at the request of the local GPO, so they could sort it out, and duly complied, whereupon the Post Office promptly forgot all about it, leaving the viewers at the end of the month no better off than before when G8HX came back on the air again. Changing tack a little, Frank is annoyed, and justifiably so, by the increasing numbers of Europeans who answer "CQ DX" calls, in particular the YU's, for some reason, often using Club calls. Perhaps if this piece finds its way to the eyes of those who compile the European national-society newsletters, they would mention it to all concerned, along with the problem of bad signals technically.

G3DCS only mentioned one contact on Forty this month, thanks to his problems with aerials — the lucky one was K2ADY, worked on CW with the long-wire.

One can almost see G2DC turn-

ing puce at the mere thought of the QRM on Forty, both as to its quantity and quality, both of which seem to make his receiver feel unhappy; it seems not a patch on the AR88D of yore, due to worsened cross-modulation performance, partly at least cured by digging out an old home-brew pre-amp. (One would have thought running the receiver at full gain with an attenuator in the receiver feeder was the most likely solution). Anyhow, problems or not, G2DC still managed to hook up his CW to KP4BBN. VP2AAT, ZL1ASZ, YV5BPG, all W call areas and VK1-3, which shows all is not yet lost in Ringwood.

A last-minute letter gives the news that G3YTS (Kippax) is once again banging away with his DX-100U into a 14-AVQ ground-mounted vertical. After a period of inactivity, Rob came to grips with things once more, starting on Forty CW, where his activities scraped up CX8CZ, CM3LN, CT3/DJ1QP, PJ2VD. FB8XX, all W call areas. PY's, UK0AAA, UA9's assorted. JX2HK, UD6AM, UD6DGV, UF6's, UL7LA, OA3Y, UL7XI and EA8FF—not bad when the lad is out of practice!

Pirates

On this subject comes our "best DX" letter for this time, from New Zealand, where, in Gisborne, sits G3XWG (and ZM2AYI). Ross is very annoyed about the activities of a pest who has appropriated his G call sign and is putting it out on 7 and 28 MHz, both CW and SSB. The requirement is for someone to catch the offender red-handed, and hang him from the boom of a Yagi. This pirate, incidentally, has been making use of the G3XWG call since March 1969, so *surely* there will be someone who can pin him down,

Top Band Notes

A light clip this time, probably because most of the Top Band troops send their letters in at the last moment and this time, thanks to the electrical-power

"FIRST-YEAR-OF-OPERATION" LADDER

Top Band Only

Phone/CW Place of Honour: G3YMH, 89/17

Callsign	Date		Countries
	Licensed	Counties	
G3ZDY	21/2/70	84	18
G3ZCC	11/4/70	73	15
GM3ZDH	24/3/70	41	5

CW Only Place of Honour: GM3YOR, 80/10

G3ZES	3/3/70	74	19
G3ZCC	11/4/70	49	14
GM3ZDH	24/3/70	36	5

A first entry to this Table must contain a statement of the date of first licensing or of commencing operations.

cuts, have missed the boat at the very moment when your conductor is rushing to finish early before *he* misses the deadline through loss of light and power!

G3XDV (Canterbury) reports in for the Top Band DX net, and has first of all the sad news that he has no car—bent it—and so no /P gear, during a month when he has been away on a GPO course. The car, incidentally, was pranged while returning from an expedition into Oxfordshire. As a result of this, and of G3YMP being QRT for a rebuild, there has been somewhat of a lack of stations strong enough, both in RF and otherwise, to act as NCS. However, VS6DO has been contacted, ZB2A is known to be coming on Sideband later in the season, and the 5N2 Newsletter is full of all the details, from which it is pretty clear that they are not only aware of the times and frequencies but actively trying to do something from their end.

G3SED (Portsmouth) must be allowed his little bit of space *now*, because his comments last time seem to have aroused the ire of all the county-chasers, who are after his blood—but it is only good form to shoot when the target is on the wing! Mike believes he has hit the jackpot with a resounding thump—what he believes to be the first G/PJ2 contact on Top Band, when he worked PJ2CC, Sint Maarten; the contact was repeated by one other G, namely GM3YCB. During the week December 1-6, no less than 42 DX QSO's were booked in, with U.S. stations in W1, W2, W3, W4, W8 and W9, including

practically all the well-known calls on the other side of the Pond apart from W1BB, who seems to be absent from the doings more than usual this year—where are you, Stew?

A near neighbour of G3SED is G3XIV, who has a great deal to say about the G3SED condemnation of county-chasing as the second-division of the DX-on-Top-Band league. As G.G.B. says, we are nearly all competitors at heart, and most of us are stuck in places where either it is not possible (or we just don't know quite how) to go about brewing an enormous signal such as the G3SED one—and G3XIV makes it pretty clear that he reckons chaps like G3SED, G3OLI, and G3IGW can pass on a lot of good information to the brethren by way of, maybe, a tape-and-slide lecture on how it should be done from an inland site. G3RKJ in particular is mentioned—interesting, in that your conductor goes near G3RKJ in his round of duty, and would comment that *there* is a station which is proof that it is all in the aerial and earth system—but it need not be too obtrusive for the neighbours to make trouble. G3XIV ends up by thinking aloud that G3SED's comments could reduce the mail to this piece and goes on "No reports—no article; no article—no Magazine; no Magazine—Gloom!"—so at least we have one reader.

G3XDY has his scores to bring up to date and mentions activity as being all but absent if one excepts his forays in Oxfordshire during MCC and the following week.

Now to look at the letter from G3YMH who has "two hats" this time. In the first one he is on and occasionally active from Cam-

bridge either as G3YMH/A or G6UW—the latter was pounding in here during MCC with an unmistakable G3YMH swing on the key! The first-named call was going to be activated during the CQ WW Contest, to which end Ron turned out at 5.45 a.m., only to find the College gate locked so that after all he could not get to the G6UW rig until 0640 BST!

Transferring to his other role, as temporary scribe to the Cambridge University Club, G3YMH offers the following details on the annual Easter DX-pedition which has formed such a feature of the calendar for years. Instead of GD, they have chosen to go to Scotland on March 14-16, Ross and Cromarty; March 17-19, Sutherland; March 20-22 in Caithness; with March 24 *only* in Nairn, signing of course GM6UW/P. In the daytime, operations will be on the HF bands. As this expedition is somewhat of a departure from the tradition of the past few years they hope to find enough customers to make it all worth while.

Still with Top Band, and G3SED, Mike has gone to the trouble to compile a table or list showing how the signals from the States could be expected to vary, given BST, as follows: 2300, when conditions are good, W1 and W2 are just audible; midnight, signals are improved to about S4 or S5; 0100 sees them go to S6-7, with W8 becoming audible at S5; 0130 BST, a peak with W1, W2, W3, up to S7 or better; 0200, W1, 2, 3, dropping back to S6, but W8 still S5; at 0300, all down to S4 or 5, continuing so through till 0400. By 0500 things are perking up again to W1-3, continuing slowly to do so through 0600 BST till 0630, when they are back up to S6 and

the W8's become audible again. By 0700, W1-3 should be peaking up to S7 or better and W8 up to S6; by 0730 the W1-3 signals are falling but W8's are coming up to a peak. Around 0800 the W1-3 chaps are down to S3 again and the W8 lads have fallen back to S4, leaving no option by 0830 BST but to *go to bed!* To which might be added a final-final saying that although there are still a few new boys who call the DX on its own frequency they soon realise that the DX is to be *heard* between 1825-1830 kHz but *listens between 1800-1810*, which is therefore the proper frequency area in which to give them a call.

Finale

This has been a rough month, one way and another; first in that the deadline was wrongly set a week late by your scribe, an error only resolved by a very fast SOS to the "regulars," as rapidly answered, for which all thanks. A second in that the electricity trouble and the disruption it caused resulted in a last-minute decision to complete the piece 36 hours earlier than would normally have been the case—so that those who seem to have been left out of the reports or the Tables will know why, with our regrets and apologies. We hope that by next time we shall all be on an even keel again.

Sign-Off

So there it is. To all readers, and particularly correspondents, a Happy New Year. The deadline—and this time it is right! — is **January 11**, addressed as always to "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM.

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RETURNING OUR THANKS

The Editor and Staff of SHORT WAVE MAGAZINE would like to take this small space to acknowledge all Season's Greetings and to thank the large number of readers—from many parts of the world—who sent cards with good wishes for the New Year. These expressions of goodwill are always greatly appreciated and it is a matter for regret that we are unable to reply to them individually. *73 es Tnx*, everyone.

VHF BANDS

A. H. DORMER, G3DAH

Propagation Conditions

THIS has been a bad month again on all the VHF bands. Here in Herne Bay, the London 70 cm. beacon, GB3GEC, has been barely audible for most of the time, and activity seems to have been very low—although better in the Midlands, judging from the reports coming in of more going on there since the advent of the G8APZ/G8AWS contest idea. GB3SC has not been heard for three weeks or so, and the Durham and Cornish beacons on two metres have been well down on their normal strength. However, GB3SX on 4m. does not seem to have varied much from normal, but GB3SU on the same band is not only well down in signal strength, but also appears to have lost his long dash and to be keying continuously. GB3ANG on 145-950 MHz has been heard once only during the last month, on November 21. Of the Continentals, F3THF on 144-007 MHz has been poor or absent, and of the German beacons only the A2 modulated Tx on 143-968 MHz has been heard at all regularly. This report may seem all rather parochial, but experience has shown that what happens in this corner of England is normally pretty rep-

resentative of propagation in other parts of the country.

Combined with on-the-air reports, the conclusions drawn are usually reliable—but went sadly adrift in reporting the October Aurora, when the statement was made that this phenomenon had been neither very widespread nor vigorous. This indeed represented the state of affairs in the South, but GM2DRD (whose call, regrettably, came out as "GM3DRD" last time) has sent long extracts from his log to prove otherwise. These indicate a completely different set of conditions up in Angus, some 400 miles to the North, where an Aurora is frequently not only heard but also seen. Over the period October 16/17, he heard or worked five DL, nine SM, four LA, two OZ, one OK, 12 G, three GW, three GM and one each in UR, OH, EI, GI and PAØ, the Estonian being UR2BU and the Finn OH2RK. Signal strengths were 56A on average, with some of the British stations (such as G3LTF, G3JVL and G6RH) at 59A on the 17th.

The Aurora was first observed on the German beacon, DLØPR, at 1646z on the 16th, when signals were 57A, and this was followed by the reception of SM7BAE, another callsign very well known to *Ar* operators, at 58A. At 2206z there was a tremendous burst of noise and all the *Ar* signals disappeared. A similar noise-burst terminated the first phase of the Aurora at 1855z the following day, and the second phase, starting at 2158z and continuing until 2230z, was similarly terminated. Neither of these bursts was heard in Herne Bay, although the brevity of the second phase was commented upon by several operators in the South.

As must be realised, many more Aurorae make their presence known, both electrically and visually, North of the Border than South of it, but even then not all of them produce effects on 144 or even 70 MHz in this country. For example, Jim reports a beautiful, visual display on October 21, with heavy QRM on TV Chs. III, IV and V but nothing heard on Two Metres. A similar visual appearance occurred on

November 7, this time unaccompanied by any TV QRM, but the opening on Two was limited to about one hour between 2000z and 2100z, with SK4MPI on 145-960 MHz at 53A to start with and then 56A and T9 at the end of it. Another short-lived effect was observed around 1630z on November 21, but little activity accompanied it.

Conditions continued average to poor throughout the remainder of November and into early December. If anything, propagation was better to the South than to the North, and the nightly skeds between F6BEG (*ex-F1BF*) in Paris and G2JF and G3DAH *et al*, on 144-030 MHz CW were generally accomplished. Incidentally, Gérard now runs about 300 watts of CW and has just completed a VFO, so look for him on your calling frequency also.

The final paragraph of these notes on propagation had just been written when the very high pressure system arrived over this country—it reached 1045 mB at Herne Bay on December 9—and was starting to drift East. The indications were that DX must be on to the North through to East, and accordingly the beam was directed towards Germany on the night of the 9th, and there was DL3XE working G6CW on SSB. Admittedly, signals were only about RS55, but there was little QSB, and as the DL was located in EI75j, right over on the Swiss border, this represented a pretty good contact. A few PAØ were about, and it is anticipated that conditions will be even better the day after this goes to press! The Angus beacon on Two was RST 529 at this time, and Durham was RST 549. Neither the Cornish nor the French beacons were audible.

VHF Century Club Awards

An Award this month goes to Roger Thackery, G8CUW, for operations on two metres from Cookridge, Leeds. He gains Certificate No. 84. To get the requisite cards for the claim, he worked 218 stations from August, 1969—not exactly a high-speed return rate! He was a bit handi-

capped in the beginning because he was using a poorish antenna, but subsequently put a 6-ele Yagi in the roof space, and with the QTH some 500ft. a.s.l., he did pretty well. The site is clear to the South through South-West to North-West, but screened to the North through to South-East by high ground, which doesn't help much with the OZ, although it is noted from his list of stations worked that he has had contacts with DL and F. Until June of this year, the rig ran 20 watts input to a QQV03-10 with EL84 modulators, but after the June opening it became apparent to Roger (as indeed it did to many others) that a VFO was essential if one was really going to have a go at the DX. As he also wanted a /P outfit, he knocked up a fully transistorised job which has been put to active use since then with entirely satisfactory results. He reports that more Continental stations have been worked since he got the VFO into service with the QRP rig than he ever got with the xtal controlled 20-watter. The new Tx is based on the Mullard design which uses an RCA 40290 in the PA, and the Rx is a dual-gate Mosfet converter into a *Trio* 9R-59DE. The antenna has now been changed for a 6/6 at 25ft., and this is outside and steerable from the operating position. Future projects include a completely transistorised Rx which will go into the same cabinet as the Tx, and a QQV06-40A linear to give just that little extra but of power when the conditions warrant it. Some time is spent /M and /P, and the best DX to date has been from G3OHH territory at Mow Cop in Staffordshire, whence an HB9 was worked during the last opening, and that with 3 watts to a halo! (No wonder G3OHH is at the top of the VHF Annual Tables this year!)

Decibels and That!

A recent article in one of the American magazines drew attention to the use of the decibel as a *measure*, and it seemed a good idea to produce these few notes for those who have not yet had much occasion to get acquainted

with this very important subject.

First of all, it should be noted that the decibel describes the *ratio* between two quantities. It is absolutely independent of their magnitudes. And arithmetical ratio such as 10:1 involves either multiplication or division to arrive at an answer, but the decibel behaves as the *logarithm* of the ratio, and multiplication and division replaced by addition and subtraction. For example, if the ratio of 10:1 is 10 dB (which it is when considering power) then 100:1 is not 10 times 10 dB, but 10 dB + 10 dB, or 20 dB. The fundamental unit in this system is

the *Bel*, and since 10 dB = 1 Bel, the thinking for calculating decibels becomes merely:

Ten times the log of the power ratio. From Ohm's Law we know that power is proportional to the square of the voltage or current, and to derive a dB expression for voltage or current it suffices to translate this squaring process into the multiplication of the ratio by 20 rather than by ten. The two equations then become:

$$\text{Power in dB} = 10 \log \frac{P1}{P2}$$

$$\text{Voltage (or current) in dB} = 20 \log \frac{V1}{V2} \text{ (or } \frac{I1}{I2} \text{)}$$

THREE BAND ANNUAL VHF TABLE
January to December, 1970

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3OHH	57	8	54	11	27	3	160
G3DAH	24	3	67	15	16	6	141
G2AXI	47	6	51	12	30	3	139
G3COJ	10	1	53	16	29	8	117
G8ATK	—	—	52	17	35	8	112
G8ATS	—	—	55	12	35	8	110
G2JF	—	—	53	11	29	8	101
G8APZ	—	—	46	9	31	4	90
EI6AS	13	8	51	10	—	—	82
G3EKP	23	6	35	8	6	4	82
GD2HDZ	—	—	51	9	17	3	80
G8BKR	—	—	56	10	11	2	79
G3IAR	35	4	30	7	—	—	76
G8CVD	—	—	48	11	2	1	62
G8BWW	—	—	45	7	5	3	60
G3BHD	—	—	42	9	—	—	51
G8AUN	—	—	35	8	2	2	47
G8AUE	—	—	—	—	40	7	47
G3FIJ	—	—	37	5	1	1	44
G3ZIG	—	—	37	7	1	1	44
G8CCH	1	1	29	5	—	—	34
G8DWW	—	—	24	5	—	—	29
G3OJY	—	—	21	5	—	—	26

Notes:
(a) G8AUE has 19 + 4 on 23 cm. also.
(b) Just a reminder that the Tables go through to December 31, 1970, so final claims may be made after January 1, 1971. The Three-Band Annual Tables show claims to date for the year commencing January, 1970. Readers are reminded that claims should be sent to: SHORT WAVE MAGAZINE, BUCKINGHAM, BUCKS.

We know that decibels are added together when the basic ratio is multiplied, so if 10:1 is 10 dB, then 100:1 is 10 + 10, or 20 dB; 1000:1 is 10+10+10, or 30 dB; and so on. Remembering that 100 is 10^2 and 1000 is 10^3 , the corresponding logs being 2 and 3 respectively, may help to make this a little clearer. The same process can be applied when the basic ratio is divided, although in this case the two logs are subtracted. If 100:1 is 20 dB and 2:1 is 3 dB, then $100/2 = 50 = 20 - 3\text{dB} = 17\text{ dB}$.

To manipulate in dB it is only necessary to memorise four values, and one can then dispense with the log tables. 1 dB = 1.25:1, 3 dB = 2:1, 5 dB = 3.16:1 and 10 dB = 10:1. (Power ratios). From these we can get any other values required by addition or subtraction. For example, 9 dB is 3+3+3 dB, or $2 \times 2 \times 2$ which gives a ratio of 8:1. Any number can be built up from the addition or subtraction of 1, 3, 5 and 10.

Practical Examples: It has recently been agreed that the spurious in-band products from an SSB transmitter should not exceed 90 dB down on the p.e.p. output. In practice this figure is quite difficult to achieve, let alone measure, so let us use as an example here a figure of 65 dB down, which is more usual, and see what this represents in terms of actual watts output.

Assuming the p.e.p. output is 150 watts, 5 dB down gives an output of $150/3.16$ watts = 47.4 watts. 60 dB down on that gives $47.4/10^6$ watts = 0.047 mW, perhaps a frighteningly low figure at first sight, but at one mile range this represents several microvolts of signal at the input to the converter and that means that it is very easily read.

Another illuminating example of the use of the decibel might be to use it to calculate the voltage developed at the grid of the mixer in a receiver from a strong local signal.

Many S-meters are so arranged that S9 on the meter is equivalent to an input of 50 μV . A signal indicating S9 + 40 dB would, therefore have to be 100 times as strong as this, or 5 mV. Assuming a converter with two RF

stages and a mixer, all with a gain of 20 dB each (a quite common figure) the input to the main receiver would be 60 dB up on this. It is probable that this receiver itself would have at least one stage of RF amplification before the mixer, and if this is also assumed to have a gain of 20 dB, we find that the signal is now 5 mV + 80 dB, or 50 volts—if the receiver has not limited before that. Just what this would do to the average mixer can well be imagined! Instant cross-modulation! Incidentally, this exercise also shows that there is a clear case for using minimum gain in front of the mixer and relying upon subsequent stages for the required degree of amplification. In fact, a converter starting off with a crystal mixer would be just the job if the requisite amount of *selectivity* could be built into the front end.

Obviously, one cannot go into great detail here on the subject of logarithms and decibels, but it is hoped that these simple explanations will help to clear up some doubtful points.

Amateur Frequency Allocation

One does not know who Bob Raggett is, but he can certainly write a good article on the use of amateur frequencies around the 70 cm. band, as is evident from his contribution to *Electronics Weekly* for November 11. It opens with a reference to a word which is on many lips these days, perhaps in a different context—pollution—and goes on to point out that radio communication frequencies are being choked for commercial gain. In particular, the author—who appears to be very much more clueful than many pressmen who boringly, and usually inaccurately, presume to pontificate on Amateur Radio matters—refers to the avaricious eyes being cast by the mobile radio interests on our allocation for amateur TV. Acquisition of this portion of the radio spectrum would enable them vastly to expand their empire at the cost of very little research and development, since it would require merely a downward extension of

their present allocation of 450-470 MHz. One suggestion is that there might be a sharing of frequencies below 450 MHz, but this would have to be on a non-interference basis, and if so, who would non-interfere? To withdraw frequencies above 434 MHz means that amateur TV would virtually grind to a halt, and this is obviously quite unacceptable, as would be the surrender of frequencies such that 625-line colour transmissions (with the audio in the communications segment of the band) became impossible. An upward extension of the band allocated for mobile use would bring a conflict with either the military or the BBC/ITA interests; would cost money for development of new equipment; and would probably end in defeat, so this is unlikely to be looked upon with other than a jaundiced eye. So what, then, is the solution?

Raggett does not offer a way out, but one easement which comes immediately to mind is a reduction in channel spacing to half the present limit. This, together with the introduction of SSB techniques, would give 1000 or more channels in the present allocation of 450-470 MHz. The allocation of frequencies on a geographical basis should be profitable, and a tightening up on the proliferation of unauthorised mobile terminals would be both profitable, (at least to Minpostel) and would ease frequency congestion and subsequent QRM.

Whatever the final outcome may be, there is little doubt that, from our point of view, a demonstrable occupancy of the 70 cm. band is highly desirable in the light of the inevitable monitoring of our allocation which is certainly taking place. Are you taking part in the contest organised by G8APZ and G8AWS?

Statistics

For those who enjoy looking at figures—and who, given the right stimulus, does not—the following analysis of German radio amateur activity may be of interest: Some 49%, or 6,600, of all amateurs in Germany are active on two metres, and of these

5% also have 70 cm.; 0.3% are QRV on 23 cm. Of the total, 65% use AM, 20% NBFM, 13% are on SSB and only 2% use CW uniquely. Some 71% run 10 watts or less, 26% use between 10 and 100 watts and 3% have more than 100 watts output. Among the mobileers, 68% are on two metres. One wonders if a similar analysis in this country would produce the same sort of answers?

Group Activity

The South-East UHF/VHF Group meeting in November listened with interest to a presentation given by a team led by Geoff Stone, G3FZL. The subjects covered included VFO techniques, receiver noise measurements, transceiver design and evaluation, and NBFM. It was profusely and convincingly illustrated by demonstrations of modern equipment for these purposes. The relative merits of NBFM and AM transmissions have been discussed several times in this Column, as has the increasing use of VFO's on VHF, and it was gratifying to find such an eminent authority as G3FZL supporting our views. The next meeting of the Group will be at Wye College, University of London, near Ashford, Kent on January 22 at 1930 hrs, when the speaker will be an authority on VHF receiver design, G3NNG, Des Desborough.

Groups of scouts from Luton, Weybridge and Slough organised a get-together, which they called "Radlec '70," at Phasels Wood Camp in Hertfordshire during October. The undoubted success of this venture may provide food for thought among others interested in Scouting. Stations were active both on the HF and the VHF bands. Readers may have heard the callsign GB3REC on two metres, and, in addition, G6AFA/T demonstrated his TV equipment by making contact with G6AFL/T and G6DGR/T to prove that it really did work. Lectures, a D/F hunt and Junk Sale were included in the programme, and it is reported that the weekend was thoroughly enjoyed by everyone. Further details of the organisation behind this venture may be culled from

one of the leading spirits, G8CUB, QTHR.

Beacons

Information on the new German two-metre beacons mentioned previously in this piece has now come to hand. DLØSGA is located in GJ76b near the Czechoslovakian border. The power output is 5 watts, the antenna a corner dipole, the frequency 145.973 MHz and the callsign is sent in A1. DLØUH is located in EL68f to the South-East of Gottingen and just west of the DM border. The power output is 1 watt, the antenna another corner dipole, the frequency is 145.990 MHz and the callsign is again in A1. DLØBRA was an experimental beacon operated by the Bremen Amateur Radio Club and has now been discontinued.

Contests

The 144 MHz Fixed Station Contest on Sunday, December 6, attracted much activity but little DX. The best contact must surely be that of G8BBB in Ely who made it with DK2AM in ENO1g, although this was certainly an isolated case, and was made on SSB; it could not have been done on AM. Roger also had the best score heard, around the 90 mark. Apparently, few contacts were made over 150 miles, and the most notable feature of the event was probably the high proportion of new callsigns to be heard. An analysis of the G3DAH log shows 25% G8D-- and 5% G8E--, the newest of whom was G8ELK, near Canterbury. Operating procedures were generally good, and it was noticeable that many more stations were equipped with VFO's than was the case in previous events. There was a welcome and growing tendency to announce "listening first on this channel" which was bringing results. It is to be hoped that the lead which the Continental European stations have over us in this respect will continue to diminish.

The results of the VHF/RTTY contest organised by BARTG are now out. No entries were received for 70 MHz working, but 16 operators put in logs for two

ANNUAL TABLE — BAND SUMMARY
January to November, 1970

TWO METRES			
Station	Counties	Countries	Total
G3DAH	67	15	82
G3COJ	53	16	69
G8ATK	52	17	69
G8ATS	55	12	67
G3BKR	56	10	66
G3OHH	54	11	65
G2JF	53	11	64
G2AXI	51	12	63
E16AS	51	10	61
GD2HDZ	51	9	60
G8CVD	48	11	59
G8APZ	46	9	55
G8BWW	45	7	52
G3BHD	42	9	51
G3ZIG	37	7	44
G3EKP	35	8	43
G8AUN	35	8	43
G3FIJ	37	5	42
G3JAR	30	7	37
G8CCH	29	5	34
G8DWW	24	5	29
G3OJY	21	5	26

FOUR METRES			
Station	Counties	Countries	Total
G3OHH	57	8	65
G2AXI	47	6	53
G3JAR	35	4	39
G3EKP	23	6	29
G3DAH	24	3	27
E16AS	13	8	21
G3COJ	10	1	11

SEVENTY CENTIMETRES			
Station	Counties	Countries	Total
G8AUE	40	7	47
G8ATK	35	8	43
G8ATS	35	8	43
G2JF	29	8	37
G3COJ	29	8	37
G8APZ	31	4	35
G2AXI	30	3	33
G3OHH	27	3	30
G3DAH	16	6	22
GD2HDZ	17	3	20
G8BKP	11	2	13
G3EKP	6	4	10
G8BWW	5	3	8
G8AUN	2	2	4
G8CVD	2	1	3
G3FIJ	1	1	2

metres, and two stations, both HB9, for 432 MHz. The winner was DJ8BT, with 840 points, and the runner-up PAØIJ with 765 points. The leading G station was G3UVZ with 225 points, and he was followed by G8AEL, G3YKB, G8COT, G3TDM and E15BH. Among British stations active, but not participating, were:—E14AL, G3DY, G3AJS, G3IIR, G3LNN, G3OIW, G3OVZ, G3PZH, G3TWX/A, G3VZV, G8AGM, G8ATQ, G8BBB, G8CKF, G8CUO and G8DQB.

It must be admitted that this large number of British calls running RTTY on VHF came as a surprise to your scribe, who would

have been prepared to bet that there were not that many *active* stations.

In general, band conditions were poor, and not at all conducive to Continental working, although the PAØ were generally producing reasonable signals. Two "Firsts" were recorded — the receipt of logs from HB9 for operation on 70 cm., and the first-ever logs from Italy, and that for /P operation too!

Amateurs interested in RTTY and contests of this type, may get in touch with Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex, who is the BARTG contests and awards manager.

December 31, 1970 is the closing date for the G8APZ/G8AWS 70 cm. Contest, and entries should be sent to either of those two stations, QTHR, as soon as possible after that date. Entries which arrive after January 31, 1971, cannot be accepted.

Annual VHF Tables

The end of the year approaches fast, and with it, the last chance to put in a claim for the Three-Band Annual Tables. We have shown the breakdown by bands this month. First places for two- and four-metre working remain unchanged from last time, but G8AUE and G8ATK have managed to overtake G8ATS, the previous leader on 70 cm. However,

more claims will undoubtedly be coming in after December 31, 1970, the closing date, and positions may well show considerable change. Bearing in mind the closing date, it would be much appreciated if readers would forward their claims as early as possible in January, 1971, and certainly no later than January 9, so that the final lists may be published in the February, 1971 issue.

News Items

G8CNQ, Rochester, Kent, has got his old callsign back after nearly 20 years; he will be heard as G3FMB again shortly. F1BF now has his full licence and is on every evening from 2115z onwards as F6BEG, and is looking for G stations, on 144-03 MHz mostly. A new callsign which will shortly be heard on two metres is that of G8EGN—a happy allocation, since his father is the well-known Bristol amateur, G6GN.

G5DS, John Danks, has moved QTH from Surbiton, Surrey and now operates from Walton-on-Thames. He reports that the new site appears to be equally as good as the old one in all directions except to the North. An added hazard to DX reception is the proximity of certain flight paths for aircraft working in and out of London Airport. John is active on two metres, both AM and SSB,

and will be well remembered as a keen two-metre man in the early days.

It is pleasing to note, from the Annual VHF Tables, that G8BWW in Southport, Lancs., is now QRV on 70 cm. as well as on two metres.

G8DTM of Wymeswold, near Loughborough, has been working /M and /P from various sites in the North of England, including operation from Thwaite Fell in Cumberland during a particularly foul weather situation over the weekend of November 1. He works and lives in his Caravette on these occasions and so has some advantage over the tenters. He has been operating mobile from North Staffordshire recently, from such good sites as Merryton Low, Cloud Side and the Weaver Hills, and reports that there is always something to be heard on the two-metre band when you are at 1600ft. a.s.l., even with just a halo! He would welcome DX contacts on Two, and he is usually active on Tuesdays and Thursdays after 5 p.m. on 145 MHz.

Deadline

Deadline for the next issue is **January 9**. The address for news, views and comment is: SHORT WAVE MAGAZINE, BUCKINGHAM, BUCKS. Cheers for now, 73 and a very happy New Year from G3DAH.

VXO TRANSMITTER FOR TWO METRES

GENERAL IDEA AND CIRCUIT DETAILS — CW AND OPTIONAL AM / NBFM

P. BENDALL (G3NBU)

SINCE becoming interested in VHF again some three years ago, the only transmitter used at G3NBU has been the somewhat modified Heathkit Two'er, on which several ideas were tried out. The prospect of producing a complete two-metre Tx has been rather daunting and for this reason the transmitter to be described was approached as three separate modules—PSU, Modulator and RF section. There were power supplies available and the modulator could come from a previous 160m. Tx, so the RF side was designed with CW in mind,

and the annual VHF/CW contest as a possible target.

A variable crystal oscillator (VXO) was chosen as it was felt that a pure VFO was rather too difficult. The circuit was taken exactly as shown in the ARRL "VHF Manual" (p. 98) and performed perfectly as claimed for it. A 6AK5 Pierce oscillator can be pulled up to 4 or 5 kHz at 8 MHz with a 2-gang 100 μ F capacitor, so that two crystals of 8004 and 8008 kHz respectively cover the whole 150 kHz of the two-metre CW band. Complete coverage of the rest of the band is obtainable only with an excessive number of crystals—but in practice the VXO is sufficient to pull "near" crystals on to net frequencies, or to move off a frequency to dodge QRM. The VHF Manual circuit also comprises the tuned buffer at 8 MHz and the 24 MHz tripler.

Previous VHF projects have resulted in difficulties with drive to the PA, so "brute force" was decided on! Accordingly, 5763 VHF beam tetrodes were used for the 72 MHz tripler and 144 MHz doubler stages. This resulted in an abundance of drive which could

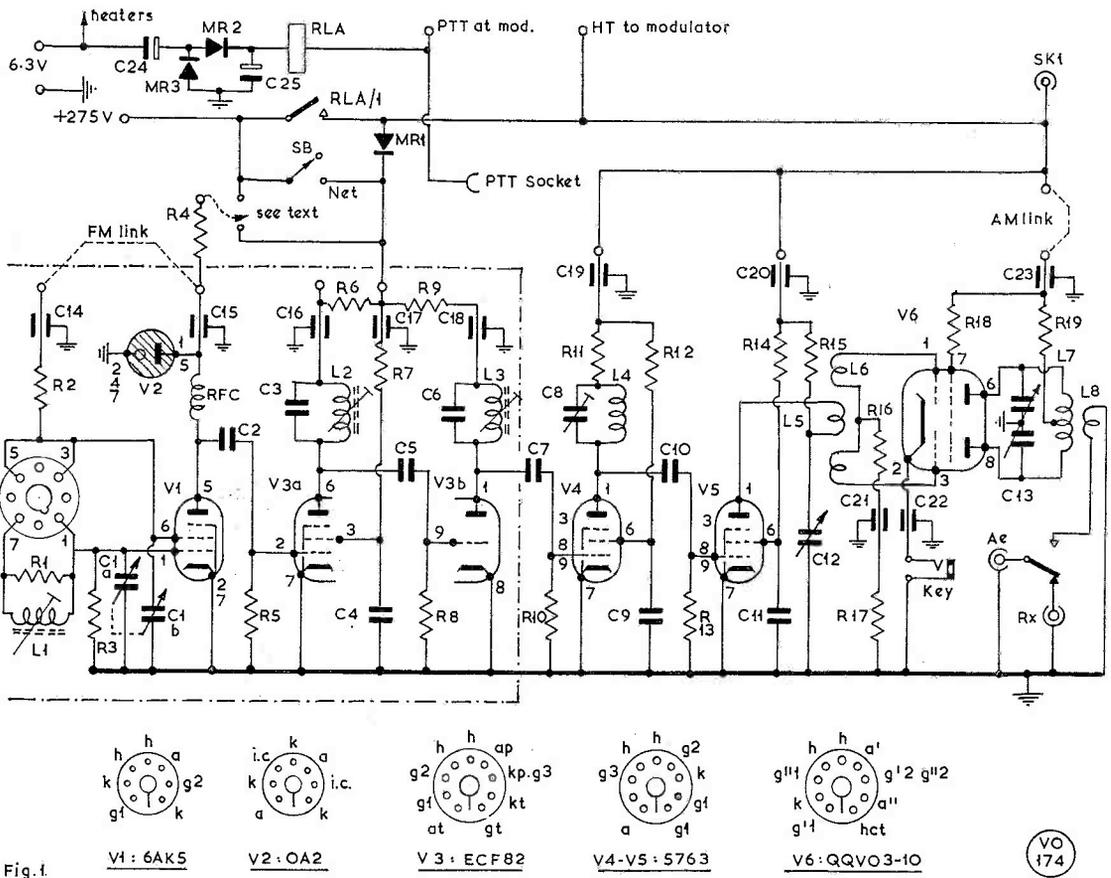


Fig. 1

Fig. 1. Circuit of the VXO Transmitter for Two Metres by G3NBU.

Table of Values

Fig. 1. Circuit of the VXO Tx for Two

C1A, C1B = 100+100 μ F tuning	R9 = 10,000 ohms
C2, C5, C7 = 47 μ F, cer.	R10 = 56,000 ohms
C3, C6 = 27 μ F, cer.	R11, R15 = 220 ohms
C4 = .005 μ F, mica	R12, R14 = 12,000 ohms
C8 = 3-30 μ F, trimmer	R16 = 22,000 ohms
C9, C11 = .001 μ F, mica	R17 = Meter shunt, 150 ohms for most 0-1 mA meters
C10 = 33 μ F, cer.	R18 = 27K 1w. non-inductive
C12 = 100 μ F min. variable	R19 = 39-ohm 1w. non-inductive
C13 = 10+10 μ F split stator, var.	RFC = 1 mH, wire-in
C14, C15, C16, C17, C18, C19, C20, C21, C22, C23 = .001 μ F min. feed-thru.	MR1 = BY-127, or any 400v. PIV diode rated 200 mA
C25, C26 = 25 μ F, 25v. wkng., elect.	MR2, MR3 = Silicon diodes, 100 mA, 32v. PIV.
R1, R6 = 470,000 ohms	RLA = Radiospares plug-in relay, 12v., two c/o
R2 = 150,000 ohms	V1 = 6AK5, EF95
R3, R5, R8 = 47,000 ohms	V2 = OA2, or similar
R4 = 100,000 ohms 1w.	V3 = 6U8, ECF82
R6 = 470 ohms	V4, V5 = 5763, QV03-12
R7, R13 = 68,000 ohms	V6 = QQV03-10

TABLE OF COIL DATA

- L1 — VXO series coil, 20 turns 28g. on $\frac{3}{8}$ in. cored former.
- L2 — Buffer for 8 MHz, 24 turns 28g. on $\frac{3}{8}$ in. cored former.
- L3 — Tripler to 24 MHz, 12 turns 28g. on $\frac{3}{8}$ in. cored former.
- L4 — Tripler to 72 MHz, 6 turns 18g., $\frac{1}{8}$ in. dia. by $\frac{1}{8}$ in. long.
- L5 — Doubler 144 MHz, 4 turns 18g., $\frac{1}{8}$ in. dia. by $\frac{1}{8}$ in. long.
- L6 — PA grid coil: $2\frac{1}{2} + 2\frac{1}{2}$ turns 18g., opened at centre to accommodate L5.
- L7 — PA tank: 4 turns 18g., $\frac{1}{8}$ in. dia., parted at centre.
- L8 — Ae. coupling: Two turns thin p.v.c. covered, $\frac{1}{8}$ in. dia., at centre L8.

Notes: All resistors rated $\frac{1}{4}$ -watt except where stated. Crystal holder, or pluggable xtals to achieve coverage, octal low-loss type. Xtal plugs across sockets 7, 5, of holder.

possibly feed an amplifier stage of greater output power capacity than the QQV03-10 actually used. Excessive drive can always be "tidied away" by increasing the screen resistors R12 and R14.

Putting it Together

Construction was on a 12 x 7in. chassis that was

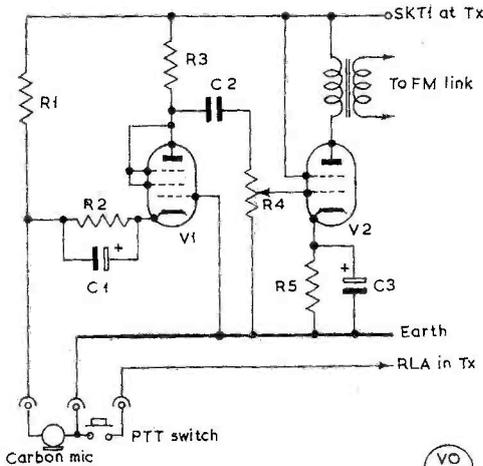


Fig. 2

Fig. 2. Suitable FM modulator for the G3NBU two-metre Tx. Values can be: C1, 10 μ F 25v; C2, 0.1 μ F; C3, 25 μ F 25v; R1, 22K one-watt; R2, 330 ohms; R3, 330K; R4, one megohm, control for deviation; R5, 330 ohms; T1, 1:1 interstage, or two o/p xformers cascaded to give 1:1; valves V1 6E91, or Z77, 6AM6; V2, 6AQ5 or any similar audio pentode.

to hand and as the valves were placed on a line two inches from the chassis front either a 4in. wide chassis could have been used or a PSU and the modulator built on the remaining area. No special precautions were taken except that all RF wiring was kept to a minimum and only one earth tag used to each valvholder. A screen was fitted across the base of V6. As Erie feed-through capacitors were available these were fitted adjacent to each stage and used to take the HT connections through to the top of the chassis (C14-C23 inclusive). It is convenient to use only one HT point per stage, wiring isolating or dropping resistors between these tags, and when testing to connect HT to each stage successively, allowing each part to be checked before going on to the next. The key and the grid resistor for the output valve are also taken through feed-through capacitors. If such capacitors are not available, suitable 500-1000 μ F condensers should be fitted to stand-off insulators or tags adjacent to each stage.

All coils were resonated in place with a GDO before applying power. Links were fitted in the screen circuit of the 6AK5 and the HT supply to the PA for NBFM and AM respectively. The simple audio amplifier was produced in about an hour to provide NBFM for local contacts and despite reports of "one-sided deviation" was found reasonably adequate.

The modulator is that suggested by G3OGR in his push-pull design ("Short Wave Magazine," March

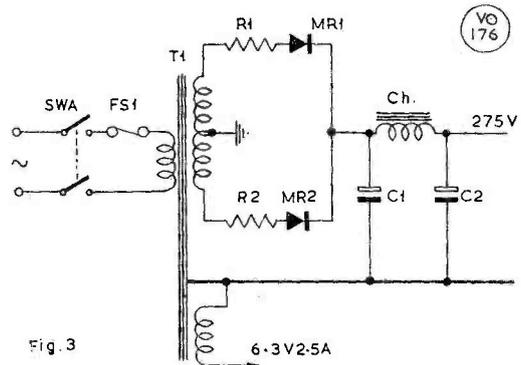
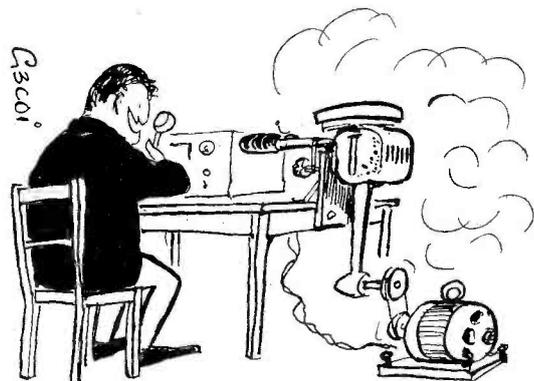


Fig. 3

Fig. 3. Suitable PSU for the G3NBU rig. This is a standard arrangement, for which values could be: C1, C2, 50 μ F 450v. electrolytic; R1, R2, 100-ohm 6-watt wirewound; rectifiers MR1, MR2, BY127; smoothing choke Ch, 100 mA 10 Henry; mains xformer T1, 300v. each side, giving 125+ mA.

1968, p.18, Fig. 6 and text). The power supply as shown has been on the bench for some years and is the one always used for such projects. An aerial change-over circuit is shown and is as that at G3NBU but is not incorporated in the Tx as built. It may be omitted if preferred.

Originally, the top of R4 was connected direct to HT so that the VXO ran continuously—but even when in its cabinet the beat could still be heard faintly, so the VXO was fed from the buffer HT line. Although this results in the oscillator having to start up from cold every time on going to "transmit," drifting has been found not to be objectionable. It is preferable to feed from the direct HT if at all possible. The crystal plugs into pins 5, 7 of the socket for VXO operation or into pins 1, 3 for normal crystal working.



"... the power supply unit here is a bit unusual ..."

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COLLAPSIBLE OSCILLOSCOPE TROLLEY

CONSTRUCTIONAL DETAILS

C. J. DORAN, B.Sc. (G3VZH)

Something on these lines would also be very useful for humping AR88's and all manner of heavy items—Editor.

IT is unusual nowadays for an oscilloscope in professional use to be caught cluttering up space on the workbench; almost invariably it is found beside the operator on a wheeled trolley. Apart from the obvious saving of bench-space, the manoeuvrability given to the instrument is of great advantage when servicing in difficult positions*. The trolley can be designed to tilt the oscilloscope screen to a convenient angle for viewing and knob-twiddling, thus saving a lot of neckache when taking accurate measurements.

An important reason for the popularity of trolleyed 'scopes in professional installations is that the floor area covered by the equipment may be large, and portability of the service oscilloscope is essential. It can be parked in a free corner of the room, and brought quickly to any point for emergency repairs. However, as all the corners of the author's shack are filled with piles of junk, it was resolved to design a trolley which would fold up when not in use. The storage space required is little more than that occupied by the oscilloscope itself.

Design

The author's trolley was built for an oscilloscope 8½ in. wide, 12 in. high and 18½ in. deep, weighing approximately 100 lb. Allowance was made in design for possible use with another instrument, and 9½ in. x 14 in. x 19½ in. can actually be accommodated. For the benefit of readers possessing one of the larger monsters, an outline is given below of the way in which the trolley dimensions were determined, so that appropriate modifications may be made.

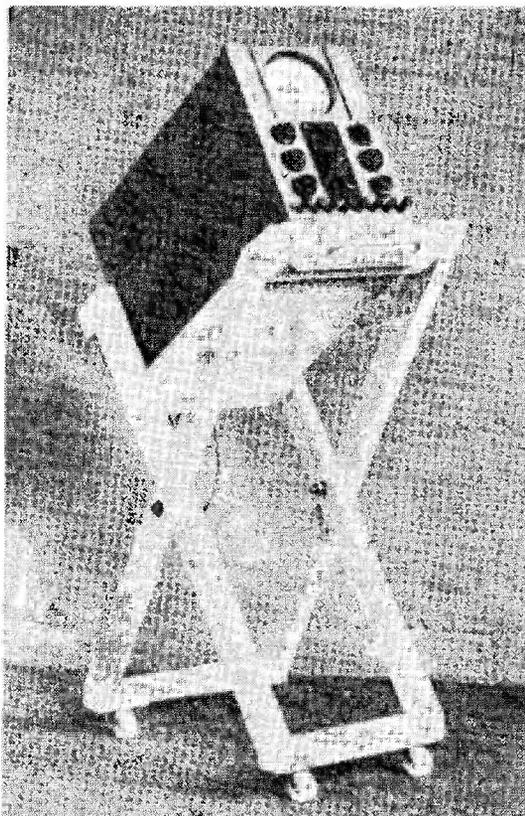
The photograph shows the erected trolley. The oscilloscope table is hinged at the back, and a lip on the underside of the table-front fits over a bar joining the two rear leg extensions, holding all rigid. To collapse the trolley, the table is lifted to raise its lip over the bar and dropped down flush with the front legs. The legs themselves are pivoted on the bolts where they cross, enabling them to fold together. The similarity to an ironing-board is no coincidence, but the temptation to carry out an unauthorised modification on the XYL's apparatus should be resisted.

The width of the trolley depends on the width of the oscilloscope—it must be able to fit between the front leg extensions, which support the back rest. (Reference Fig. 1 overleaf identifies parts.) The table needs to be only a little longer than the oscilloscope; but some

excess may be allowed, in anticipation of a larger instrument. Trolley height and table angle are more difficult to determine, depending on the size of the oscilloscope, the height of the workbench, and even the seated height of the user. The dimensions given seem a reasonable compromise; the bottom of the 'scope front panel is level with a 2ft. 9in. high bench.

The table angle, lengths of legs, and pivot position may be determined by scale drawing or by calculation, subject to the following simple requirements, which make absolutely certain that the loaded trolley will be stable: Seen in plan, the lines of (i) the bottom front panel, and (ii) the top back, of the oscilloscope *must* lie between the front and rear castors. It is also desirable that the table make a right-angle with the front leg extension, so that the 'scope back lies flat against the back rest. The first and last requirements dictate the table angle and front leg position, so drawing or calculation should position this leg first, the rear leg dimensions then being determined by requirement (ii). For those whose geometry is a little rusty, or plain seized-up, it is quite possible to support the front of the 'scope at the required height, but free to tilt, and experiment with pieces of wood until the foregoing requirements are satisfied. The author, however, wishes publicly to disclaim all responsibility for damaged 'scopes and/or feet, which may result from the use of this method.

[over



View of the completed trolley carrying an oscilloscope.

*One of Murphy's Laws states: "The 'scope screen is always invisible from the position of the operator when taking a measurement."

Material Preparation

Fig. 2 gives the dimensions of all the parts, which may be cut to sizes as shown, or as otherwise required. The table is made from 1/2 in. thick material, such as 9-ply, wood, or blockboard. The legs and cross-pieces are of 1 in. x 1 1/2 in. softwood, except the two castor bars, which are of more substantial 2 in. x 1 1/2 in. wood. The exact materials could be varied if other wood is to hand, but too flimsy a structure could prove a false economy—scopes are expensive! Accordingly, all joints were made with two 2 1/2 in. No. 8 woodscrews per joint, reinforced with 2 in. wire nails. Such joints were found sufficiently rigid to render unnecessary diagonal strengthening ties between pairs of legs, but such ties might be useful in wider models.

Construction

Lay the two, shorter, front legs parallel on the floor with the angled ends forming a ramp. Fix the back rest to the square-cut ends, overlapping the legs. The feet may now be fixed into the cut-outs for them in the front castor bar. The table hinge supporting bar is mounted between the legs, 7 in. below the top of the back rest, and leaning 3° backwards, just sufficient for the table to be lifted so that its lip clears the front supporting bar when collapsing the trolley.

Similarly, the rear pair of legs are assembled on the longer castor bar, and the table front support is fixed at the top. The two pairs of legs may be bolted together with 3 in. x 3/8 in. bolts. The legs will hinge easier if three washers are used—at the bolt head, between the legs, and at the nut. Lock with two nuts per bolt.

The nuts may be temporarily tightened sufficiently to stop the trolley folding, while hinge screw holes are marked on the underside of the table. The table lip is fixed to the underside with five 1 1/2 in. No. 8 countersunk screws through the table top. 1 1/2 in. screws should be used to hold the hinges to their supporting bar. These hinges and the lip are all that prevent the trolley collapsing at an inopportune moment!

Best stability is obtained by spacing the castors as close as possible to the ends of the castor bars, but the joint screws must, of course, be avoided. Finally, screw heads may be filled in and the whole painted—about 1/2 pt. is required per coat.

Optional extras include a handle, fixed to the table lip, which greatly helps moving the trolley; and a pair of hooks on the rear of the back rest are useful for holding the power cable. The whole job can be completed in an afternoon, plus the time for paint to dry.

Table of Materials

15ft.	1 in. x 1 1/2 in. planed softwood
26in.	2 in. x 1 1/2 in. planed softwood
11 1/2 in. x 21 3/4 in.	9-ply, or 1/2 in. wood or blockboard
4	1 1/2 in. diameter castors
2	stout hinges with 1/2 in. and 1 1/2 in. wood-screws to suit
20	2 1/2 in. No. 8 countersink woodscrews
5	1 1/2 in. No. 8 countersink woodscrews
2	3 in. x 3/8 in. bolts with 6 washers and 4 nuts to suit.

Constructional details for the trolley. Names of parts cross-refer in text. In the cutting details for materials, it is assumed that wood has suffered normal planing losses. If not, Fig. 2 items will have to be adjusted accordingly.

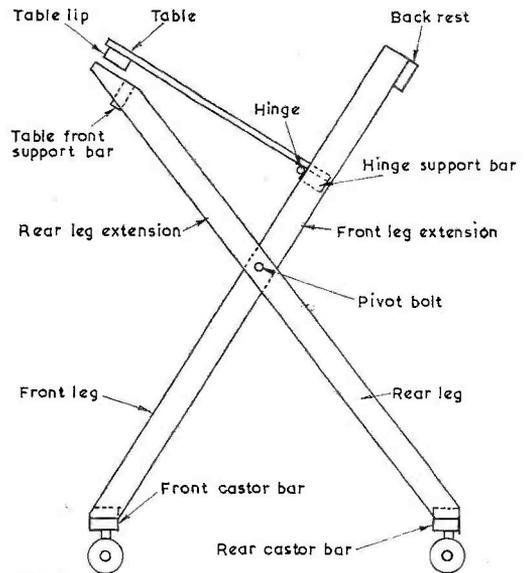
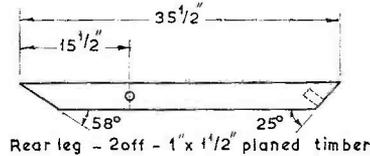
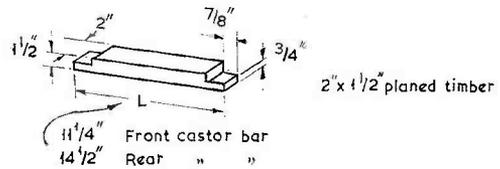
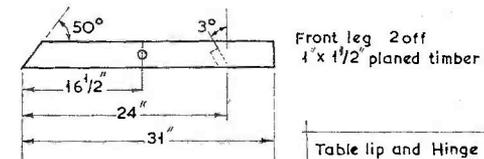


Fig. 1



Rear leg - 2 off - 1" x 1 1/2" planed timber



Front leg 2 off
1" x 1 1/2" planed timber

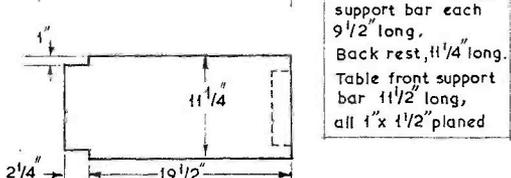


Table lip and Hinge support bar each 9 1/2 long, Back rest, 11 1/4 long. Table front support bar 11 1/2 long, all 1" x 1 1/2" planed

Table: 9mm ply or 1/2" wood or blockboard,

Fig. 2

• • • SWL • • •

SHORT WAVE LISTENER
FEATURETHOUGHTS ABOUT PIRACY—CURRENT NEWS AND
COMMENT—GLEANINGS FROM A LARGE
MAIL—HOW THE TABLES LOOK

By Justin Cooper

IT seems to be about time we talked about pirates and piracy, in the context not only of Amateur Radio but of the use of the whole electro-magnetic wave spectrum, which today extends almost continuously from just above audio, 16 kHz, right through long, medium and short waves, VHF, UHF, SHF and right on into the light-wave range by means of laser beams.

Now, in all this enormous spectrum, every user wants a clear channel. Over a large proportion of the bands this means making sure that the frequency allocated to a particular transmitter is considered in relation to other stations using the same frequency, simply because of the pressure of demand. Some of the frequencies are good only for line-of-sight communication, such as the microwaves; others are usually line-of-sight but sometimes not, as for example the VHF/UHF allocations. At HF a one-watt transmitter talking to its twin a mile away may be clearly audible in Australia, where another station is trying to use the same frequency for the same purpose. At MF the situation changes again; in general, local range in the day, but a wide, and very variable, range at night.

It is a truism that many more stations want channels than there is room for, and thus it becomes needful to share channels; this being the case, the international body to which all countries using telecommunications belong ladles out frequencies to each country on the basis that, for instance, a MW station in Russia and another on the same frequency in the U.K. can co-exist with the minimum of mutual interference, and both do not interfere with a station in Africa and another in the U.S., all four (and more, usually) being on the same frequency at, maybe, the same time.

Now, regardless of whether or not you are in favour of what is called "free radio" you cannot, and as responsible users of our amateur bands we *must* not, ever regard "free" radio as the permitting of a station to exist that does not owe allegiance to some country and have a licence to transmit therefrom. It doesn't matter what you think of their "programmes"—and, Lord knows, most consist of awful noises from a cheap record player amplified through a "communications-quality" audio system modulating a wabby carrier—but it *does* matter that it is sitting on a frequency which is in the international schedule, allocated in accordance with the agreed rules of the international body, so that

it does not interfere with allocations on nearby channels.

If such a station is not licensed, it is a pirate, in the nastiest and worse sense, and like all pirate ships, should be blown out of the water for the benefit of all—even if it is putting out continuous symphony music of the highest quality.

The same reasoning applies—though perhaps with rather less force—to the pirate within the amateur bands. Anyone who knows of a pirate should make sure the authorities are made aware of his activities. But the worst of them all is the chap who, *having got his licence* is prepared to sit on, say, Top Band, with an AM transmitter, and spout obscenities into the microphone, and deliberately disrupt the activities of the people who have done so much to help him along. One such silly teen-age twerp infests the area of North-West Essex centred on Harlow—and although this one will probably, by the time this reaches print, have made an involuntary QRT, it is much to be deplored that the elders of the local Club or group did not get together to apply a thick ear to the offender *before* he got too cheeky. One hopes that in this case the authorities will cancel the licence.

The New Entries

As always, some come in and some drop out this month. First on the clip is the unknown warrior who sent in a list from Digby Street, Bethnal Green, but was diverted from his letter at the last moment and so forgot to sign his name—perhaps he will see this and let us know his "handle."

E. Shaw (Chester) comes in with a first list, and some comments on your conductor's philosophy of receiver design as outlined last time. Eric feels that the test-gear requirement alone for such a receiver would be a lot too complex for the average SWL. This is an opinion with which we must take issue, insofar as the sort of receiver we talked about would be a darn sight easier to align than the "classic" designs of yesteryear—mainly, of course, because the essential items are pretuned and so the greater part of the work is simply one of peaking a few slugs and tuning-up the front-end. It could be done in its entirety with the aid of a valve voltmeter and a keen ear, with the possible addition of a general-coverage receiver. However, SWL Shaw admits that he is using a couple of home-built receivers, one of which sounds quite advanced, and to using a home-

brew trapped vertical as the aerial. Just to round off, Eric takes a quote from *Wireless World*, circa 1913 (with apologies to Rudyard Kipling).

"If you can keep your nerve when all about you, Are stations jamming hard and blaming you, Or if you can read through half a dozen stations The weaker signals meant for you . . ." *Plus ça change, plus c'est la même chose.*

Encouragement from S. Foster has set P. Harris (Lincoln) on the prefix-hunting trail, using mainly home-built front-end tackle into either a transistor receiver or an old BC set, the aerial being a dipole for 14 MHz.

A list with no comments save an almost audible puff as he rushed out to the post to meet the deadline is the contribution from T. Thornton (Wargrave) and his Codar CR-70A plus 135-foot end-fed wire.

D. A. Shepherd (Stourbridge) bewails his poor location, in a second-storey flat, only 270 feet above sea-level—but he goes on to mention four different aerials which he can tack on to his Eddystone EC-10 Mk. II main receiver. One wonders what G3BMY, who works just about everything there is (and was your scribe's mentor at the formative stage of his career) would have to say about such defeatism!

From Pontefract comes H. Wright, who has an Eddystone 888A operated with a 14 MHz ground-plane at the CW end of the bands, to produce a starting list of 291, all DX'y prefixes heard pounding the brass.

In the first list from M. Marsden (Ilford), Mark raises a query in OA1RAF—an odd call, certainly, but possible, one would suppose, even though it does not appear for Peru in the current "DX-Listings" of the *Call Book*.

Having started off at 15, with a HQ-180A receiver, M. Gawthorpe (Hull) has recently become interested in VHF, and has added an eight-element Yagi array plus a converter to the set-up; and he mentions his friendship with John Singleton of the same town, who has been with this column as long as your conductor.

L. J. Turner (Newark) uses a Unica UR1A (from Japan) with the built-in telescopic aerial, a receiver which he compares with an AR-88D belonging to a licensed neighbour, which is the only other receiver he has real knowledge of, and he finds himself quite pleased with his choice. Lawrence will have become a "reverend gentleman" by the time this script is being read, and starting work at a parish in Lower Gornal—a fact which will no doubt be noted by the hon. secretary of the Stourbridge group.

A nicely typed list from M. Savegar (Bexhill) next, but with no covering letter. It is followed by a list and a covering letter from G. S. Taylor (Rugeley) who has returned to the fold after three years, during which time he has married and set up home; it means the old score goes by the board, as it was amassed in Wolverhampton.

E. Ransom (Redcar) is one of the relatively small band of SWL's who have /M gear; Ed uses a Trio-9R-59DE at the main station, with dipoles for the HF bands, or a 136-foot wire. As he is on shift work, listening times are varied, a fact which shows

itself up very clearly in the loggings. Obviously an addict, Ed is a member of the Cleveland Club, and has already had a stab at R.A.E.—but will have to have another try.

A. D. C. Baker comes from Sanderstead, Surrey, and sent in an all-SSB list acquired with the aid of Hallicrafters SX-117 and SX-122A receivers.

The SWL interest is still lively up in Scotland, as shown by our next letter, which comes in from K. A. Hastie (Jedburgh). He has a CR-100 receiver plus preselector tacked on to a Joystick and Joymatch aerial system. Kenneth is at the moment "on short commons" for time, as he is entering the final run-up for his higher exams, which cuts listening down to weekends only.

J. Halden (Newcastle, Staffs.) has a neat turn of phrase—discussing his CW list and his reading ability, he says he will "still be pestering on" until he can take the stuff at much higher speeds.

Our next "new boy" has in fact returned to the game after an absence of *twenty years*, and has many interesting comments to offer on the changes in the habits of the fraternity, at least insofar as operating techniques go. There is, of course, the more or less complete swing to SSB, resulting in higher power, more breakers, and more bad manners—albeit the bad manners are more a function of the times than

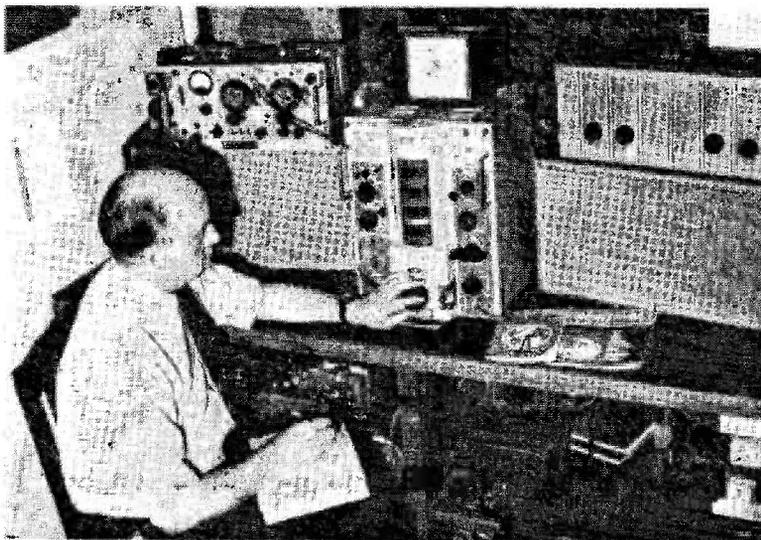
NEW HPX LADDER

(Starting January 1, 1970)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
D. Smith (Nuneaton)	485	R. Thompson	
A. Judge (Bishops Cleeve)	483	(Birmingham, 29)	331
C. J. Deacon (E. Ham)	482	D. Whittaker (Harrogate)	323
R. Bence (Cardiff)	482	D. J. Lee	
R. Pepper (Bradford)	469	(Hemel Hempstead)	323
S. Proud (Leterston)	465	A. Wood (Darwen)	322
M. Gawthorpe (Hull)	453	J. Law (Stonehaven)	320
D. Foster (Llandaff)	452	A. Pyne (Budleigh Salterton)	318
J. R. Cowan (Rochford)	444	I. Simpson	
P. Harris (Lincoln)	444	(Newcastle-on-Tyne)	318
T. Rootsey (Ilford)	437	A. Vest (Durham)	309
K. F. Bone (Chard)	428	J. Marchant (Sharnbrook)	289
W. F. Swain (Bodmin)	427	T. Thornton (Wargrave)	280
N. Crampton (Romford)	423	P. Corrigan (Tallaght)	271
P. Goff (Towcester)	416	M. Marsden (Ilford)	266
K. C. Webb (Slough)	409	M. W. Savegar (Bexhill)	263
W. R. Martin (Tewkesbury)	392	N. Hydes (Darwen)	255
A. P. Whittaker		E. Shaw (Chester)	252
(London, S.E.2)	384	E. Ransom (Redcar)	251
G. Stuart (Edinburgh)	375	D. Waters (Ruislip)	245
M. Rivers (Whyteleafe)	362	R. Friend (London, S.W.19)	244
J. Brackenridge (Maybole)	359	M. Cuckoo (Herne Bay)	234
P. Fry (Eastleigh)	359	K. A. Hastie (Jedburgh)	229
P. Oliver (Mansfield)	356	K. Murphy (Manchester)	228
J. Spearing (Orpingon)	350	R. Banister (Chorley)	227
R. Smith (Basingstoke)	350	L. Turner (Newcastle)	225
A. Watson (Dartford)	334	S. Head (Birmingham, 29)	214
Miss L. Hyder		A. D. C. Baker	
(Southampton)	332	(Sanderstead)	210
		P. Reeves (Burton-on-Trent)	204

Listings include only recent claims. Starting score 200. Rules for HPX as p.156, May, 1970 issue. This is the final appearance of this Table: next issue of SWL will carry entries for a new Ladder commencing date for which will be January 1, 1971. Other rules will be unchanged.

An unusual SWL station—the radio section of the Queen's Own Cameron Highlanders' Youth Club, run by SWL Bill Begg, 68 Tomnahurich Street, Inverness, shown here at the operating position with the main Rx, a B.40D. There is a useful array of auxiliary equipment and no less than three antennae are available—two end-fed wires, 300ft. N-S and 150ft. E-W, also a tuned vertical system. A well-equipped work bench out of view runs the length of the room.



of sideband suppression. However, *L. W. Robinson, Bury St. Edmunds*, says it is still good fun—and after all is said and done that is what matters.

P. Reaves hails from *Burton*, where the brews come from; *Phil* has a 9R-59DE which he operates with an end-fed aerial through the all-important ATU.

Technical

Is a word that quite definitely applies to this hobby of ours, in spite of the “appliance operators” who are so numerous these days in Amateur Radio generally, and not only on the SWL side.

However, on looking through the pile, your scribe was a little startled to notice that for the first time on record there were *no* technical queries, at least in the radio sense. *R. Carter (Blackburn)* has one of a rather unusual nature, though, concerning local time. Looking at a map, he notes that for each 15 degrees of longitude, local times change by one hour, relative to Greenwich Mean Time. Does this mean, SWL Carter wants to know, that all the countries in between, say Long. 15° and 30° will use the same local time? Broadly speaking, the answer is Yes, although in detail one should strictly say No! Many countries extend over more than one time zone, and split into several parts time-wise—as for instance the U.S.A., where there are Eastern, Central, Mountain, and Pacific Times (not to mention Daylight Saving Times adopted in the summer). Saudi Arabia keeps Arabic Time, which involves all timepieces being set to midnight at sundown, so that there is no standard conversion to Greenwich. GMT is sometimes referred to as *Z*, e.g., 2144z as this is being written, or as Universal Time—2145UT for an example. However, there is only one country where the politicians are so nit-witted as to adopt Daylight Saving Time throughout the year and so make their clocks adrift from both local time, sun time—which is not quite the same—and GMT. That puts us back

further than the Saudis. And, of course, it is as well to realise that GMT itself is only a convenient standardisation to remove the “Equation of Time” from the calculation of clock-time. A fascinating introduction to the whole subject is *Have Fun with the Sun* by A. P. Herbert. To take a subject such as this, and write about it with the masterly hand of a great novelist/playwright means a most interesting book, full of vintage A.P.H.’isms.

Interesting Matters

This is not normally a column for the licensed chaps, but occasionally there is an exception. G3XON (Newcastle-on-Tyne) comes in here, and encloses a report he received from SWL Nick Bainbridge, of Glasgow. Now, G3XON is a well-qualified professional engineer but at the time in question was having considerable difficulty in a QSO with G3JYO near Birmingham, to the point where he began to think of tearing the rig to bits to find out what was wrong. Stanley was, you may imagine, both surprised and pleased to receive a report on his signals from Nick, setting out in detail the state of conditions, a graph of his signal strength over a period of about thirty minutes, readability over the same period, strength of others near the frequency, local noise level, QSB and the quality of the transmission in terms of its readability, drift, “tunability”—a very good basis for reporting an SSB signal—and other comments. Far too much for a printed QSL-card type of report, and far more valuable to the recipient. As G3XON says, anyone would reckon a QSL card to be a cheap price to pay for such a detailed and scientific assessment of his signals at a time when something *seemed* to be very much wrong. The Bainbridge report will no doubt adorn the shack wall at G3XON for the edification of future SWL visitors as to how it *should* be done.

Changing tack a little, our notes on the early

post-war licensing situation and those MD5 calls prompted a very interesting line from G3HCL, who recalls that at first, before the Administration got around to such low priorities as amateur licensing, the lads got permission to operate from the C/O, and "adopted" a suitable prefix. In Libya they used LI, one later to become famous in a more "legitimate" line as the call of the *Kon-Tiki*, and later the reed-boat *Ra*, both of which used LI2B. Tripolitanian calls were in some cases T1 and others TR1—the boys had not quite got into line! By mid-1947 the Administrations got down to sorting things out, so that MD calls, the numeral giving the location, were allocated in the Mediterranean area, e.g., MP4 in the Persian Gulf, MF2 up around Trieste, and MB9 in Austria. All are now history, saving only the MP4's, and G3HCL suggests that someone should record a history before all this is lost in the web of time.

The rest of the "licensed amateur" dip are the lads who are writing to tell us they have at last gone into the top class, as it were. G3ZOQ used to be known as *G. Foster (Leyland)*—he put the meat of his letter round the edge in dits-and-dahs, just to prove he still remembers the code!

Another one is G3ZTJ, who used to be better-known as *C. J. A. Morgan (Wallsend)*; he tells us his first QSO, on 14 MHz CW, was with 3ZØPKR, which seems quite appropriate for a dedicated HPX'er. And it is good to see Charles is joining the ranks of the faithful few who still use the G call on the HF bands despite TV, and even more so to realise he is paddling a key! Good!

D. J. Reynolds (Dudley) is an old-timer at HPX, who now signs G3ZPF on Top Band, Eighty and Two, and wants a QSO with your old scribe; Heaven help us, the last time J.C. transmitted he got his beard caught in the key, and he hasn't had the nerve to try it again since!

Congratulations to all these new licensees, and long may they enjoy their callsigns.

In the midst of a long letter on other subjects, the secretary of the Fareham Club, who has been a long-term SWL as well as operating from various exotic spots and so really knows the ropes, passes on some words of real wisdom to those taking up amateur-band reception for the first time—listen to *anything* and *everything* at first, all bands and all modes, so as to expose you to as many facets of the game as possible; this way you get the chance to let your instincts teach you which your preferences really are; spend as much time on CW as you can, even if you don't like the mode, also in learning how to control your Rx to dig a buried signal out of the mud—a knack that is extremely useful in a pile-up, whether on CW or phone.

Talking of CW, an interesting letter from *R. Bence (Cardiff)* says how pleased he is to have just received the RNARS Certificate for 25 w.p.m. (see note p.529, November issue, on G3BZU Morse Runs). Ray is entirely self-taught, through records and listening, and points out that he is in the "retired" group, which means learning is a little slower. Just

for now, Ray keeps his HPX entry to Phone only.

I. Brown (*Newtownabbey, Co. Antrim*) has a few corrections to make in HPX, plus some additions. One oddity was a "ZB4ZH," claiming to be using the equipment set up for the ZC4RAF Exhibition station. Possible, one supposes, although there is not a ZB4ZH in the current *Call Book*, and one would think the numbers of operators who would have liked to get a run at the Exhibition gear must be legion, when there is no licensing for the ex-5B4 chaps outside the ZC4 enclave.

Here and There

D. J. Browning (Bishops Stortford) has gone to the trouble of writing his list out this time on a typewriter, because everyone says his writing is so bad! Douglas has a radio friend in New Zealand, directly as a result of remarks in this piece some time back—A. O. Towns is his name, and Douglas has been nagging at him to enter HPX. On a different line, the HTI prefix is queried—this is a "special" for Nicaragua.

Another one from the same district is *Tony Judge*, who has been taking a casual look at Top Band, and seems to have found most of what there is to be heard, both in the SSB mode and also, praise be, on CW.

N. Crampton (Romford) has moved home, on account of "having taken the plunge into matrimony." The new place has a landlady who apparently looks on trailing wires with some element of disfavour, and so our hero is at the time of writing trying to think up ways of bringing her round.

Cricket being over, *N. Henbrey (Northiam)* is back in circulation, and digging in at the contests, to bring him back into training. After knocking off his 100 wickets for the season again, Norm went into a recent 10-metre contest, and heard 70 countries for about 4000 points. On HPX, he takes quite a leap by browsing through his old logs, and bringing in a whole daffy of prefixes from yesteryear which had J.C. scratching through *his* old logs to see if they were OK—and they were, too!

All the additions to the list of *M. Quintin (Wotton-under-Edge)* are "specials" of one sort and another, covered by reference to the back page of our new Prefix List, or mentioned previously by G3KFE.

That CW List

Its absence from the listings last time was not by any means an accident—we were still trying to make up our minds whether to kill it for want of support, work it exactly the same as the Phone list, or to make it an All-Time Post War list only, starting as ever at 200. The last course of action is what we have finally decided on—so everyone will go into that list, but on the next occasion we will be taking in the culls from the old logs as well.

The Phone Tables

Here the A-T-P-W list seems to be quite happy; so we can now make the *bottom* part of the Table, which at the moment starts 1970, start from

January 1 1971 and be an annual affair. The starting line will remain, as usual, 200 prefixes, and those you have already claimed can be stored as you progress through the years to the point where you enter the "experts" A-T-P-W Listings.

This will mean a reprint of the Rules to make it all fit, something that we will try to do in the March "SWL."

The last couple of paragraphs will answer the questions of many people, notable among them being *A. Vest (Durham)* and *A. T. Cheesley (Malaysia)*.

Rest of the Mail

We must press on, lest the editorial axe fall upon the tail-end of the piece. *G. Raven (London, S.E.13)* is hampered now term has started again by the need for study, if he is to achieve his aim and pass those A-levels.

T. Rootsey (Ilford) made the concerted effort we advised a while ago, over three evenings and a weekend after flu, and so manages to go up by almost 100.

An interesting letter from *J. Spearing (Orpington)* describes his new ATU, which is of his own devising and surprised him by working quite well on the revised aerial which has twenty-five feet more tacked on at the far end. John wants to claim 9C9DX, who is quite OK and has been mentioned elsewhere in the Magazine.

P. L. King (I.O.W.) works on the mainland, which means his listening time is restricted to weekends; but weekends mean contests, which bring out the prefixes, to bump up the score! SWL King claims JY1—who has been mentioned enough times in CDXN to make him acceptable in spite of the unorthodoxy of the call.

M. Cuckoo (Herne Bay) suffers from work-QRM, too—Michael finds he has a mere 26 new ones to offer because of this—but there was a consolation in the mail, with cards received for six new countries.

A good question from *J. Dunnett (Leighton Buzzard)* returned to the fold after his fourth move since he started HPX'ing. He would like to know about the /MA suffix in the HPX context. Well now, says J.C., putting on his judicial look, this is a little difficult; but as he is really a /MM, and signs /MA only when the ship is at anchor, he should properly come in the /MM category. His other queries all are countable.

Quite a few chaps seem to have entered, or at least logged, in the RSGB 7 MHz contest, among them *J. Brackenridge (Maybole)* who found such DX as EP2TW, EP2BQ, ET3USA, ZC4JW, PZ1AH and W's, all at RS -59.

M. Williams (Sleaford) is quite determined to pass R.A.E., so instead of listening he spends a bit of time each evening in boning up on the necessary facts for an exam. which he has, by the time this is being read, either passed or not, regardless of whether the result is to hand yet.

R. Treacher (Eltham) wants to claim LA8YB/4W as a 4WO—sorry, no-can-do; the rules are quite

HPX LADDER

(All-Time post war)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
B. J. Gilbert (Tonbridge)	1226	H. Alford	
S. Foster (Lincoln)	1188	(Burnham-on-Sea)	615
J. Singleton (Hull)	1063	C. Price (Bolton)	615
A. W. Nielson (Glasgow)	1039	A. Cobb (Hull)	611
R. Nicholls (Narborough)	923	J. Williams (Wrexham)	610
D. Reynolds (Dudley)	908	P. King (Ryde, I.O.W.)	601
R. Woods (Slough)	900	G. W. Raven	
W. H. Butcher (Towcester)	858	(London, S.E.13)	579
G. Dover (Nottingham)	832	P. Batt (Littleborough)	574
M. Toms (Ilford)	831	G. Foster (Preston)	572
J. Fitzgerald (Gt. Missenden)	816	E. Parker (Hove)	560
M. T. Hyder (Hythe)	795	M. Williams (Sleaford)	553
G. Braund (Taplow)	789	L. W. Robinson	
N. Hembrey (Northiam)	788	(Bury St. Edmunds)	547
G. S. Taylor (Rugeley)	786	N. Askew (Coventry)	546
W. Moncrieff (Hampton)	768	P. Butterfield	
C. J. A. Morgan (Wallsend)	757	(Sharlston Common)	542
R. A. Treacher (Eltham)	732	P. Sharman (Hayes)	529
M. Fisher (Bradford)	731	Mrs. S. Singleton (Hull)	527
G. Ayton (Sunderland)	731	J. Lee (Nuneaton)	522
R. Shilvock (Lye)	708	D. Browning	
R. Carter (Blackburn)	686	(Bishops Stortford)	515
J. P. Scragg (Stockport)	686	B. Cushing (Kenley)	508
R. Bagwell (Frimley)	665		
I. Brown (Newtownabbey)	663	CW ONLY	
A. T. Cheesley		A. Vest (Durham)	656
(Kuala Lumpur)	661	A. Glass (Plymouth)	647
H. M. Graham (Harefield)	660	J. Dunnett (Preston)	613
D. Rogers (Bolton)	650	J. Wrench (Kidderminster)	482
M. Quintin (Wotton-u-Edge)	648	G. Foster (Leyland)	391
T. W. Hyder (Southampton)	647	G. Braund (Taplow)	304
B. Hughes (Worcester)	646	H. Wright (Pontefract)	291
K. Plumridge (Southampton)	627	J. Lee (Nuneaton)	255
D. Robinson		J. Halden (Newcastle)	221
(Birmingham, 26)	616		

Starting score, 500 for Phone, 200 for CW. Listings include only recent claims. Rules for HPX as p.156, May 1970 issue. DX Zone Map and latest Prefix List, 16s. 9d. post free from Publications Dept., Short Wave Magazine Ltd., 55 Victoria Street, London, S.W.1.

clear and it counts as a 4W8. This interpretation of the rules takes Bob down a couple of notches. However, he will doubtless gather some more, especially now that he is taking up CW seriously in preparation for the Top Band DX season.

Those motor cars—if you mend 'em yourself you spend good listening-time under 'em, and if someone else does the maintenance for you, bang goes the boodle for the new rig. Murphy's Law again, this time hitting at *G. Dover (Nottingham)*. Geoff has also joined the local group—fine!—and they are knocking Morse into him for another operator in next year's MCC!

Not very often that an "SWL" column passes into print without a missive signed "*Hyder, Southampton*." This time it is the younger generation, Miss Lynne going up to 332, while brother Michael is at 795. Doubtless it will be Dad's turn next time—your old J.C. reckons they stagger their three entries to avoid confusing him!

Another radio family is represented by the *Singletons*, who seem to have been rather occupied one way and another, what between a succession of illnesses, not to mention having to remove some aerials and let a little light into the garden, all of which has reduced activity a lot—but still both Shelagh and John manage to add a few more to keep

them going up.

J. Fitzgerald (*Gt. Missenden*) still sticks at it, even though, as he says, he has only got to *think* about DX on Eighty and a jammer comes up on the DX channel! However, John has got going /A in Palmers Green, where he finds himself suffering tortures from the cars on the North Circular Road, and their "suppressed" ignition.

Another LF-band addict, like John Fitzgerald, is S. Proud (*Letterston, Pembs.*) who though a long way off seems to have heard a fair sample of what is going, from PAØPN on Top Band through to PFILS, who claimed to be in Amsterdam—seems faintly possible.

A session in MCC for Nuneaton convinced D. Smith (*Nuneaton*) that here was something he had missed out on; there is no doubt that this is probably the best way of all to get the taste for Morse, albeit the best fun is surely being able to ragchew on the key, and be free from breakers.

J. Lee likewise comes from *Nuneaton*, also did his bit in MCC, and found out, too, what fun it could be—not to mention saying that he thinks it could lead to a real revival of the Club, which would be a fine thing. Incidentally, SWL Lee complains bitterly that we did not give him the correct initials last time round—but we would have done the same this time had he not *printed* his name under the signature!

H. M. Graham (*Harefield*) has lots of interesting things to say, as always. This time, H.M.G. has a solution to the problem of the blokes who just won't QSL—he opines they must *collect* s.a.e.'s and stick 'em in an album. One evening, listening around the band, a VK came up at umpteen over S9, which made the Graham ears lie back a little—but it turned out to be /W2 and in New Jersey!

D. Lee (*Hemel Hempstead*) has a mention of the C31 prefix—perfectly OK and should be added to the Prefix List, as Andorra.

Although E. Parker (*Hove*) says he now "feels a bit more wanted" after reading November's Editorial—but still his XYL on the rare occasion when she ventures into the shack "can't understand a word of it!"

One of the SWL's to log ZA2RPS is J. R. Cowan (*Rochford*), but on the other side of the coin is a "thing" signing "C59C" and claiming to be on Gan—news which will no doubt startle the inhabitants of that island no end! John also wants to know why he only has LX1 and LX9 logged as yet—which is because the vast majority of the LX lads are LX1 calls, with a few LX9, and even fewer LX2s, in the *Call Book*. There are in total only about a double handcount of amateurs in Luxembourg, anyway.

Finally, to top-of-the-table man—well, nearly, anyway—S. Foster (*Lincoln*) who has, as always, a very interesting letter. This time, the main item of news not already mentioned is the change in the rules for the U.S. stations who hold reciprocal TF

ATTENTION OF SWL'S, PSE!

We would like to see more good photographs of SWL stations. Prints should be black-and-white, clear and sharp, any size though postcard preferred, with station details on a separate sheet, not on the back of the picture or run in with a report for "SWL". (Picture production and captioning are handled quite separately from the feature.) Please do not send negatives. All photographs used are paid for, immediately on appearance. Next deadlines for the regular "SWL" feature are: January 18, March 15 and May 17, addressed "SWL", Short Wave Magazine, Buckingham. Material received after these dates cannot be included in the succeeding issue, but may be held for the one after.

licences. These lads are now using their own home calls with the suffix /TF, as a change from the old TF2W -- type of thing in use to differentiate them previously.

And we have just had news that an ON (Belgian) SWL group has started an award scheme for SWL's. Full details from: Werner C. Simoen, Kalvaviebergstr. 52, 8000 Bruges, Belgium.

The Others

As usual, J.C. has been garrulous enough to run out of space, and so he has also to acknowledge and thank the following readers for their letters with table entries: R. Nicholls, *Narborough*; R. Pepper, *Bradford*; H. Alford, *Burnham-on-Sea*; J. Marchant, *Sharnbrook*; R. M. Woodhouse, *Norwich*; A. Pyne, *Budleigh Salterton*; B. Cushing, *Kenley*; G. E. Bartlett, *Emsworth*; W. R. Martin, *Tewkesbury*; D. Rodgers, *Harwood*; C. Deacon, *London, E.6*; N. Askew, *Coventry*; R. Friend, *London, S.W.19*; M. Fisher, *Bradford*; J. Law, *Stonehaven*; R. Shilcock, *Lye*; G. Ayton, *Sunderland*; A. Wood, *Darwen*; K. Murphy, *Manchester*; B. Hughes, *Worcester*; B. Glass, *Plymouth*; and W. Moncrieff, *Hampton*.

And that, good people, is that, for another month. A Happy New Year to you all, and for March issue the deadline will be **January 18**, addressed as always "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM.

KEPT IN TOUCH

G3WR (Brighton) writes: "My licence was originally issued in 1938 and I was active until 1953—but due to business commitments I had to give up. However, I kept up-to-date by continued readership of SHORT WAVE MAGAZINE and must say that the model R.A.E. answers given each year materially assisted me in passing the Exam. last May. The Morse side I had kept up by a regular weekly session listening to Met. forecasts so I had no worries on that score. Continued success to your excellent 'text book' and many thanks."

"Short Wave Magazine" carries more paid Small Advertising of radio amateur interest than any similar periodical circulating in the U.K.

THE TWENTY-FIFTH MCC

The Magazine Top-Band Club Contest November 7-8, 1970

THE Twenty-Fifth MCC—and although it has changed a bit in form over the years, it still seems to have the entertainment power as strongly as ever. Two years ago, we pointed out just how difficult a handicapping system was; to invent one not affected by conditions is all but impossible. Last year we said nothing about the scoring system but lots about the weather, which made a mockery of many efforts by the simple expedient of blowing the aerial down. Third time lucky, they say—and this time conditions were just about right. Murphy had an off day and left most people severely alone. A surprisingly small number of Clubs griped about the revised scoring system, which seems on the whole to be well liked.

Having said all this, we have now to come to the nasty bit—disqualifications. This time the unlucky ones are Manchester University Institute of Science and Technology, G3CXX. The trouble, once again, was the clicks; probably the same subtle reason for the same noises emanating from the same type of rig as was penalised last year. If G3CXX had looked at the back of the key-jack they would probably have found the 4.7 μ F click-suppressing capacitor making only intermittent contact, due to the flexing of the spring leaf when the plug is put in or out. However, possibly remembering last year, G3CXX was told about the clicks a couple of days before MCC, several stations made the required addition to the RST code during their contest QSO's (in the hearing of the invigilators at that) and lots of people complained. Sad indeed, as if they had been radiating acceptable signals they would have won by a clear margin of 500 points! However, there it is, and let us hope that all the stations entering next year are inside the rules.

The "thumping signal" being radiated by G3JLE during the first half of the Saturday session caused the invigilators some anxiety. Had this not been cleared up, Oxford also would have been disqualified.

Another one who was the subject of several complaints was G3SRC. The moan in this case was from most of the nearby clubs who said G3SRC had a T6 *alter ego* a few kHz away from the real one—a beautiful example of an LF parasitic. They escape the axe simply because the complaints were all from nearby, and nothing to their detriment was reported by the invigilators.

Incidentally, as has frequently been explained, MCC is always closely invigilated—and *not* with the idea of looking for transgressors. In fact, we would far rather not find anyone to disqualify—but because the rules are specific, it is only fair to other entrants if a station radiating a signal generally agreed to be a nuisance should be disqualified.

Problem

A difficult one for us was the signal from G3EMD, who appears to have been on for a time on the Sunday, and was heard to be sending S32. As there was no such identification in this year's listing the stations who worked him concluded he was making S32, B32, U32, C32 or D32, as their inclinations or studies thought fittest. However, since no log has come in from G3EMD, we have taken him to be a privateer, and marked his contacts down accordingly. There is, of course, the possibility that he was on for Stourbridge, *using last year's code!*

The Winners

Port Talbot "A" it was, and the winning score this year 6223 points—their only complaint was that the rules were biased against them! They were on from the shack of our old friend "Andy the Lamp," GW3UUZ, and using his call. A DX-100U did the radiating and the incoming signals went into his HQ-170A. Instead of a full-size vertical, the Lighthouse itself was this time used to prop up a full half-wave end-fed, with the top fixed to the lamp at 90ft. up. As if that were not enough, it was all sitting—as lighthouses are wont to—over salt water, which takes care quite well of the earthing needs of the station. But nonetheless a wonderful effort.

Runners-up **Verulam** made a score of 5823 points from their usual contest spot where they have a rotatable dipole—the null is five S-points down on the peak!—with its feed at a "mere" 50 feet high. But, to make the aerial radiate properly, they have a farm of earth radials laid over the surface—lucky their QTH was in the middle of two fields. G3NOH, who calls himself the fastest key on one leg, was the driver, with assistance from G3LXP as aerial-shifter and logger.

Perhaps the most unlucky were third place-men **Maidstone YMCA**, who had not one but two "funnies" in their log. One was the previously mentioned G3EMD, and the other was a character who insisted his reference was P28—so down it went to a non-Club rating, and the two of them made a dent in the Maidstone score which, as amended, was 5799 points. Maidstone's aerial was an inverted-Vee with apex at 70 feet and a new transceiver, to make operating a little easier.

The Gear

As we remarked, the notable thing last time was the virtual eclipse of the HRO receiver. The trend to transceivers was again noticeable, and in some cases to the use of transceivers together with an outboard receiver to make a more agile CW contest tool. Apart from the operating, the thing that sorts out the men from the boys

is the immense amount of trouble the leaders have taken to make quite sure the RF they generate goes just where it is wanted. Verulam were perhaps exceptional in going to the lengths of rotating the dipole and working it against an earth mat laid out specially for the contest, but it pays off—a few minutes listening to their receiver is a fascinating experience, as is the one at GW3UUZ, and makes it quite clear how the improvement works out practically. Anyone can be accused of running over-power—all you do is pile in lots of earthing!

Typical of the approach outlined in the last few lines was that adopted by fourth placers Guildford "The aerial here may have helped. I took my four-band Quad off the tower, and substituted a 36-foot mast on top, which raised the apex of my inverted-vee dipole to about 96 feet!" G3KMO was a solo effort for them, and averaged 25 QSO's an hour for his return, pretty good for a lone operator doing his own logging.

In fifth place was North Staff "B" operated by father and son, G4QD and G3VNR, under the former call; they rolled up 5649 points but seemed to have some difficulty finding the GM/GI stations which held them back a little.

The Non-Club Contingent

This year for some reason the European stations managed to throw a small spanner into the works, in that most of the OK's, HB's, DL's, PA's, and so on who took a hand seemed reluctant to give their location, contenting themselves with a three-figure serial number, or using 028 which has a suitable connotation to them. This being the case, no points have been docked by the scrutineers for such contacts; but there seems little doubt that in their enthusiasm to give competitors a few points they did frighten some folk, who would otherwise have been glad to work them, off a scoring QSO.

Amongst the U.K. gang there were, as always, some well-known operators. G3BMY this year was reported by everybody, praise be, as being at his correct QTH—in past years he has been noted in all sorts of weird spots by people who could not read good fast Morse! G3SVK is a well-enough known call for any Top Band man, and we need make no comments on his operating—superb. From Salisbury way, G5YN was busy demonstrating to all and sundry that once the touch is gained it doesn't leave you in a hurry—he used to be AC4YN back before the War.

Operating Tactics

Of all the logs, it is perhaps natural that the ones with most to say here were those from the invigilators and SWL D. Law (Birstall, Leics.) who has been a "volunteer" check-log exponent for years now—if he were operating a key at the same standard he would win hands down, with a good station to help along. His HRO had a bit of minor surgery during the year, and the aerial had to come down from its tree and be transferred to a pole to meet wifely objections, but still he managed to hear it all—and his records are of inestimable value in checking the logs. He, along with one of your invigilators, was present at a most comical happening: GW3XJC, G3ZEF, GW3XJE/A, GW3XNS, GW3UUZ and G3VIP, all making "CQ MCC" simultaneously on the

TABLE II

Top Scorers in the Zones

<i>Zone A—Scotland</i>			
1	Glenrothes (GM3PFO/A)	5374	
2	Glasgow Univ. (GM3VTB)	4514	
<i>Zone B—Northern England</i>			
1	Leyland Hundred (G3GGS)	3566	
2	Scarborough (G4BP/A)	3541	
<i>Zone C—Midlands</i>			
1	North Staffs. (G4QD)	5649	
2	Nottingham (G3EKW)	5570	
<i>Zone D—Southern England</i>			
1	Verulam (G3VER)	5823	
2	Maidstone YMCA (G3TRF)	5799	
<i>Zone E—South-Western</i>			
<i>One entry:</i>			
	Torbay (G3NJA/A)	3812	
<i>Zone F—Wales</i>			
1	Port Talbot "A" (GW3UUZ)	6223	
2	Univ. Coll. of S. Wales (GW3UWC)	5415	
<i>Zone G—Ireland and Isle of Man</i>			
1	IRTS Region I (EI9ONE)	4393	
2	Limerick (EI4LRC)	2961	
<i>Zone H—Channel Isles</i>			
<i>No entries</i>			
<i>Zone J—Eastern</i>			
1	Cambridge University (G6UW)	5369	
2	Wheatshaf (G3VIP)	2927	

same frequency—and nobody heard anybody else! The silence as they all went over was quite electric! The time of this "non-happening" was around 1700z on the first evening.

By and large, the keys were well-driven, although there were, as ever, the odd dot-spewing bugs around. People were using QSL in some cases with just the meaning assigned to it in RG 67, *The Handbook for Wireless Operators*, as a neat and pointed way of getting over what was wanted. SWL Law has particular compliments to pay to the fists of G4QD, G6UW, G2ASF, a non-club operator in G3ZPC, and, of course, G3VOC, from whom it is expected.

Several of the upper-echelon Clubs were on occasion noted to be working them two or more at a time, to the evident confusion of one or two learner-operators at other stations who failed to note the AS after their call.

Time-Keeping

As always, one or two were heard operating after time. On the first night, G3SRA was calling "CQ MCC" at time, and continued to do so for a minute or so, only to be swamped under about five different calls all sending "time!" on his frequency. He got the message. One does understand that it is a bit difficult in some stations to ensure the services of a reliable time-piece, but it should not be beyond the bounds of possibility for a little more accuracy in starting and finishing to be obtained, and indeed in the times noted in the logs.

The Logs

Apart from the contestants' logs, there were also SWL Law's masterpiece—"The Institution," it is called by the scrutineers, who look forward to reading it—and check logs from G4AR and G3XDY, both of which were a great help in sorting out what went on.

Looking at the entrants' logs, as distinct from the

check-logs, it is noticeable that this year the general standard was much higher, with fewer logs being penalised for incorrectly-scoring their efforts, or lapses in the arithmetic. A couple even went to the extent of sending in an adding-machine tape to prove their figures were right! It is an odd quirk, this, that a new scoring system which is more complex should so improve the way the entries were checked before sending them in, making life much easier for the scrutineering fatigue-party. Presentation was also much improved generally. Among the handwritten ones, one must mention Kings Norton and Glenrothes (who, incidentally, seemed to be the Kirkcaldy team still in business even though their old

Club has died); they are "under new management," as it were. Nearly all the rest, whether typed or hand-written were good, one very fine typed one coming in from Surrey, who managed to make it much easier than usual to read, by attention to layout. A blessing this time was the complete absence of real stinkers, the sort that sometimes appear, scribbled in pencil and covered in beer-stains, that cause the scrutineer to gnash his teeth and reach for his blue pencil.

Comments

We asked for comments with your logs, and of course we got them; but it is an odd fact that the really funny

TABLE 1

Positions and Scores, Twenty-Fifth MCC

PLACE	CLUB	REGION	POINTS	PLACE	CLUB	REGION	POINTS
1	Port Talbot "A" (GW3UUZ)	F	6223	44	Scarborough (G4BP/A)	B	3541
2	Verulam "A" (G3VER)	D(U)	5823	45	Culham (G3ZEF)	D(U)	3476
3	Maidstone YMCA (G3TRF)	D(U)	5799	46	Oxford (G3JLE)	D(U)	3330
4	Guildford (G3KMO)	D(U)	5773	47	Verulam "B" (G3YUK/A)	D(U)	3301
5	North Staffs. (G4QD)	C	5649	48	Southampton (G3SOU)	D(U)	3257
6	Nottingham (G3EKW)	C	5570	49	Fareham "B"	D(U)	3229
7	Univ. Coll. of South Wales (GW3UWC)	F	5415	50	Royal Navy (G3BZU)	D(U)	3170
8	Glenrothes (GM3PFQ/A)	A	5374	51	Purley "A" (G3TWW)	D(U)	3125
9	Cambridge University (G6UW)	J	5369	52	Greenford (G3VMD)	D(U)	3004
10	Kings Norton (G3GVA)	C	5339	53	Isle of Wight (G3SKY)	D(U)	2982
11	Coventry (G2ASE)	C	5272	54	Limerick (EI4LRC)	G	2961
12	Finchley (G3XTJ)	D(U)	5133	55	Port Talbot "B" (GW4NZ)	F	2940
13	Maesteg Contest Group (GW3XJC)	F	5107	56	Wheatshaf (G3VIP)	J	2927
14	Surrey (G3SRC)	D(U)	4943	57	Macclesfield (G3LDT)	C	2914
15	Govt. Comms. Hq. (G3SSO)	D(U)	4794	58	Purley "C" (G3XMW)	D(U)	2832
16	Southampton University (G3KMI)	D(U)	4678	59	Speedbird (G3NAF)	D(U)	2792
17	Glasgow University (GM3VTB)	A	4514	60	Veteran Operators (G3VOC)	D(U)	2791
18	Bristol (G3TAD/A)	D(U)	4490	61	Crawley "B" (G3GRO)	D(U)	2781
19	Crawley "A" (G3TR)	D(U)	4420	62	Ariel (G3GDT)	D(U)	2711
20	IRTS Region 1 (EI9ONE)	G	4393	63	Echelford (G3UES/A)	D(U)	2617
21	Hereford (G3YDD)	C	4346	64	Fareham "A" (G3VEF)	D(U)	2588
22	Univ. Coll. of North Wales (GW3XNS)	F	4326	65	Sunderland (G3STC)	B	2602
23	Mid-Sussex (G3ZMS)	D(U)	4319	66	Moray Firth (GM3TKV/P)	A	2290
24	RAF Abingdon (G3TAB)	D(U)	4281	67	Nuneaton (G3XJU/A)	C	2287
25	Crawley "C" (G3WSC)	D(U)	4222	68	Tyneside (G3ZQM)	B	2268
26	Fareham "C" (G3YRO)	D(U)	4137	69	Eccles (G3GXI)	B	2228
27	Salisbury (G3FKF)	D(U)	4116	70	South Shields (G3KZZ)	B	2196
28	STC Harlow (G3NIS)	D(U)	4084	71	Crawley "D" (G3MGL/A)	D(U)	2170
29	Southend (G3XSC)	D(U)	4064	72	Acton, Brentford and Chiswick (G3IUU)	D(U)	2143
30	Addiscombe (G3VYI/A)	D(U)	4058	73	Mansfield (G3GGQ)	C	2000
31	Southgate (G3SFG/A)	D(U)	3881	74	N. W. Durham (G3VZO/A)	B	1989
32	West of Scotland "B" (GM3YCB)	A	3838	75	Chippenham (G3VRE/A)	D(U)	1949
33	Torbay (G3NJA/A)	E	3812	76	Southdown (G3WQK)	D(U)	1922
34	Chesham (G3MDG/A)	D(U)	3811	77	West of Scotland "C" (GM3YUO/A)	A	1916
35	University of Essex (G3UOE)	D(U)	3795	78	Shefford (G3FJE/A)	D(U)	1899
	Wirral DX Association (G3OKA)	C	3795	79	Liverpool (G3AHD/A)	B	1847
37	Purley "B" (G3SIX)	D(U)	3756	80	Wimbledon (G3WIM/A)	D(U)	1684
38	Edgware (G3ASR)	D(U)	3709	81	East Kent (G3LTY)	D(U)	1684
39	Silverthorn (G3SRA)	D(U)	3601	82	Reigate (G3REI/A)	D(SU)	1523
40	Crawley "E" (G3TNO)	D(U)	3581	83	Clifton (G3GHN)	D(U)	1395
41	University of Keele (G3UOK)	C	3571	84	Thanet (G3DOE)	D(U)	1338
42	West of Scotland "A" (GM3YRK)	A	3570	85	Sully (GW3ZIT/A)	F	1230
43	Leyland Hundred (G3GGS)	B	3566	86	Flint (GW3XJF/A)	F	875

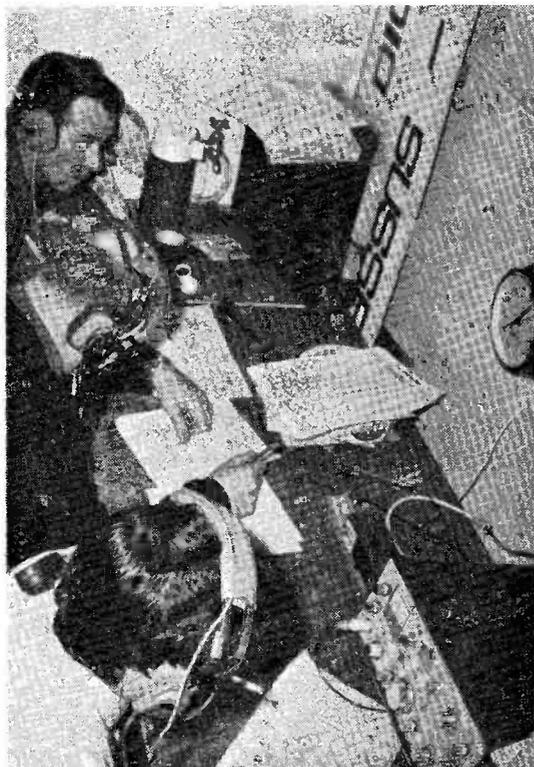
Table III
Top Scorers, 1967-1970

Place	1967	1968	1969	1970
1	Burslem	Moray Firth	Kirkcaldy	Port Talbot "A"
2	Moray Firth	Manchester Univ.	Maesteg	Verulam
3	Kirkcaldy	Kirkcaldy	Verteran Ops.	Maidstone
4	Newcastle Univ.	Spenn Valley	Maidstone	Guildford
5	E. Barnet	Stourbridge	Kings Norton	N. Staffs.
6	Spenn Valley	Keele Univ.	Univ. Coll. of S. Wales	Nottingham

NOTE: Scores not quoted owing to change of Rules

ones are born of adversity, and as so many people escaped the attention of Murphy's Law it follows the funnies were rather fewer. A selection from the logs follows.

Wonder if Short Wave Magazine award a certificate for last place in the contest? (*Flint*) . . . Indoor Joystick first night, TVI second night! (*Thanet*) . . . Our bug key got a little unruly at times—must have been the beer it kept drinking (*Reigate*) . . . Main bugbear at this location, TV timebases (*Liverpool*) . . . NFD is a picnic compared with MCC (*Shefford*) . . . G3VPS did a great job mending

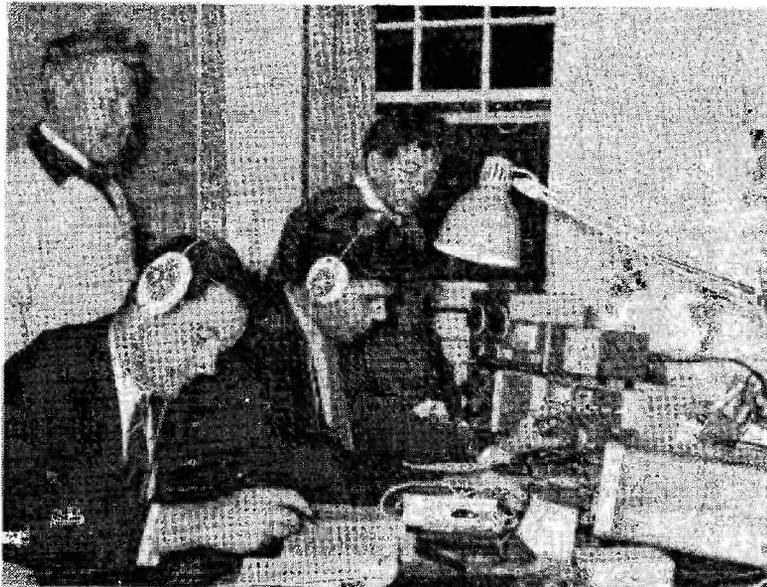


The Mid-Sussex Amateur Radio Society entered with G3ZMS for MCC, running a KW-2000 feeding a Vee-dipole with its apex at 90ft. The three operators seen here are G3WPO (near), G3VAK (centre) and G3RXJ (check logger). They came in with a handsome claim of 4329 points.

the club electric fire (*Southdown*) . . . Temperature maintained using 3 kW—not to the PA but to a tangential fan heater (*Greenford*) . . . Called several stations *umpteenth* times, but N.D. (*Limerick*) . . . One or two signals a bit off—wonder how many gave G3CXX a true report? (*Wheatsheaf*) . . . Wish the bug keys would send slower and more readable Morse (*Macclesfield*) . . . Aerial—a half-wave among the neighbours apple trees! (*Speedbird*) . . . Score down a bit this year due to lack of ground rock salt—How about a mid-year MCC? (*Veteran Operators*) . . . My first MCC. Found the going a bit slow with my very temporary piece of wire (*Crawley B*) . . . May have been the necessity for squeezing quart aerials into pint gardens (*Echelford*) . . . Having received their code and RST, couldn't wait to send *ours!* (*Ariel*) . . . One or two really big signals about but no gripes (*Fareham A*) . . . Terrible noise level; hence, apologies to those who called and were not worked (*Sunderland*) . . . Will send comments later (*Moray Firth*) . . . Due to the aerial falling down the previous week and a dog chewing through the coaxial cable, the aerial was rather a lash-up (*Nuneaton*) . . . Scoring system was unnecessarily complicated (*Eccles*) . . . Our results were disappointing; nothing like a contest for sorting out the boys from the men (*Mansfield*) . . . Had to shift QTH due to caretakers' strike. Usual Wiltshire "attenuation effect" even better this year. Enjoyable contest at a gentlemanly rate of scoring! (*Chippenham*) . . .

We feel our Q-Multiplier was worth at least 20% of our score (*Verulam*) . . . Very enjoyable. Look forward to the results (!) and to MCC next year (*Maidstone YMCA*) . . . Started late on the Saturday as I have to work. I must be the only one in the country! (*Guildford*) . . . Dearth of GM/GI/GC meant low score (*North Staffs*) . . . We lost the mains for fifteen minutes and reckon it lost us five QSO's (*Nottingham*) . . . A station in Scotland has a distinct advantage over a station in amongst the QRM . . . who issued code R28? (*Glenrothes*) (Not us—*Ed.*) . . . Please—never change the times of the operating periods; they are ideal as they are. (*Kings Norton*) . . . Discussion with — — made it quite clear several horses had ridden over the antenna during the morning! (*Coventry*) . . . QRM—Nil! (*Maesteg*) . . . Competitive spirit somewhat dampened when we spent the first hour of the contest retrieving our feeder (*Southampton*) . . . Stations in line-of-sight to us in the contest were GM3YRK, GM3YCB, and GM3YUO/A

R.A.F. Abingdon Club Station G3TAB, operated by, left to right standing: G3KTC, G3MNN and seated G3XHK, G3VOD. They claimed 4281 points, using a KW-2000 /2E26A PA into a full-size 160m. inverted-Vee with the apex at 90ft. This picture well conveys the tension and excitement MCC engenders when the operators are taking it seriously.



(Glasgow University) . . . Some of the largest signals we've ever heard in a Top Band contest (Bristol) . . . A very strong signal from G3IGW calling CQ VK did not help us (Crawley) . . . Half-wave dipole at forty feet over a small water reservoir helped us (IRTS Region I, EI9ONE) . . . Don't like the look of the new scoring system (Hereford) . . . Surely OK, etc. are worth a few more points (Mid-Sussex) . . . We enjoyed the tension, excitement and team spirit that this event creates, and if we are all together next year we shall, once again, be pounding the brass (RAF Abingdon) . . .

Shift the Contest one hour later (Fareham C) . . . More points next year (Addiscombe) . . . Rain static on the Sunday held the S-meter at 30 over S9 (West of Scotland B) . . . It took some time for us to arrive at an agreement over our figures; nearly took it to the computer to calculate the final result! (University of Essex) . . . CU NXT YR 73 de TORBAY . . . See you next year (Wirral DX Association) . . . A receiver is of prime importance in this event (Purley B) . . . Think our trouble may have been the new untried antenna we were using (Leyland Hundred) . . . Contacts difficult on Saturday, presumably due to capacity hat not being connected and loading coil full of water (Crawley E) . . . We were all packed tight into a tiny clubroom; even the big barrel of beer had to stand outside. Its tap was indoors, of course! (University of Keele) . . . Looking forward to next year's event (West of Scotland A) . . . No adverse comments on the Rules; a pleasant Saturday and Sunday evening (Culham) . . .

The Regional Aspect

It has always been stressed for more years than your present conductor can count, that the object of MCC is mainly *Regional*, in the sense that to take on other Clubs within your own region, by direct challenge or whatever, is far more a "personal" matter and so has

more positive benefit to Club morale than does entering a contest with a known relatively weak set-up against the Top Boys who are using top-flight gear, meticulously prepared, from a super site. If you challenge the Bloggs-ville group to get higher up the results table, and you win, even though they are bottom and you one place above, is a very satisfying result—whereas to go in with such a set-up hoping for an outright win is likely to be disappointing.

Consistency

The palm for this quality must surely go to Kings Norton who have been entering this contest each year since about 1961 and have never yet won and in the same way have never dropped below the first ten places. Likewise they always seem able to turn in a log which is a pleasure to work on.

The Future

The new Rules certainly seem to have hit the jackpot in that nearly everyone, on the first time they were used, thought well of them, so it is reasonably sure that something along the same lines can be looked forward to next year. As to the question of another effort in mid-year—we'll have to wait and see! (It takes much time and a lot of hard work to mount just one MCC!—Ed.)

Conclusion

A good time seems to have been had by all concerned; a sporting and clean contest in the good old MCC tradition. Roll on the next one! And our thanks to all who made the 1970 MCC so successful by taking part and putting in a log.

The "Month with The Clubs" feature reverts to normal with the February issue, for which the closing date is **January 8**, all reports to: "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM.

A Happy New Year to all who follow "Clubs."

NEW QTH'S

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

- G3WR, H. T. Lunson, 17 Tongdean Rise, Brighton, Sussex. BN1 5JG. (Tel. Brighton 501100) (re-issue.)
- G3ZCC, M. Davidsohn, 101 Hew Road, Chingford, London. E4 9EX. (Tel. 01-529 2235.)
- G3ZKW, A. C. Freer, 60 Beaumont Road, Barrow-upon-Soar, Leics. LE12 8PJ. (Tel. Quorn 3181.)
- G3ZNF, B. M. Whitford, 45 Chapel Street, Shephed, Loughborough, Leics.
- G3ZNU, M. S. Appleby, 37 Rectory Road, Salisbury, Wilts.
- G3ZOA, G. W. Nash, Hill Farm, Dry Doddington, Newark, Notts. (Tel. Long Bennington 318.)
- G3ZOH, B. R. George, 8 Maxwell Gardens, Orpington, Kent. BR6 9QS.
- G3ZPE, F. J. Raby, 38 Broadway, Codsall, Wolverhampton, Staffs. WV8 2EL. (Tel. Codsall 2387.)
- G3ZQK, L. A. Outridge, Flat B, 203 High Street, Penge, London, S.E.20.
- G3ZRD, I. M. Pick, 30 Merlin Grove, Beckenham, Kent. (Tel. 01-650 7801.)
- GM3ZRI, Radio Department, Glasgow College of Nautical Studies, 21 Thistle Street, Glasgow, C.5.
- G3ZRN, D. F. Catherwood, 9 Summerville Gardens, Stockton Heath, Warrington, Lancs.
- GM3ZSP, K. M. Riddoch, 106 Ballingry Crescent, Ballingry, Lochgelly, Fife.
- G3ZSZ, R. James, 10 Lansdowne Avenue, Newbold, Chesterfield, Derbyshire. (Tel. Chesterfield 79699.)
- G13ZTL, F. Convery, Lower Fallagoon, Maghera, Co. Londonderry.
- G3ZUR, R. J. Jones, Alfresco, Brimpton Common, Reading, Berks. RG7 4RN.
- G3ZVE, G. Valentine, 112 Gonville Crescent, Stevenage, Herts.
- G5ATG, K. D. Farr (K6TWT /VE7BST), 1 The Serpentine, Grassendale, Liverpool 19, Lancs.
- GW8DEZ, H. S. Massey, 10 Morley Avenue, Connah's Quay, Deeside, Flintshire.
- G8DJI, J. H. Stewart, Sussex House, 29 Ashurst Drive, Goring-by-Sea, Sussex.
- G8DPX, W. E. Hazlehurst (G6OBE /T), 28 Broomfield Lane, Hale, Altrincham, Cheshire.
- G8DXV, H. King, c/o Romford Y.M.C.A., Rush Green Road, Romford, Essex.
- G8DXX, P. L. Pomeroy, 15 Southwood Road, Tankerton, Whitstable, Kent.
- G8DZZ, J. T. Lawrence, 23 Claremont Gardens, Tunbridge Wells, Kent. (Tel. Tunbridge Wells 25023.)
- G8ECV, A. H. Wallwork, 9 Bury Lane, Withnell, Chorley, Lancs.
- G8EEC, P. Nixon, 1 College Grove Road, Wakefield, Yorkshire.
- G8EEJ, K. Basterfield, 8 Causeway, Rowley Regis, Warley, Worcs.
- G8EFG, M. J. Vaughan, 73 Glenwood Avenue, Westcliff-on-Sea, Essex. SS0 9DS.
- G8EFV, J. Hesling, 168 Station Road, Ossett, Yorkshire.
- G8EFW, R. Johnson, 87 Esther Grove, Wakefield, Yorkshire.
- G8EGB, R. Mountain, 9 Windhill Road, Wakefield, Yorkshire.
- G8EGE, J. Denton, 217 Thornes Road, Wakefield, Yorkshire.
- G8EGF, L. J. Hicks, 9 Pine Grove, Edenbridge, Kent.
- G8EHU, T. W. Legg, 67 Deepmore Close, Alrewas, Burton-on-Trent, Staffs. (Tel. Burton - on - Trent 790454.)
- G8EIR, G. R. Morse, Christowe, Sandford Road, Cheltenham, Glos. GL53 7AJ.
- G8EJB, R. J. Edwards, 212 Garstang Road, Preston, Lancs.
- G8EJR, N. E. Griffiths, Tikvah, Barncliffe Glen, Sheffield. S10 4DR. (Tel. Sheffield 306427.)
- GW8EJU, T. Massey, 10 Morley Avenue, Connah's Quay, Deeside, Flintshire.
- G8EKA, A. T. Cooper, 1 Shenstone Close, Crayford, Kent.
- GW8EKZ, A. Jones, 121 Upper Tennyson Road, Newport, Mon.
- G8ELA, L. K. Ferguson, 223 London Road, Bedford, Beds.

CHANGE OF ADDRESS

G3BN, A. E. Sutton, 3 Crossfield Road, Wardle, Rochdale, Lancs.

G3DZS, H. W. Fudge, Chetnole Inn, Chetnole, Sherborne, Dorset. (Tel. Yetminster 337.)

G3JHI, R. L. S. Hathaway, c/o Officers' Mess, R.A.F. Bawdsey, Woodbridge, Suffolk.

G3MXK, D. R. Paice, 19 Laburnum Grove, Banbury, Oxon. (Tel. Banbury 3493.)

GM3PCX, B. J. Dodge, Firthside Lodge, Thurlow Road, Nairn, Nairnshire.

GW3RFA, D. E. Garrington, 10 James Close, Llanon, Cards. SY23 5HP.

G3TZI, A. Senior, 12-A Temple Road, London, NW2 6PP. (Tel. 01-450 8877.)

G3UBP, C. Riches, 95 Hallford Way, Dartford, Kent.

G3URA, R. G. Whittering, 51 Percival Crescent, Hampden Park, Eastbourne, Sussex.

GM3VOX, A. J. T. Thomson, 108 Tannahill Drive, Calderwood 12, East Kilbride, Glasgow, Lanarks.

G3WLL, P. I. Peters, 20 Cobwell Road, Retford, Notts.

G8BXI, R. T. Payne, Flat 8, Bevere House, Bevere, Worcester.

GW8CGH, D. C. Pickering, 2 Penprisk Road, Pencoed, Bridgend, Glam. (Tel. Pencoed 444.)

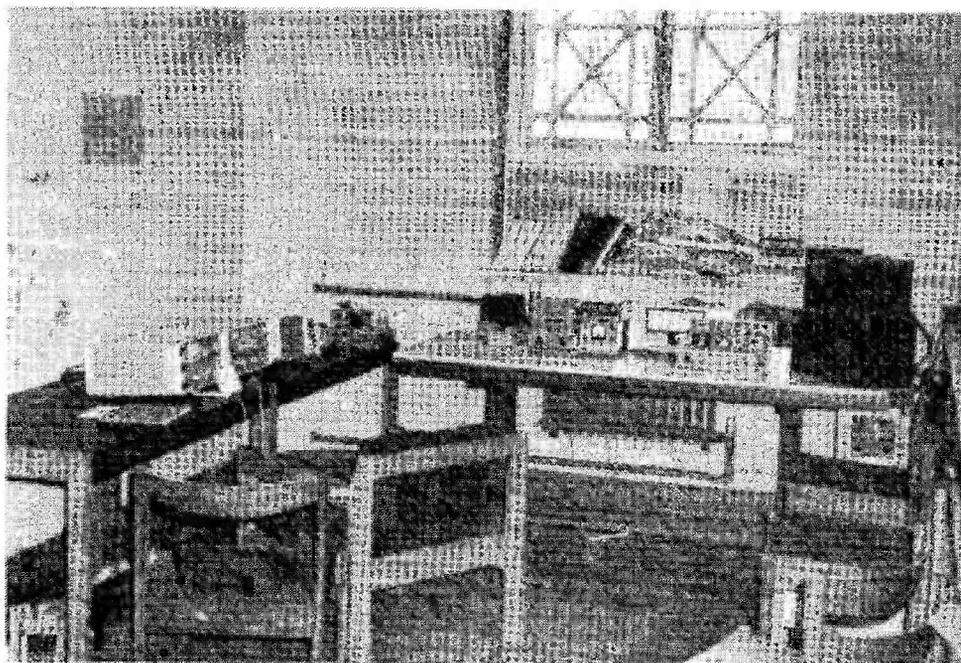
G8CHS, S. H. Johnson, 125 Marlborough Avenue, Hull, Yorkshire.

G8DQF, L. Johnston, 9-B Tunbridge Close, Burwell, Cambs. CB5 0EL.

G8RY, F. E. Wyer, 3 Breidden Close, Morda, Oswestry, Salop. (Tel. Oswestry 4667.)

AMENDMENT

G8CAD, D. R. Ellis, 67 Linden Road, Littlehampton, Sussex. (Tel. Littlehampton 6862.)



THE OTHER MAN'S STATION

G3OUL

THIS might more properly be called "Other Men's" station—for it is the property of the University of Liverpool Radio Amateur Society, G3OUL, 2 Bedford Street, Liverpool, 7.

In the ordinary way, undergraduates living in digs. have few amenities or conveniences for Amateur Radio, and it is largely because of this that G3OUL has evolved over the years. The equipment now available enables operation on all bands 10 to 160m. with a KW-2000B and KW-1000 linear; for VHF there is a range of commercial converters, feeding into an Eddystone 940 and an HRO as tunable IF/AF strips, for the 4m., 2m. and 70 cm. bands, running home-built transmitter units. An aerial system to match is provided, consisting of Yagis for the VHF ranges (perched on top of the Students' Union building, at one of the highest points in the City), antennae for the other bands being various dipoles, a vertical system and a half-wave wire for Top Band which is matched for use on 40-80-160m.

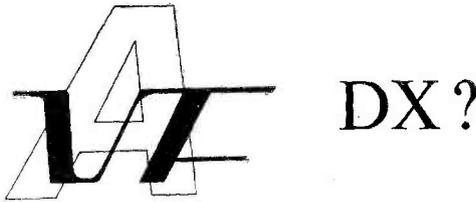
With such accommodation and facilities, G3OUL can be on the air every lunch-hour and the University call is well known from Top Band to VHF, as well as to the many U.S. amateur stations worked during contests.

At Liverpool Univ., the newcomer to Amateur Radio has at his disposal a full range of the standard

text books; bound volumes of the leading radio amateur magazines, with copies of their latest issues; facilities for experiment and the building of equipment; and the advice and assistance of members experienced from Top Band, through HF/DX to the VHF's. There are many who have come along as "Freshers just interested in short-wave," and who subsequently have graduated not only with a degree from the University but also their own callsign.

Morse classes are run as demand dictates but of late interest has tended towards the Class-B (G8/3) licence, with many members having a keen interest in the experimental aspects of VHF. Out of view in our picture are the benches, along the other walls, with test gear and the facilities for experimental and constructional work.

The natural turn-over of membership about every three years means that the infusion of new blood and new ideas keeps Club G3OUL truly alive and active. A radio amateur set-up like this might well be the envy of many other Club organisations. The present chairman of the University of Liverpool Radio Amateur Society is D. F. Harvey, G3XBY, and the hon. secretary J. A. Share, G3OKA, address as Call Book.



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ABC's OF ANTENNAS

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The introductory chapters cover the fundamentals of radio-wave propagation and basic antenna characteristics. The remainder of the book is then devoted to a discussion of the various types of antennas and their uses. Antennas for radio, television and two-way communications are included. Business radio, amateur, both mobile and fixed-station operation, are covered. The final chapter should be particularly appealing to those interested in microwave uses and radio-navigational systems. A perusal of this book will provide any student with an excellent foundation for more advanced study in antenna design. 17/-

HAM ANTENNA CONSTRUCTION PROJECTS

For the many amateur radio operators who like to construct their own antenna gear, and for those interested in getting into the fascinating field of Amateur Radio, here is a practical guide to building and operating many types of ham antennas.

Although the antennae described in this book cost little to construct, many will out-perform some of the best-designed, ready-made designs on the market. By using parts you already have on hand (wire, 2 x 4's, insulators, etc.), you can build radiators that will allow you to DX places like Singapore, Moscow, Berlin, and the North Pole.

Besides full details on many useful and interesting types of aeriels, Ham Antenna Construction Projects includes complete information on long-lasting construction methods, as well as how to position your antenna to achieve maximum distance with a given radiation pattern. In addition, much easy-to-understand technical information on tuning antennas and the use of test equipment is presented. 27/6

ABC's of SHORT-WAVE LISTENING

Have you ever listened to a radio and thought how enjoyable it would be to hear broadcasts from faraway places, such as Toronto, Berlin, and Tokyo, as well as signals from ships at sea and satellites in space. All these broadcasts can be at your fingertips, offering a fascinating hobby.

ABC's of Short-Wave Listening a non-technical guide, will help you get started, or give you added pointers if you are now engaged in this hobby. The mysteries of radio waves are revealed in a manner that anyone can understand, providing priceless knowledge about the ever-expanding world of short-wave radio.

Even though you may not have a basic knowledge of radio principles, author Len Buckwalter introduces you to the subject by first explaining just what short-wave listening is, what makes a radio wave and a "meter," and just how these short waves travel in the earth's atmosphere and space.

Using a unique collection of photographs, drawings, charts, and authoritative text, this book tells how the short-wave receiver works; what the various controls are for; and what to look for when selecting equipment. In addition, antennas are presented and explained so that you can better receive those elusive foreign stations on your set.

Finally, this book lets you in on the secrets of how best to set up and operate your listening station; how to track and "hold" DX (distant stations); and how to locate and listen to the space satellites and manned space vehicles. 19/6

ABC's of RADIO & TV BROADCASTING

This is a book for those who want to know what goes on at the transmitting end in radio and television broadcasting. It explains how the radio and television signals are formed, built up, and transmitted. In addition to the discussion of basic transmitter circuits, information is provided concerning metering and monitoring circuits and procedures.

ABC's of Radio & TV Broadcasting is a basic survey of transmitter equipment and operation. The first chapter deals with the principles of electromagnetic radiation. Then two chapters cover audio and video modulating signals. The next two chapters treat the origin and amplification of the transmitter carrier signal. Two following chapters discuss modulation, both amplitude and frequency types. The remaining chapters deal with power supplies, transmission lines, standard broadcasting antennas, FM and television antennas, and remote transmitter operation.

The author has avoided a detailed mathematical treatment, keeping the text basic and the essentials in view. Review questions are included at the end of each of the twelve chapters. The answers are given in the back of the book. 21/6

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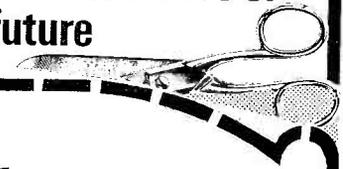
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SELLING: TCS-12 Tx, £10; PSU, mains, 70s.; 12v. DC, 80s.; R.1155L Rx, with PSU, £10; B.44 Tx/Rx, £6; SCR-522 Tx/Rx, covers 100 to 156 MHz, 90s.; mains PSU, 80s.; 28v. DC, 30s.; Type AD.107 aircraft Tx, for 2.0 to 18 MHz, with three 829B valves, £8; TR.13046, 44-channel over 115 to 145 MHz, Tx/Rx, £12; TR.1520 4-channel ditto, 80s.; TBY-8 Tx/Rx, for 28 to 95 MHz, two valves missing, 70s.; Cossor Type 1035 'scope, £15; BC-221 with PSU, calibration OK, £17 10s.; PTR-61 VHF Tx/Rx, transmitter on two metres, Rx RF stage needs attention, 80s.; R.1937, 190 kHz to 1.5 MHz, British Q5'er, IF selectivity 2.5 kHz at 6 dB, needs PSU, £5 10s.; PSU, C42/C45 12v. DC, £5; C13 12v. DC PSU, 40s.; TR.2002 VHF Tx/Rx, £6; Rx only, 40s. Command Equipment: Tx, 3 to 4 MHz, 60s.; 7 to 9 MHz, 50s.; 14 MHz, 50s.; 21 MHz, 50s.; 100 to 156 MHz, 90s.; Rx Q5'er, 90s.; 550 kHz to 1.5 MHz, £4; 1.5 to 3 MHz, £6; 3 to 6 MHz, £5; 7 to 9 MHz, 50s.; 100 to 156 MHz, 50s. Modulator, two 1625's, 40s. Racks: Transmitter twin, 15s.; Rx, single, 10s.; triple, 20s. Rx triple-control unit, 2/HF, 1/VHF, 20s. Rx flexible drive, 7s. 6d. Plugs, 2s. 6d. Valves: 813, 20s.; 5B258M, 5763, 1625, at 5s.; 6V6, 12A6, EF37A, 9002, 9003, 12AX7, 12AU7, 02A, at 3s.; 12AT7, 1T4, 1L4, 3A4, 9001, EC91, EF50, at 1s. 6d. Manuals for CT.38, SCR-522, 25s.; BC-625C, 7s. 6d. TR-144 spare thermo-couples, new, 10s. Carriage extra all items.—Clarke, Copper Coin, Old Galgorm Road, Ballymena, Co. Antrim, Northern Ireland.

COMPLETE SWL Station for Sale, housed in steel cabinet and including meters, heaters and switches mounted on steel desk. Equipment consists of the following: Eddystone EA-12 and 770-R receivers, Tandberg-15 tape recorder, three electric clocks, speakers, two PMI pre-selectors, aerial relays, two aerial towers, one Channel-Master auto beam rotator, aerials, small amplifier and books. Inspection and offers invited.—Griffiths, Kenwyn, 21 Summerhill Road, Coseley, Nr. Bilston, South Staffs., WV14. (Tel: 021-557 2905.)

WANTED: Ex-R.A.F. HF transmitter/receiver Type TR9. Circuit condition not important but would prefer front panel to be undamaged. (Surrey.)—Box No. 4980, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: BC-348 and BC-453 receivers each with external PSU's, at £10 each. Advance signal generator EI, 100 kHz to 60 MHz; Advance RF voltmeter Type VM78, 1 mV to 300v.; Pye AF output meter, 50 to 5000 mV at 2.5 to 5000 ohms impedance; price £5 each. Also Heathkit V7A Valve Voltmeter at 60s. Buyers to collect, Kingston-on-Thames district.—Ring Howes, 01-942 1230.

SELLING: R.308 AM/CW/FM receiver, 20 to 145 MHz, £20. Canadian No. 52 Tx, covering 1.6 to 16 MHz, £6. Naval B.46 receiver, tunes 1.4 to 15 MHz, mains PSU integral, £6. Cavity wavemeter BC-906D, 145 to 235 MHz, £4. Field strength meter Type I-95-AM, for 100 to 150 MHz, 60s. TR.1986 with control box, £6. Type 31 Set, 20s. All foregoing items with gen. Indicator Type 28, 3-inch face, 20s. Indicator Type 266, 6-inch, 40s. Carriage by arrangement.—Stoodley, G3UNW, East Street, Ash (509), Canterbury, Kent.

SALE: Genuine R.C.A. S-meter, new and boxed, with R.C.A. circuitry and fitting instructions, £4 and no offers. **WANTED:** Original front panel with fixing screws and knobs, meters, for the Collins TCS transmitter. State price, including post/packing.—Box No. 4984, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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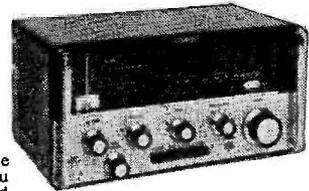
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P.M. IV There is also a 1 Mc. crystal calibrator to enable you to set your receiver up to the nearest megacycle point, invaluable with receivers having a bandset control. This also has internal modulation for easy recognition of the marker points, priced at **£4 10s.**

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SOLATRON VARI-PACK. 0-500v. D.C. at 100 mA, 6.3v. 3 amps, A.C. For A.C. mains 200-250v. Compact hammer finish cabinet, good condition, £7/5/-, carriage paid.

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Terms: Cash with order. Early closing Wednesday.

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WANTED: For the HRO, coil packs Type F and JA, 480 to 960 kHz and 14 to 30 MHz. Also interested in bandsread coil packs for this receiver.—Falcon, 12 Hillfield Avenue, Morden, Surrey. (Or ring 01-648 2366, evenings.)

WANTED: Class-D Wavemeter, preferably for mains. The Trio HS-4 headphones. Crystal Calibrator. ARRL "Handbook". RSGB "Radio Communication Handbook", or similar. Pse quote price, including postage/packing.—Box No. 4981, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE or Sale: New set "Newnes Radio & TV Servicing", 1965-1970 (cost £20) price £15 for quick sale, or EXCHANGE for SX-28, S.27, S.36A, or Signal Generator 1-6 to 200 MHz. (West Country).—Box No. 4982, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: K.W. Viceroy Mk. II CW/SSB transmitter, with solid-state PSU, in excellent condition, £75. National HRO, table model, with all coil packs and 20m. bandsread, £15. Transmitter, 150 watt AM/CW, Geloso VFO, 2/6146 PA, with PSU, £18.—Yilmaz, G3PRK, 31 Nursery Road, Southgate, London, N.14. (Or ring 01-637 1355, extn. 103 by day, or 01-886 4587, evenings.)

SELLING: Heathkit RA-1, with xtal calibrator, matching speaker, QPM-16 unit, all as new, £40. Marconi valve voltmeter, Wobulator, needs working on, £10 the pair. Stanley-Kelly hi-fi cabinet speaker unit, £10.—Munroe, 2 Morland Close, Dunstable (62592), Beds. LU6-3QB.

SALE: Sphinx AM/CW/SSB Tx, unused (cost £84), at £50. Lafayette KT-340, £15. Wavemeter Class-D No. 2, perfect, with spares and handbook, £10. Professionally built 4-over-4 beam for two metres, 40s.—King, 5 Bushwood Drive, Dorridge, Solihull, Warwickshire. (Tel: Knowle 3633.)

DISPOSING: National HRO Senior receiver with PSU and speaker, BS coil packs for 15-20-80-160m., including 5RV Q5'er second IF, for £10, exceptional opportunity for SWL to obtain first-class Rx, no offers and buyer to collect Thornton Heath, Surrey.—Box No. 4983, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Racial items as follows: PV.78B Converter Keyer; RA.316 FSK Converter; RA.326 Dual FSK Converter; RA.66B Panoramic Adaptor; RA.17 Cabinet; and Racial RA-17L receiver. Also a Hallcrafters SX-28 Rx, must be in mint condition. **SELLING:** Marconi CR-150/3 receiver, covering 2.0 to 60 MHz, with PSU and in FB condition, £30. For RTTY: Creed tape perforator Type 7P/N3, Murrey Code, £6; Creed printing reperforator, Type 85R, as new, £25; Teletype teleprinter Type TT4 (this is the Type 26 lightweight T/P "in uniform") price £30; ATM FRS 1.1 teleprinter terminal unit, £5; Indicator Unit Type 3, for use with the foregoing TU, £10; PSU, 80+80 volt, 50s. RTTY Admiralty receivers Type B.40/D and B.41/C, not the usual thing offered, but in new condition, both with miniature valves and specially designed for FSK working, incorporating special mode switching for FSK and extra stability, the pair for £70. Erskine Laboratories double-beam scope, in FB condition, complete with cables, £17 10s.—Phillips, 155 Franklands Village, Haywards Heath (50265), Sussex.

WANTED: Pye F27AM, Cambridge, Bantams, Westminster, Motaphone. Please gentlemen, if you have 2702's, Reporters, Rangers, Hudson or BCC 69D's, don't ring me, I'll ring you! Also Wanted working and unmodified Walkie-Talkies on either 27 or 28.5 MHz.—Kates, G3PHS, QTHR, Caterham (Surrey) 46692.

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500 volt tubular ceramics :—50, 150, 700, 2000, 3000pF; also—
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OFFERING: Scots. Laboratories receiver, coverage 38 to 1000 MHz, £125. Hammarlund SP-600J11. Transmitter T-50XM, MO, 1.5 to 12 MHz, £10 10s. Type R-50 Rx, £14. BC-221 frequency meter, £10. All following in new condition: Marconi ATU, 25s. PSU for HRO Rx, 50s.; dial, 30s.; crystal and coil, 20s. AR88 gear box, dial, manual, etc. Multitester, 35s. AN/URM-45, 50 MHz to 11,000 MHz. All plus carriage, s.a.e. for details.—Wright, 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

WANTED: For collection, civil and military Morse telegraph keys, from any country. Please describe and indicate asking price, trade requirements or other conditions.—Box No. 4966, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: The Lot for £120. K.W. Viceroy Mk. III, KW-77 Rx, K.W. E-Zee Match, K.W. SWR Bridge. Buyer to collect.—Creedy, Rose & Crown, Bell Street, Wellington (2708), Shropshire.

SWL Seeks practical tuition to supplement R.A.E. theoretical course at evening classes. Fee by arrangement.—Ring Cousins, Hornchurch (Essex) 51410, after 8.0 p.m.

FEBRUARY Issue SHORT WAVE MAGAZINE will appear on Friday, January 29. Single copies at 4s. 6d. (or 4s. 9d. first-class posting) can be supplied to orders reaching us by Wednesday 27th, for despatch on Thursday 28th the day before publication. Orders with remittance to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: FT-DX400/500, with 160m. on Aux-1, £185 or near offer. FL-DX2000 Linear, new (only air-tested), £95. KY-102 semi-automatic keyer, unused, 60s. Three GJS6A valves, new and boxed, at £4, or 30s. each. New 6HF5, 35s.—Barry, G3RJS, 47 Gerald Road, Wollaston, Stourbridge, Warwickshire.

STATION of the Late G3YUA: Two-metre linear, pair 4CX250B's, £25. Two-metre Tx, 150w., series-gate modulated, with PSU and microphone, £18. Snowflake two-metre Tx, £8. Codar A.T.5 Tx, with mains PSU, £18. Class-D Wavemeter Mk. I, mains, £6. Class-D Wavemeter Mk. II, £10. Also coax cable, etc.—Eames, G3SBF, QTHR or ring Markfield (Leics.) 2585.

SALE: Latest solid-state custom-special Trio JR-599 receiver, coverage Top Band to two metres, air-tested only. Outstanding performance, making this Rx a real winner. One only, purchased to take abroad (not now possible). Accept nearest offer to list price.—Box No. 4985, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Genuine R.C.A. S-meter for AR88D receiver; your price paid.—Richardson, 2 Edna Road, Maidstone (51578), Kent.

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NEW F.W. BRIDGE RECTIFIERS:
900 P.I.V. (638v. rms.) 17 amps., 25/- plus 2/- P.P.
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Send an s.a.e. for our lists, including grinding prices, or telephone your requirements to West Kingsdown 2344: our telephone is manned between 9 a.m. to 6 p.m. 6 days a week.

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SELLING: Collins KWM-2 in mint condition inside and out, looks like new, very little used, price including 516F-2 AC/PSU and manual, £475.—Box No. 4986, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: Labgear LG.300, in mint condition, with or without home-built PSU's and modulator —offers?—Henney, GM2MP, 48 St. Mary's Street, Kirkcudbright, Scotland.

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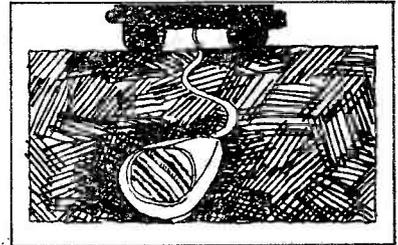
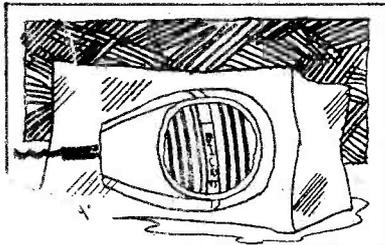
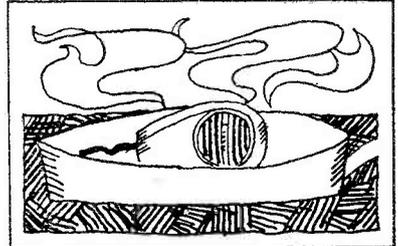
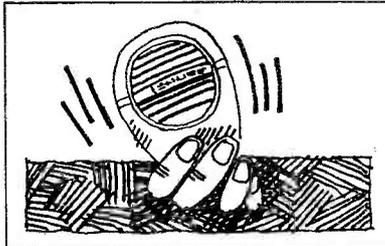
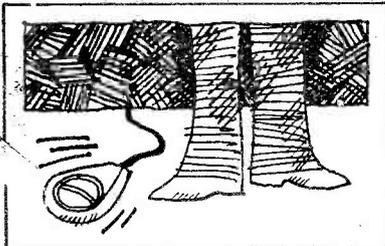
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