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CONTENTS

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E. & O. E.

The SHORT-WAVE Magazine

EDITORIAL

Christmas

It seems a bit early to be offering Season's Greetings but once again the time has come round for that—no less than three decades have passed since the writer of this piece first wished our readers and trade friends a Happy Christmas.

Much has happened in those thirty years but even so all the struggles, hopes and fears for the MAGAZINE*—launched on a hard world in the depressed year of 1937—can be remembered as if they had been happening during the last twelve months—the reason being, of course, that each year sees some new problem, or difficulty or disappointment. There is now nobody left who was associated in the pre-war strivings to get the Magazine established. And good friends have been lost along the way since . . .*

However, there are compensations. We are in a strong commercial position, still entirely independent, and there is ample evidence—it comes in daily—that SHORT WAVE MAGAZINE *enjoys the warm support of 1,000's of readers, some proud still to possess their copy of Issue No. 1. And every now and again there is one of those heartening episodes or encounters which make it all seem very much worth while.*

So once again it is our pleasure to offer good wishes for their health and happiness to all who may chance upon these lines—

From The Editor, Management and Staff
of SHORT WAVE MAGAZINE

SOLID-STATE MODULES

FOR VALVE REPLACEMENT IN COMMUNICATION RECEIVERS

Part I

D. R. DRYDEN (G3BKQ)

In this interesting series of articles, our contributor will show how valve stages in conventional communication receivers can be replaced by equivalent transistor units, made up as pluggable modules having the same input-output characteristics as the valves for which they are substituted—thus preserving the general tuned-circuit layout and parameters of the original Rx. This is done by using a combination of FET-and-transistor, and he shows that these modules can be designed to take care of any usual circuit-substitution requirement. The practical ideas brought out in these articles constitute original work in the field of solid-state circuitry as applied to receiver design, and thus will be of great interest to many readers.—Editor.

SINCE the introduction of transistors, many radio amateurs and SWL's have expressed great interest in the possibility of producing a solid-state communication receiver of satisfactory all-round performance, using an existing valve receiver as a basis. The advantages of transistors are well known, and in recent years they have proved to be better than most valves in respect of gain, noise and HT current drain.

Replacing valves with transistors *directly* is not practical because of the low input impedance of the transistor, the different nature of the neutralisation problem, and the necessity for complete reorganisation of bias and HT supplies.

The advent of the FET offered a possible solution, and the author therefore determined to re-examine the situation. In grounded gate, the FET has a low input impedance, which causes much the same difficulty in matching a tuned circuit as does the introduction of a transistor. In grounded source, neutralizing a FET is rather difficult if it is to be used in a multi-band configuration, but the input impedance is better than with a valve.

The author therefore designed the plug-in modules discussed in these notes, using the FET as a matching device to produce a high input impedance. This drives a conventional transistor circuit which exhibits high output impedance. *In this way, it is possible to utilise existing tuned circuits, without altering the tuning and tracking characteristics.* Furthermore, the circuit arrangement required is cut to a minimum.

It has also been possible to improve the gain, selectively and AVC characteristics, and reduce cross-modulation effects to negligible proportions compared with an original valve-operated receiver. The modules are suitable for use in any Rx, car-radios, and also 2 and 4-metre converters. In the case of the 2-metre converter, the noise figure, gain and cross-modulation performance are outstanding.

Receivers may be modified one stage at a time if required, without affecting the performance of the remaining valve stages. This exercise was actually carried out by the author, to establish the complete interchangeability of the modules with existing valves.

The RF modules exhibit high gain, values of 300 at 30 mc and 80-100 at 144 mc being typical. Usually, if a valve is to be replaced by the device, the gain is reduced to the same as the valve to preserve the overall characteristics of the receiver. The stability of the device against temperature change, and in respect of neutralisation, is very high.

To illustrate the application of the modules, this article will later include complete conversion data for the BC453/454 series of receivers. The ideas set out will enable a scheme of modification for any receiver to be evolved along the same lines. The BC series was chosen for illustration, because they are in wide use for mobile applications, as Top Band receivers, tunable IF's on the 2-metre band, and (particularly in the U.S.A.) for main-receiver IF's in conjunction with xtal-controlled converters. To illustrate VHF applications, a description of a 2 or 4-metre RF stage is also included.

RF Module

The basic circuit of the RF Module is shown in Fig. 1(A) and (B). This will replace RF pentodes or

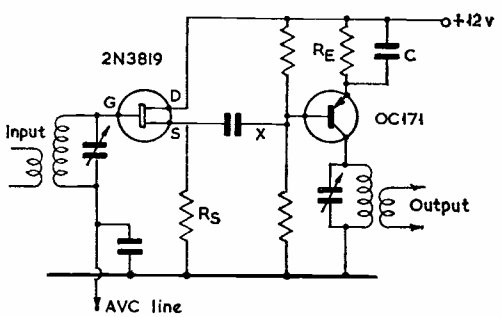


Fig. 1A RF MODULE

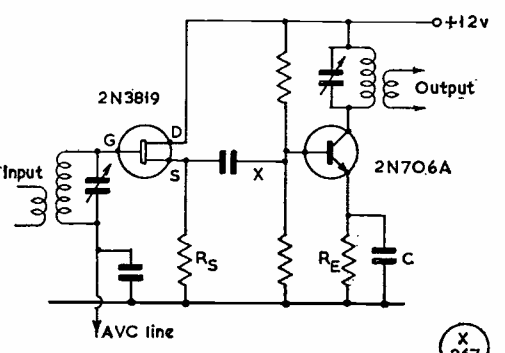
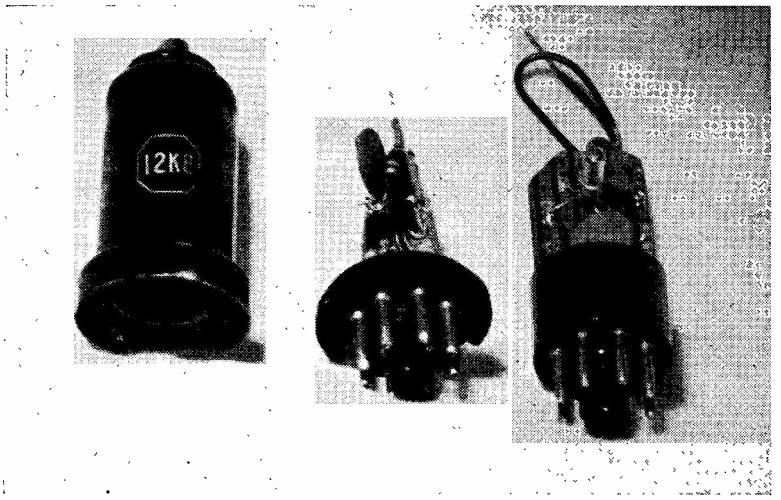


Fig. 1B



Examples of some of the transistorised module assemblies, of the kind discussed in the article, with a size comparison. They can be built up on standard valve bases to be pluggable replacements in the various stages of the receiver.

triodes, *e.g.*, 6AK5, 6SG7, 6K7, etc. The FET is operated as a source-follower, which is coupled to a p.n.p. or n.p.n. transistor as an amplifier with high output impedance. Since point X is at a very low impedance, the transistor does not need neutralizing. The FET capacitance (C)DG forms part of the input tuned circuit, while (C)GS is reduced to negligible proportions by the voltage gain of the FET stage (0·9). In this way, the isolation between input and output is, for practical purposes, complete.

If AVC is required, it can be applied at the gate of the FET, Fig. 1(C). This is possible because the voltage transfer characteristic of the FET is curved, due to the low value of the HT supply. An AVC signal of —3v. produces a fall in gain of approximately 30 dB. This control is best applied where the module is handling low-level signals (up to about 50mV) to preserve linearity. For

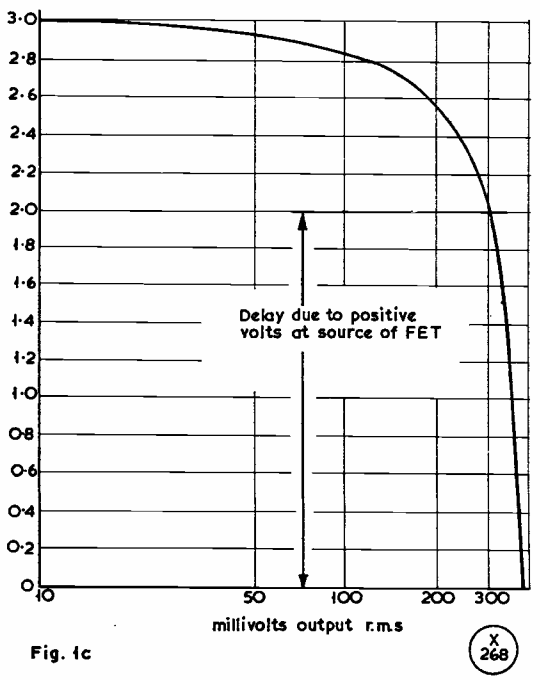


Fig. 1c

Fig. 1C. In the RF/IF module, this is the input/output curve showing the DC variation at gate to AC output.

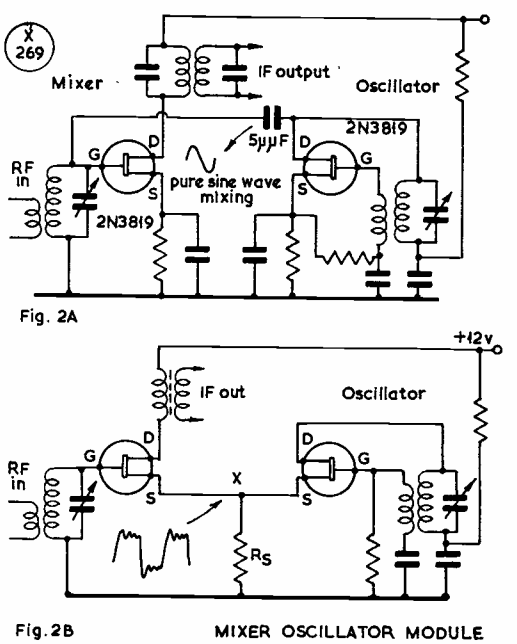


Fig. 2B. The mixer/oscillator configuration shown in the lower sketch is not recommended because of the bad waveform at point X, which can produce unwanted beats up to 200 mc.

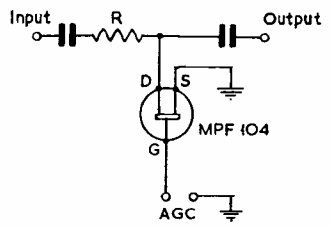


Fig.3A

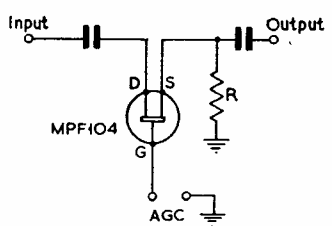


Fig.3B

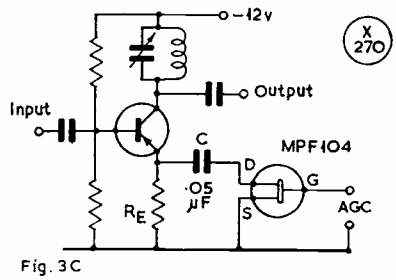


Fig. 3C

somewhat higher levels, or more rigid control, another circuit (described later) is recommended.

The fixed gain of the circuit may be set by varying Re, with suitable adjustment of bias to preserve the standing current through the transistor at a convenient level. To realise further gain, Re can be wholly or partially by-passed. Up to 30 mc, adjustment of the fixed gain over a range of 5-300 is feasible, if the coils have sufficient Q. At lower frequencies, around 465 kc, the coils have higher Q, and a gain of 800 can be realised. The HT supply is at 12v., and the recommended current per stage is about 1·8 mA.

The frequency limit of the device is set by the FET, and bipolar transistors are selected for a given application.

Mixer—Oscillator Module

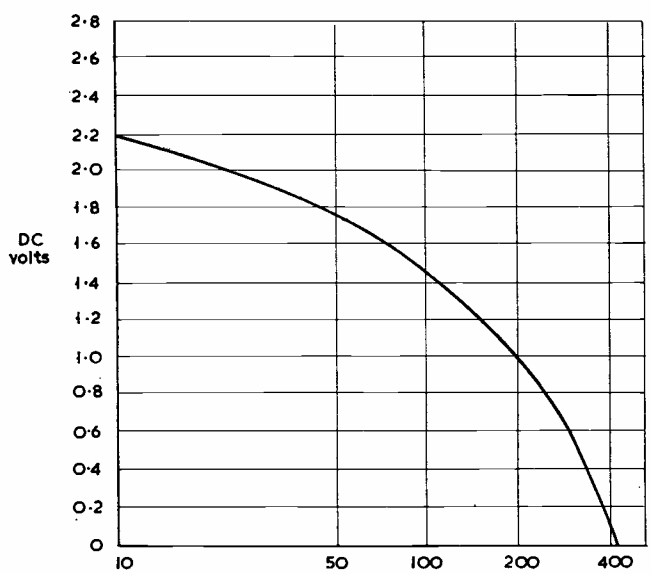
This bears a strong resemblance to its valve counterpart, the basic circuit being shown in Fig. 2(A). This may be used to replace any mixer-oscillator valve, *e.g.*, 6K8, 6SA7, or separate mixer and oscillator stages in radio or communication receivers. (C)DG in the mixer is not troublesome, since the output circuit is tuned to IF, and in any case, the mixer is highly non-linear. The trans-conductance of this stage considerably exceeds that of any comparable valve configuration.

AVC and Manual RF Gain Control, using FET'S

In the past, the application of AVC to solid-state amplifiers has presented considerable difficulty. Since the IF stages contribute virtually no noise to the total receiver noise with the configuration adopted here, it is feasible to use attenuators to control the IF gain. The bilateral properties of the FET below pinch-off make this type of control very attractive indeed, and this is the method adopted.

A FET can be used as a variable resistor by applying DC to the gate with zero DC voltage on the drain. Provided that the signal voltage on the drain is below a level which approaches pinch-off, this property is preserved. DC-controlled attenuators using this principle are shown in Fig. 3(A) (FET in shunt), and Fig. 3(B) (FET in series).

A further possibility is to make the FET part of the



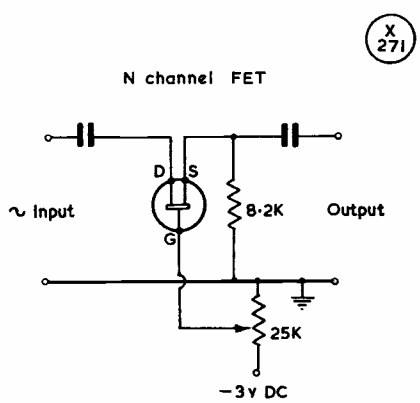


Fig.3d.

Fig. 3D. The electronic attenuator mentioned in the text. The curve shows input/output in terms of DC variation to AC output at 2.5 mc.

emitter resistor of a transistor amplifier which then becomes variable and so can control the gain of the stage. This arrangement is shown in Fig. 3(C).

Variable Attenuation

The circuit of Fig. 3(A) varies the attenuation over the range 0-60 dB for a DC swing of about 3v. However, the distortion of the input waveform is pronounced unless the signal level is very low, and its use would normally be restricted to RF stages. Since the noise figure is degraded as the attenuation is increased, its use is therefore not recommended, and other means have been employed in the RF stage. Distortion of course, precludes its use in the IF, where the circuit of Fig. 3(B) is preferred.

Fig. 3(B) and 3(D). This circuit will provide an attenuation well over 60 dB, but can only be used up to 2 mc, owing to capacity effects. As the 60 dB attenuation is obtained for around 2v. DC swing, this circuit was adopted for the IF control. Noise suppression pulses, manual gain control and AVC may all be applied effectively to this device.

Fig. 3(C). This will vary the gain of the transistor stage by 15-20 dB in a typical case, is not frequency sensitive, and does not degrade the noise. The variable resistance of the FET in series with capacitor C alters the negative feedback due to Re, the gain being maximum when the resistance of the FET is lowest. A swing of about 3v. DC is required.

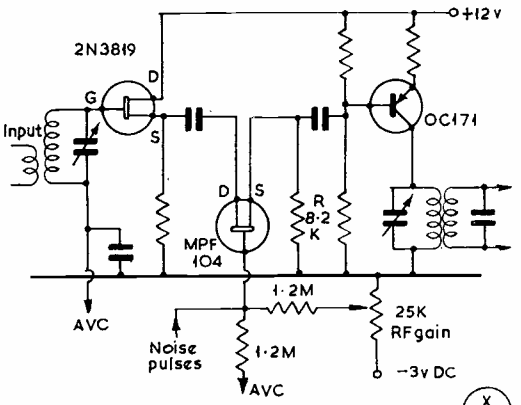


Fig. 4 RF MODULE WITH GAIN CONTROL

RF Module with Gain Control

A suggested practical circuit incorporating an attenuator-type control is shown in Fig. 4. The attenuator is introduced between the source of the FET and the base of the transistor to minimise side-effects due to the introduction of the attenuator. It is recommended that this module should form the first IF of the completed receiver.

(To be continued)

The new Racal RA.1218 communications receiver is fully transistorised, with a read-out scale ("electronic frequency display") to the nearest 10 cycles—the dial reading in the picture represents a frequency of 29.457 mc and 310 cycles. The frequency coverage overall is 1.0-30.0 mc, and reception modes provided for are CW/DSB/MCW/USB/LSB, switch selected, and the Rx can also be used with various adaptor units, for ISB/FSK/LF/MF working, or panoramic reception. Calibration accuracy is preserved by a xtal oscillator giving 100 kc pips. The BFO is variable and can be switched plus or minus the IF centre. Modular construction is used throughout, each module being a plug-in unit, making servicing and maintenance a simple matter. To ensure the utmost stability (μ50 cycles over 8 hours), sensitivity (1 mV for 15 dB S/N on CW/SSB) and selectivity (8 kc, 3 kc and 200 cycles, switched, with standard 3 dB bandwidth filters) very sophisticated design and circuitry are used in the RA.1218.

AERIAL THEORY AND PRACTICE

SOME MULTI-BAND AND RESTRICTED-SPACE SYSTEMS—RESONATING IN LOCAL CIRCUMSTANCES

Part III

E. P. ESSERY (G3KFE)

FOR the owner of a largish plot of land, there is really no problem, and any of the standard texts will provide more than adequate food for thought. However, there are many—indeed, probably a majority—of the amateur population to whom adequate space to lay out even a modest aerial system is just a dream. It is to these folk to whom we address ourselves in the main, and it is hoped that some of the ideas that follow are of some help.

The first problem is that of getting a useful system going in the small garden when Top Band operation is desired. A typical case is that in which the garden is only about 25 or 30 feet long, and it is not possible to get up anything like a decent pole at the end of the garden due to the closeness of neighbouring gardens or their owners' objections. Let us assume that the shack is located on the first floor at the rear of the house, as shown in Fig. 1. In the first place, the aerial stopped short at the point Y, having a total length of about 85 feet; as far as Top Band is concerned, the " useful " or high-current portion of the aerial had mainly disappeared into the ATU, as the top is clearly less than ¼-wave long. However, it was loaded up by means of a wide-range aerial coupler, and was tolerable as far as the local contacts around town went, with the occasional reasonable contact when conditions were exceptionably good —a fairly typical situation. However, it was realised that if the current maximum (antinode) could be moved to the point X considerably better results could be expected. Thus was added the coil and condenser below point X, and the second earth to the rotor of the capacitor, as shown. The principle was that of electrically lengthening the aerial, as in a mobile whip, but such that the distance from X over the house and down looked like a quarter-wave at mid-Top Band, and the length from the transmitter to the end, therefore looked like this plus the length from X to the pole and thence to the transmitter.

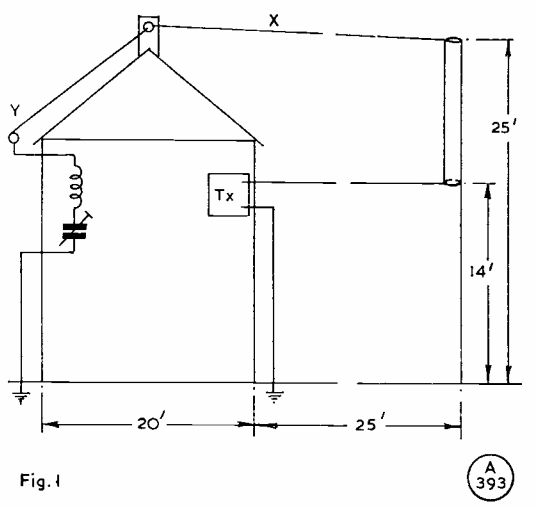


Fig. 1. An end-fed aerial configuration discussed in the text.

Taking a practical example, a quarter-wave at 1·9 mc is ½ × 468/f feet, where f is the operating frequency in megacycles. Thus, we want the end up to X to look like 123 feet approximately; the length from X back to the Tx adds up to about 52 feet, plus the earth lead length from transmitter to ground. Now, this means we would like the aerial to look as though it is 175 feet. But 175 feet is quarter-wave resonant, from the formula just quoted, at about 1·3 mc. Thus, a few turns of wire were formed into a link, and the GDO, set to 1·3 mc, coupled into the link. The coil and condenser were then fiddled until the GDO gave indications of resonance. The immediate result was that the signal rose a couple of S-points locally, and quite good DX contacts around the 160m. band were to be had more often. However, it should be noted that when this aerial had been set up in the manner indicated, it is quite possible that the existing ATU may need a spot of pruning to make it load power into the aerial. The principle, however, is applicable to most cases where the aerial is of such a length that point X, where the current maximum is desired, up in the air and in the clear, does for some reason not coincide with the point at which the current maximum actually occurs.

For operation on several bands, the coil and capacitor network may either be left alone, or, preferably, altered for each band such that the current maximum always comes in the same place, using the principles of calculation as already outlined. However, it should be noted that if the distance from the coil to X is more than half-wavelength at the desired frequency, then the given formula (468/f equals feet), should be replaced by the formula 492(N—0·05)/f equals feet, where N is the number of half-waves at the frequency f.

The End-Fed Zepp

This is another multi-band system which is possible for the location where, as so often occurs, the shack has, perforce, to be at one end of any aerial put up in the garden. The principle here is to get up a half-wave for the lowest frequency band which can be accommodated in the garden, and then, if necessary, strap the feeders together and work the whole thing as a short Marconi-type aerial against earth, resorting to a loading coil or G3UKP-type arrangement if necessary—as shown in Fig. 2(A) for the basic arrangement and 2(B) for the way of working it as a Marconi, while Fig. 2(C) shows the ploy to use to make it go G3UKP-fashion.

Two things should be mentioned about this aerial; in the first place, it works because the aerial is either a half-wave or a multiple of half-waves long, so that the leg of the feeder which is o/c to the insulator " sees " almost the same as the other leg which " sees " the high

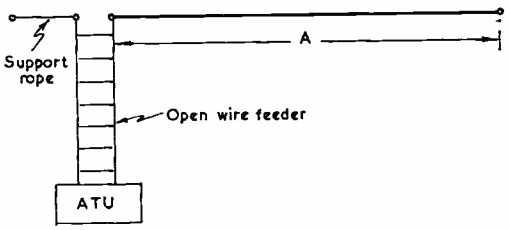


Fig. 2 A

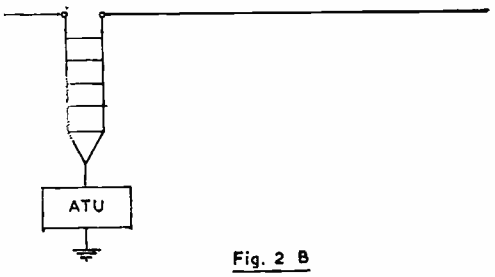


Fig. 2 B

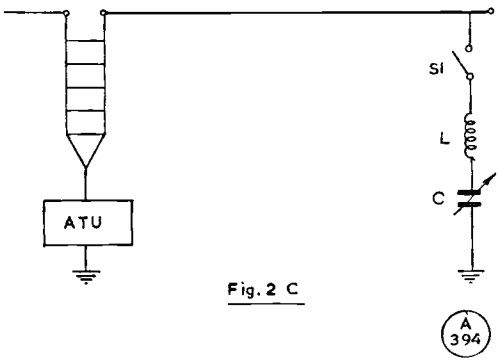


Fig. 2 C

A 394

Fig. 2(A). The end-fed Zepp, in which the length of the top section A is a function of the lowest frequency on which it is to be operated, e.g., 135ft. for 3.5 mc, or 22ft. 4in. for the 21 mc band. The feeder is of open-wire construction (see text), and can be of any length—although it will be found that for multi-band working with a 67 or 135ft. top, a feeder length of 45ft. is desirable to avoid unwanted resonances.

Fig. 2(B). Operation as a "Marconi" on a frequency lower than that discussed in Fig. 2(A).

Fig. 2(C). The G3UKP arrangement, as discussed in the text, with S1 used for Top Band resonance. For other bands, S1 is left open and the Fig. 2(A) and Fig. 2(B) configurations apply. Values for L and C to suit. Note that S1 should be of ceramic construction and adequate for high RF voltages.

impedance due to the half-wave length of the radiating portion. Thus, it means that the feeder is always running with high standing waves, and should be an open-wire line, constructed for low losses. The line ought, if possible, to be of such a length that it is not, in itself, a half-wave long, or the shack may become "full of RF" with the results mentioned earlier. Secondly, the usual technique of tuning the ATU for equal current in each feeder is not the ideal one, and should not be used on the favourite band of operation.

The method to be adopted to tune this aerial up on the favoured band is more like this: First, the aerial is disconnected and replaced by a cord, and the feeder alone hoisted into place. Then, with an RF ammeter in each leg of the feeder, load up the transmitter, loosely coupled, to the feeder, and work the tuning for equal and maximum current up the feeders. *Note carefully the settings of transmitter and ATU thus achieved.* Cut the aerial long to the theoretical length, attach it, and hoist the whole bag-of-tricks back into the air. Tune the ATU for maximum as before, when it will be found the ATU settings will have moved. Drop the aerial again (who said Amateur Radio is a sedentary hobby?), prune a couple of inches off, rehoist, and try again. The object of the whole exercise is to prune the aerial to a length at which the ATU settings originally noted are again found to produce the goods—and it will almost surely be found that at this setting the aerial currents are not quite equal. Having achieved this best setting on the favoured band, the others can be dealt with by the usual method of tuning the ATU for equal and maximum current.

Where possible, the system should be cut with a 66-foot top, to cover 7, 14, 21 and 28 mc as an end-fed Zepp, or 132 feet to add 80m. Top Band can then be used, in the latter case, or Eighty and Top Band in the former, by one of the methods used and shown in Fig. 2(B) or 2(C), as may be appropriate. If the 66 or 132-foot versions is used, the coverage will be world-wide on one band or another, depending on the radiation pattern. Attempts to use a 260-foot version on Top Band as an all-band system will almost certainly fail to "give" properly on one or other of the HF bands, due to the fact of Top Band not being in true harmonic relationship, unless the aerial is carefully pruned for an acceptable compromise, which may prove very difficult.

The method of working the Zepp as a Marconi is clearly shown; if however, it is desired to try the G3UKP scheme, then something along the lines of Fig. 2(C) will do the trick. On the bands where the aerial is used as a Zepp, S1 is open-circuit—although it is suggested that the final pruning be done with S1 in position. Test the stray capacity through the switch shift the resonance a little. When this has been done, the feeders are strapped as shown, S1 is closed, and the G3UKP technique already discussed is applied on whatever bands it is thought to be required. As the switch is at an HV point when the aerial is working as a Zepp, it should be of first-class quality and voltage rating; a good scheme is to use this arrangement when the shack is at the end of the garden, and have S1 in a warm, dry atmosphere in the upper regions of the house, but out of the way of the family fingers. If this is done, the Zepp length will be the length from the feeders to the contact of S1.

Centre-fed Multiband Aerials

These types are not generally so practical in the average situation, but on the other hand it is probably fair to say that, in general, such systems are slightly better in the average location.

The first one in this context is the well-known G5RV arrangement, shown in Fig. 3. Whilst it is shown as being fed through coax, it is fair to say that it is preferable to dispense with the coax and apply Tx power at the bottom of the open-wire section, which can then be of

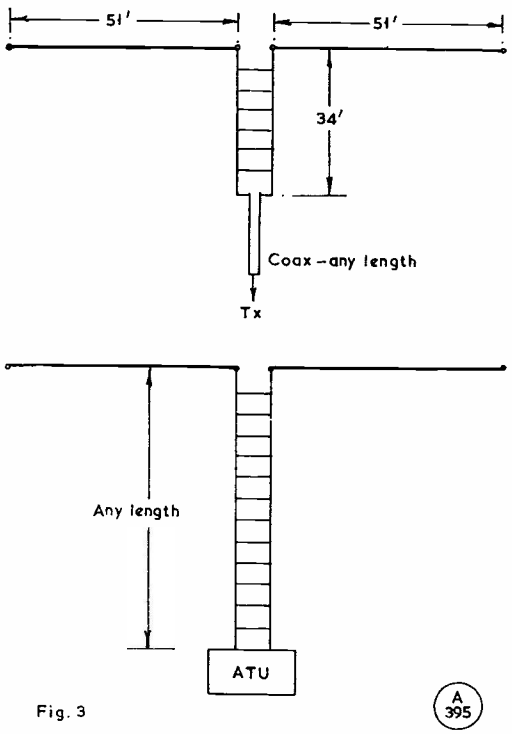


Fig. 3. Two versions of the "5RV system." The upper shows the coax feed arrangement, using 34ft. of open-wire line and any length of coax feeder to the Tx. The lower version takes any length of open wire feeder, run to the ATU direct. The dimensions may be halved ("half-size 5RV") for working on 20 metres and above. Two half-5RV's at right angles, NW/SW, will give world-wide coverage on the DX bands.

any length and operated as tuned feeders. However, for simplicity and quick band-changing there is no doubt at all that the coax-fed version is much more convenient. As for the explanation of its working, there is a very good and detailed description in the *Amateur Radio Handbook*, pp.387-388. Suffice it to say here that by strapping the feeders together and using the whole lot as a Marconi, effective operation can be obtained on Top Band, and by operating the system in the nomral way it will cover the bands 3·5-28 mc, and is particularly effective on 20 metres.

For those who are restricted to operation in the loft only, there are various possible ways of obtaining satisfactory operation.

If the house is a long-and-narrow sort of place, a loft aerial can be put up as shown in Fig. 4. Here, we are, in effect, connecting five dipoles, some of which are shortened by loading, to a common feed line, the idea being that only the aerial which is resonant at the operating frequency will take power while all the others are so hopelessly mismatched that they can be disregarded. This is wishful thinking, as a few careful measurements with a bridge capable of seeing both resistance and reactance components of the system will soon show. However, there is no doubt at all that the system *does* radiate effectively, which is what matters. There is one point that should always be borne in mind when working on aerials in the loft space—that is the fact that the close proximity to various objects of a disturbing nature (like mains wiring and water pipes) which always exist can never be the same in two installations, and thus it is always necessary to do a bit of cut-and-try when setting them up. Also, it is worth while remembering that if the shack is on the top floor, the operator's position is virtually "in the eye of the beam" and if he moves he may have marked effects on the aerial! So all final measurements should be done when sitting at the operating table—a bit of a nuisance but a small price to pay for getting the best out of a poor location.

The aerial system illustrated in Fig. 4 is, as already remarked, five aerials in parallel. As shown, there are no loading elements in the 10, 15 and 20m. dipoles; as for the ones for 80 and 40 metres, these are given loading coils which are wound on 3-inch formers, at a rate of ten turns per inch. For the 40-metre band this comes out at 20 turns, and about 40 turns for 80 metres; however, it is clear that to provide a system that would go in a smaller loft, then this loading would have to be increased, and more turns provided. It is suggested that this is best done by putting a few turns of wire on the end of the feeder, and pruning the coils till resonance occurs on the band—but as this is a process involving two coils it is essential to alter each coil to the same extent so that they both show the same value of inductance. It is probably best, therefore, to use either manufactured coils, such as the *Codar Qoils* or the American B & W type coil stock, which is obtainable in this country, or alternatively to wind the coils carefully on threaded formers of the specified diameter—

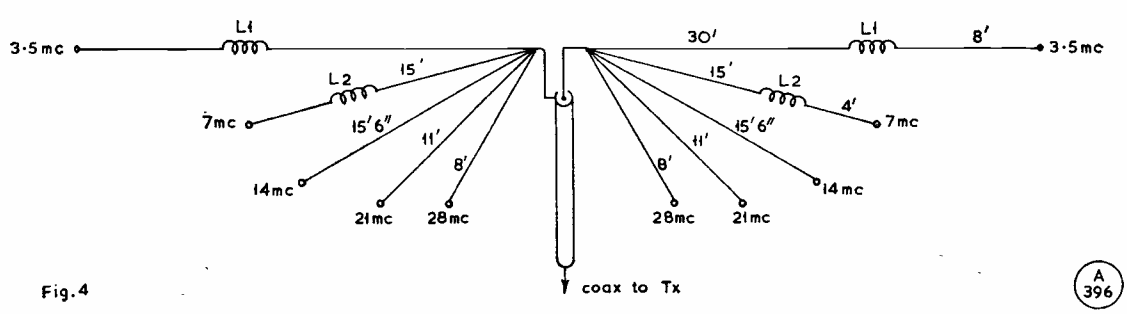


Fig. 4. Multi-band loft (indoor) aerial system. Coils are, for L1's, 10 turns per inch, and L2's, 20 turns same spacing, all on 3in. dia. formers.

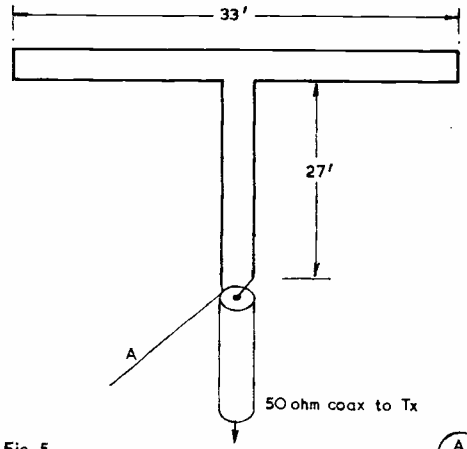


Fig. 5. The W6CBX " Multee," for 40/80m. At (A) is connected either a good earth or a number of radials, as many as possible, each of 25ft. All dimensions can be scaled down to give any two harmonically-related bands, e.g., 7/14 mc.

which may have to be specially made using fibre-glass in its malleable form—but that is another story.

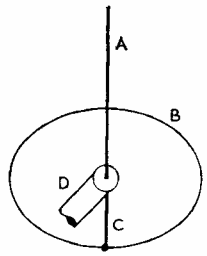
In very restricted lofts it may be found necessary to load the 20-metre section as well as those for the two LF bands. In this case, it is suggested that the 20m. configuration be in scale with the 40m. dimensions—that is, from the feeder, 7ft. 6in., to a loading coil of ten turns of 3in. diameter wound at 10 t.p.i., and an outer section of 2ft. to the end insulator.

Compact Two-Band Aerial

The W6CBX " Multee " aerial is shown in Fig. 5. As will be seen, this requires a top of only 35ft. for operation on 3·5 and 7 mc, but has a longish piece of 300-ohm twin feeder running down to the point where it is fed with 50-ohm coax cable to the transmitter; thus it may well be of interest to the increasing number of people who are living in flats. If the construction is such that the top part can be placed on the level roof which most of these " tower blocks " seem to boast, and the vertical section brought down the outside wall to the shack window, either the radials can be made " invisible " by the use of very thin wire, or replaced by a direct ground connection if the shack is at ground-floor level. If the " invisible radials " are adopted, wire as thin as 36g. may be used—but remember that the breaking strain is very low, so that the insulators should be made of such material as small pieces of discarded polythene coax insulation, to save weight. The system can be scaled for operation on Top Band and Eighty by a simple process of doubling all the dimensions—which may be a great help if the block is *really* high! Operation on other bands may well be practicable by strapping the feeders together and loading the whole lot up against an earth, or the radials.

Vertical Aerials

These types are often hailed as the answer to the problem of lack of garden-space; however, they should



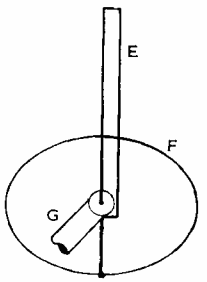


Fig. 6(A). Compact ground-plane aerial. " A " is the normal quarter-wave vertical radiator, and " B " is a wire ring, circumference 0.43 w/l, joined to the outer of the coax feeder by " C," 0.07 w/l long. For this system the coax line " D " should be of 50 ohms impedance, or less.

Fig. 6(B). Variation on Fig. 6(A), in which the vertical section is folded. (E) is the folded element, quarter-wave high, " F " is the GP ring as before, and " G " is the feeder line, which now may be up to 75 ohms impedance.

always be operated against a *really good* ground system, and the majority of reports of poor results with verticals stem from this cause. If there is not enough space to spread out radials in the normal way, then the use of a coiled radial as a ground, as shown in Fig. 6, will save a lot of space, at the expense of dropping the radiation resistance markedly and reducing the bandwidth of the system. The length of the *circumference* of the ring is 0·43 wavelength, and the piece joining the circumference to the outer of the coax is therefore 0·07 wavelength. Hence, to make such a radial, one takes a half-wavelength of wire, which can be calculated from the formula 492/f feet, where f is in megacycles, and running it round in the proportions shown; thus the free end comes right round the aerial and is soldered to the start of the ring, so that one is left with a continuous ring electrically, and a wire joining the ring to the sheath of the feeder. If the vertical element is folded, as in Fig. 6(B) a better match to 75-ohm cable will be obtained, although it is not likely to be very good. As for the construction of the folded element, this can be of wire on stand-off insulators up the side of a wooden pole, or even of ribbon feeder, although in the latter case some pruning might be needed to bring the system to resonance.

(To be continued)

MINI-COAXIAL PASSIVE PRESELECTOR

FINAL ASSEMBLY, CHECKING AND INSERTION IN AERIAL SYSTEM

Part II

P. HARRIS (G3GFN)

The first part of this article appeared in our November issue and discussed the theory, practical approach and the constructional solution.—Editor.

TAKING up the constructional aspect from p.571 of the November issue—where the details of Fig. 4 on that page were being discussed—we now come to further assembly details.

Actually, assembling the resonator and link tags to the copper mounting plate can be a finger burning, cussing exercise as the various parts either fall over, or wander off to unwanted positions in a sea of molten solder. Unfortunately, they *must* be soldered to ensure lowest possible contact resistance. No apology is offered for the following step-by-step description of a method evolved after several skin-sizzling experiences:

(1) Thoroughly clean the surfaces to be joined. (2) Scribe lines diagonally from corner to corner of the copper plate to locate the centre. (3) From the centre scribe two circles equal to the inside and outside diameters of the resonator tube. (4) Parallel to the long edges, scribe a line across the plate passing through the centre point. (5) Place a solder tag on this line $\frac{1}{8}$-inch away from the outer circle and mark its fixing point. (6) Repeat for the other tag on the other side of the outer circle. (7) Mark the inner circle at 120° intervals and scribe lines from these to the centre. (8) Take three long small dia. c/s *PK* screws and measure their o/s diameter. (9) Mark half this distance on each radial line measuring from the inner circle. (10) Drill entry holes for the *PK* screws and clearance holes for the tag fixings and countersink all five holes on the underside of the plate. (11) Fix the tags. (12) Drive the *PK* screws through the plate from the underside. (13) Check that the bore of the tube is a tight fit over the *PK* screws. (14) Heat one end of the tube in a gas flame and run *Multicore* solder around it. Wipe off surplus. (15) Fit tube over *PK* screws and stand assembly on a gas ring ensuring tube is vertical. (16) Slowly raise temperature. As soon as applied solder starts to melt run in *Multicore* solder around junction of tube and plate, and the solder tags. Turn off gas as soon as possible. (17) When cool, remove *PK* screws (if possible).

The capacitor connection around the resonator is made from 16g. tinned copper wire. Form to shape shown in Fig. 3 and locate it accurately. Place a large wet rag round the copper plate and the joint to the tube to keep it cool. Hold the assembly at 45° with the open end of the tube uppermost and in a gentle gas flame. As soon as solder starts to melt at the position of the loop, remove the tube from the flame and run in solder around the loop and tube.

Clean and polish the tube and the plate with fine emery paper, a wet *Brillo* pad and *Bluebell*, in that order. Coat the tube only with clear varnish. Place the assembly in the box and determine the exact position for the tuning condenser mounting hole. The fixed-plate stubs should be directly below the " wings " on the loop. Mount the capacitor, and then fix the resonator assembly with six 6BA c/s brass screws and nuts passing through both the aluminium and the copper sheet. The input and output loops are critical, and they must be exactly as shown in Fig. 4. Particularly note that they are connected to the ends of the coaxial socket stubs.

The tuning capacitor has a maximum value of 45 $\mu\mu$F and is a surplus unit marked 10C/4321 with eleven fixed plates, and nine moving plates, close spaced, often sold as 50 $\mu\mu$F nominal. An identical condenser is available from *Jackson Bros.* in their C804 range. These capacitors will only fit between the resonator and the cavity if (*a*) The rotor tail is sawn off level with the last stator plate, and (*b*) The stator connections are clipped so that they are $\frac{1}{8}$-inch long.

Checking and Use

The preselector is only suitable for use with 75/80 ohm coaxial transmission line, and as it functions as a coaxial cavity, it will not operate correctly unless the close fitting lid is in position.

Provided the dimensions and layout have been faithfully copied there is no real need for functional checks, but if you are a belt *and* braces type, reassurance may be obtained in the following manner provided an *accurate* SWR bridge, and an *accurate* 75/80 ohm dummy load are available.

Connect the output of a 70 mc transmitter to one socket of the preselector, and with *very short* leads, the SWR bridge to the other, and the dummy load to the output of the bridge. With the bridge at *Forward*, and the transmitter on, tune the preselector for maximum reading. Adjust the sensitivity control of the bridge to give some convenient three-quarter scale reading. Switch off, and without disturbing the preselector tuning, or the meter setting, transfer the bridge to the transmitter output lead as close to the preselector as possible, connecting the preselector to the load connection of the

bridge, and the dummy load to the output of the preselector. Upon switching on, the bridge should indicate a slightly higher reading.

With the same connections, adjust the bridge to give full scale reading. Switch to *Reflected*. The SWR indicated should not be worse than 1·15 : 1. If the bridge and load exhibit an inherent error, so long as this is not too large, the reflected reading should not be much above this.

If there is a large variation between input and output voltages as shown by the first test, this will probably be due to incorrect positioning of one, or both, of the links. A high SWR given by the second test indicates incorrectly proportioned links. To some extent these two effects are inter-related.

The preselector should be placed in the aerial lead before the transmit/receive switching. To facilitate tuning during transmission, an in-line RF voltmeter, or an SWR bridge set to *Forward*, needs to be connected between the output of the preselector and the aerial. Tune for maximum reading on the indicator, switch to receive and locate a signal as near to the transmitter frequency as possible. By reference to an S-meter, check that peak received signal strength occurs at precisely the same tuning point as maximum transmitter output. Any discrepancy indicates either (1) the transmitter output is not adjusted for optimum match into 75/80 ohms or, more likely, (2) the receiver input is not matched to 75/80 ohms. Both should be checked and adjusted until the tuning point of the preselector is common to both modes.

It must be emphasised that this preselector will do nothing to improve any mismatch between aerial and feeder. Indeed, if a serious mismatch is present giving rise to signal voltages on the coaxial feeder outer, then the performance of the preselector will be impaired, for such signals will bypass the preselector *via* the cavity outer. Peak performance requires a correctly matched system.

With surplus crystals in converters/receivers, even if used in an overtone mode, it is not always possible to place secondary response frequencies ideally, and some undesirable signals may be apparent. The Mini-Coaxial Preselector will remove these, and for this purpose alone it is a worthwhile project.

In conclusion the writer would like to express thanks to G2DSP for making available a two-metre transmitter to permit tests and measurements of the preselector performance on that band.

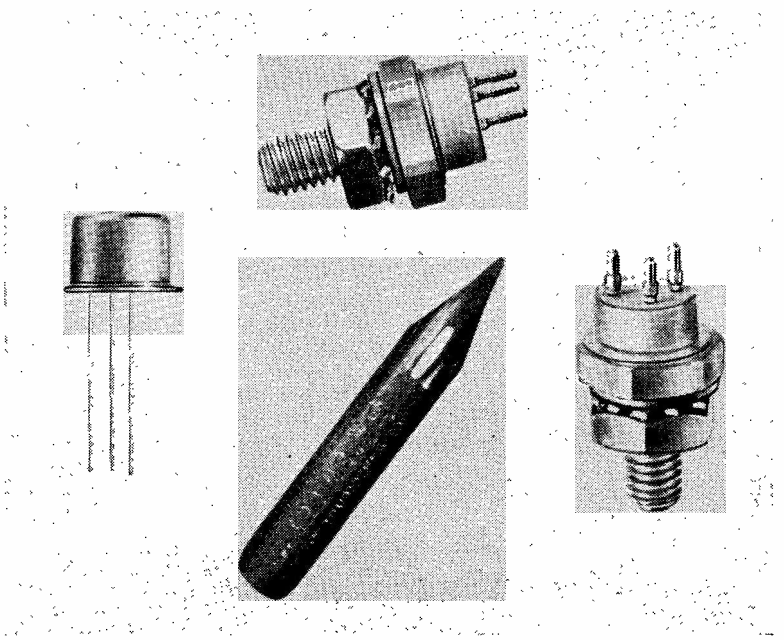
MINI COAXIAL PRESELECTOR

Typical performance data

	70 mc	145 mc
Input/Output impedance (1)	71 ohms	81 ohms
Insertion loss	0·3 dB	0·5 dB
RF handling capacity (2)	50 watts	50 watts
SWR (3)	1·1 : 1	1·13 : 1
Bandwidth ±3 dB	500 kc	350 kc
Tuning range	65 mc — 160 mc	
Attenuation (4)	Not less than 50 dB.	

Notes

(1) Measured on VHF impedance bridge. (2) See text for higher powers. (3) Measured at input to preselector with output terminated by 75-ohm dummy load. (4) To signals spaced from tuning point by four times bandwidth.



New Mullard silicon planar transistors. The BLY34, left, can deliver 3 watts output and, above the nib for size comparison, is the BLY55, rated 4 watts. The BLY36, right, will give 13w. These transistors are intended for mobile FM applications, in the 175 mc region, with a supply rail of 13.8v.

HOME-BUILT MOBILE FOR TOP BAND

TRANSISTORISED RECEIVER AND VALVE TRANSMITTER— CHEAP DESIGN USING SIMPLE CIRCUITRY

E. E. MEACHEN (G3SFV)

THIS equipment was built as an exercise to see how little it would cost to go mobile if one had a very shallow junkbox and it was necessary to purchase most of the components and materials. It is not offered as a prototype to be copied to the letter and the prices quoted are not necessarily the lowest or the current prices, but merely the lowest the author could obtain at the time.

No originality is claimed for the project which is simple and straightforward. The units are a transistorised power supply and receiver, with a valved transmitter, Fig. 1. No details are given on the layout as anyone building this type of equipment must normally tailor the units to suit his vehicle—in the writer's case, a Ford Cortina.

Before construction started a bender was made. This was a rough but effective affair which cost 7s. 7d. for scrap angle, a block of hardwood and a pair of strong hinges. The block of hardwood is hinged to the longest length of angle iron. In order to obtain good bends the hinges must be let into the wood. There are other ways of making clean bends.

The Receiver

This unit, Fig. 2, was built first. Small IF and audio strips, ready made up, are in plentiful supply. The cuicuit diagram for these strips is not included here as this varies with the makers. Most suppliers furnish a diagram if requested. Each strip, containing three transistors, IF transformers and associated components, is very good value. The price for these varies from 7s. 6d. to 15s. 0d.

A U-shaped chassis was made to mount the strips and other components, and a cursor formed from a piece

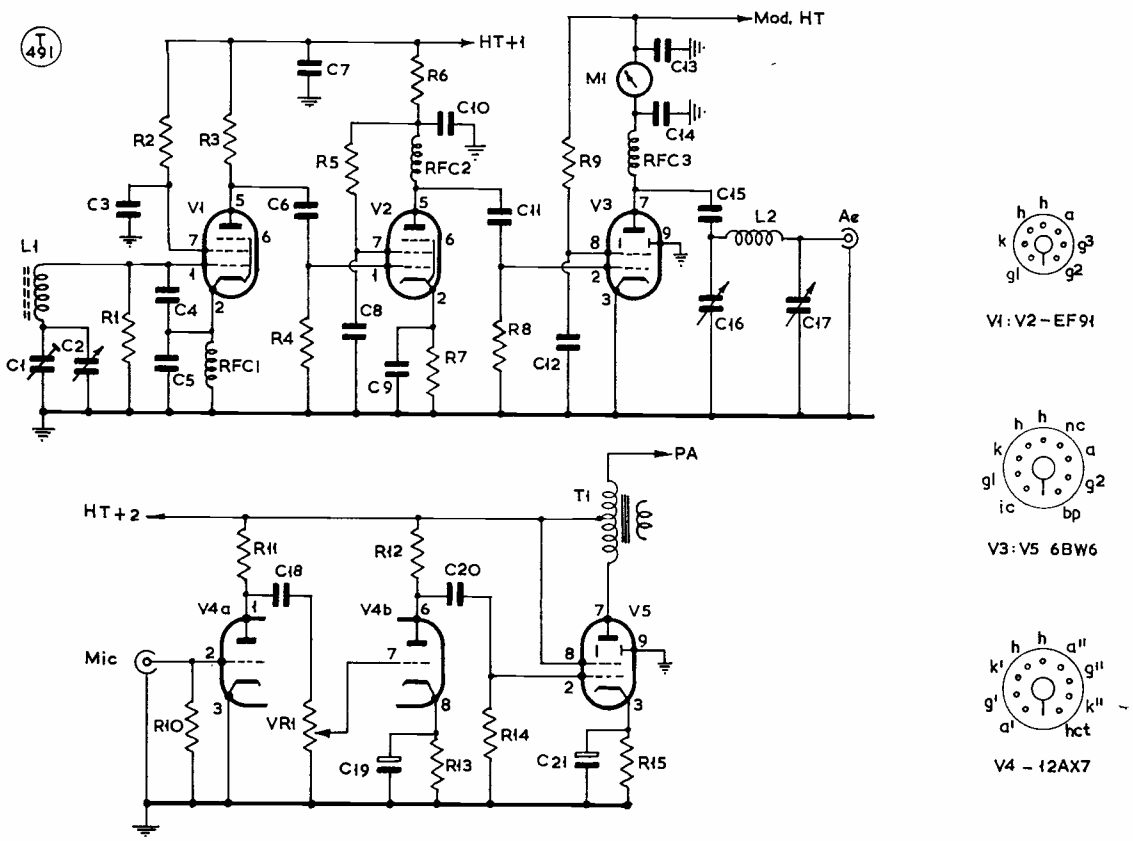
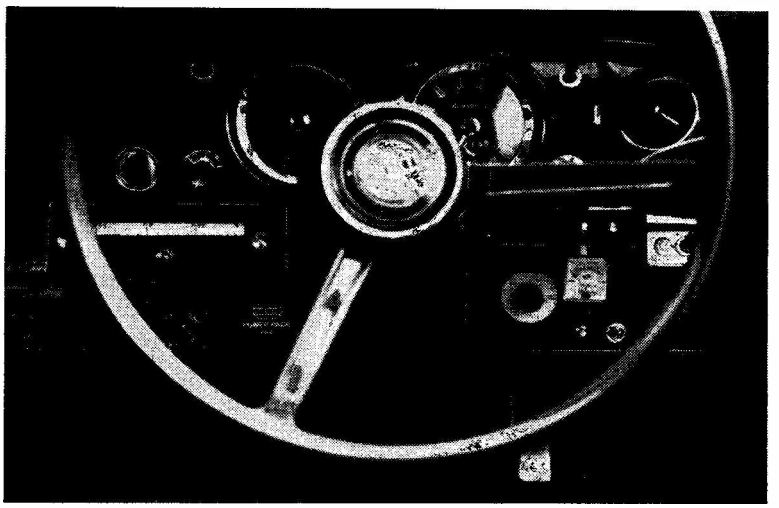
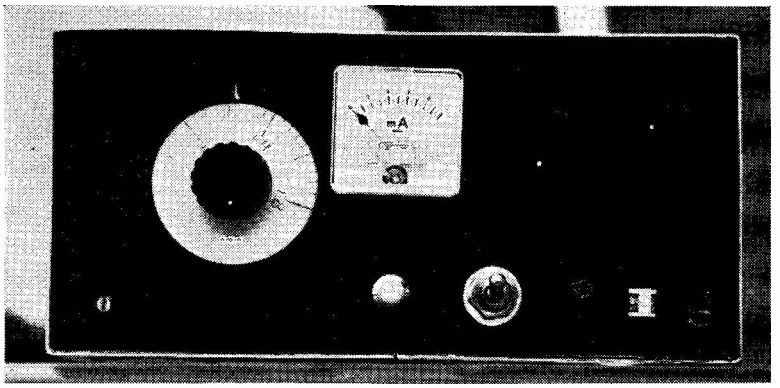


Fig. 1. Circuit of the G3SFV/M Transmitter for Top Band



Fitting of the G3SFV/M Tx/Rx for Top Band in his Ford Cortina. The receiver is on the left. Provided the units are tailored to fit, there is plenty of room in these spaces in almost any car to accommodate mobile equipment.



The transmitter section of the G3SFV/M rig is built as a separate unit, to cover the whole of Top Band. The fitting of the Tx/Rx assembly is shown above.

of wire soldered to a suitably bent runner of " tin," to slide along the front vertical. A small tuning capacitor is mounted on its end in order to allow the use of a fairly large drive drum without increasing the height of the receiver—*see* photograph.

Perspex, masked for the scale opening, was drilled for the various spindles and then sprayed to match the car. Spacers were fitted to the protruding bushes, the panel fitted and locked in place with a second lot of nuts.

Denco coils 3T Red and Blue were used in the tuner. Vanes were pulled from the tuning capacitor (140 $\mu\mu$F + 140 $\mu\mu$F) to cover the required segment of the band. This, in the author's case, was 1·85 to 2·0 mc. The coils were mounted on a small piece of printed circuit board and the mixer transistor removed from the IF strip and placed between the two coils to make for easy connecting.

Another U-shaped section forms the cover, in this case held in place under the facia of the car with two small self-tapping screws. A small bit of foam rubber was sandwiched between them to prevent the paintwork being damaged. There is ample scope to improve this receiver by the addition of an RF stage, a BFO or a Q-multiplier.

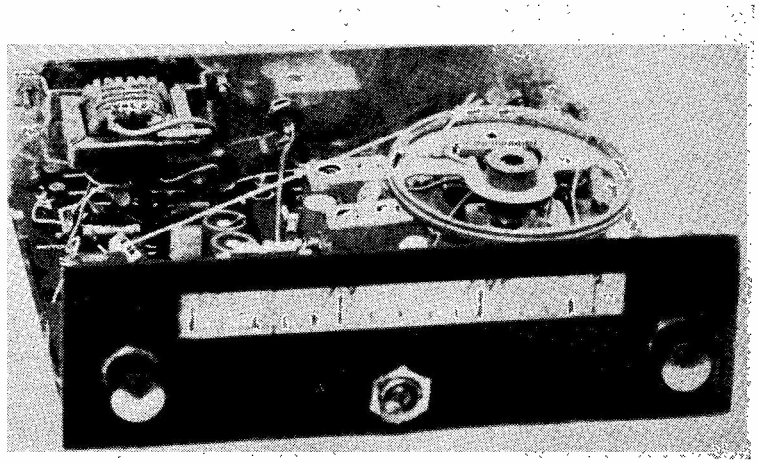
The cost of this stage, for components and both strips, was 43s. The washers, nuts, bolts and spacers all came from a 2s. 6d. mixed bag. Drive cord was obtained from a laundry parcel. The XYL's nail varnish provided the etching resist. Aluminium for all the units was an additional item and rather expensive, costing 15s. 0d.

[over

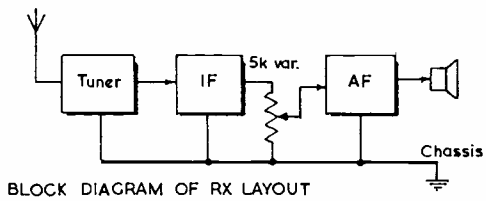
Table of Values

Fig. 1. Circuit of the G3SFV/M Transmitter

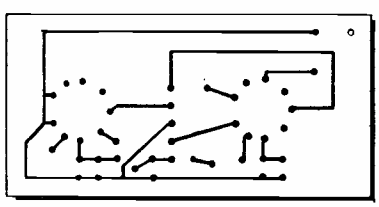
C1, C6, C11	= 100 $\mu\mu$F	R7	= 220 ohms
C2	= 50 $\mu\mu$F	R8	= 22,000 ohms
C3, C7, C8, C13	= ·01 μF	R9	= 12,000 ohms
C4	= ·002 μF	R10	= 4·7 megohms
C5, C10, C12, C14, C15, C17, C18, C20	= ·001 μF	R11	= 470,000 ohms
C9	= ·005 μF	R12	= 220,000 ohms
C16	= 350 $\mu\mu$F	R13	= 8,200 ohms
C19, C21	= 25 μF	R14	= 470,000 ohms
R1	= 62,000 ohms	R15	= 270 ohms
R2, R5	= 47,000 ohms	VR1	= 0·5 megohm
R3	= 27,000 ohms	RFC1, RFC2, RFC3	= 2·5 mH RF chokes
R4	= 100,000 ohms	L1, L2	= *See text*
R6	= 3,300 ohms	T1	= *See text*
		V1, V2	= EF91
		V3, V5	= 6BW6
		V4	= 12AX7



View of the receiver unit, designed to tune over 1.85 to 2.0 mc, and built separately from the transmitter.

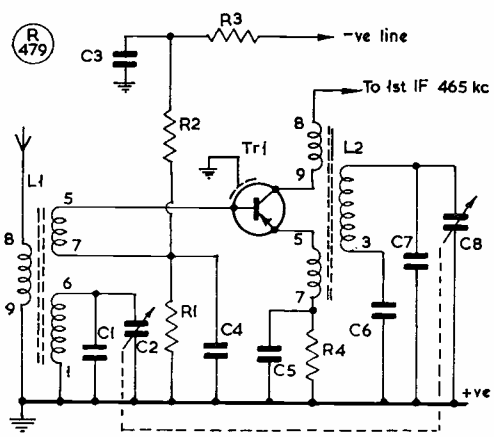


BLOCK DIAGRAM OF RX LAYOUT



PRINTED CIRCUIT FOR TUNER

Fig. 2



CIRCUIT OF TUNER

The Transmitter

A glance at the diagram, Fig. 1, will show that this is a variant of well-tried circuitry used by many amateurs. The 6BW6 in the PA keeps the height of the unit to just over four inches. This was the greatest size which would fit comfortably on the parcel shelf of the Cortina. It also meant that another 6BW6 as the modulator solved the problem of a 12-volt heater chain. EF91's (at 9d. each) were an automatic choice for the VFO and buffer stages. A 12AX7 completes the modulator.

A coil of " unknown origin," but similar to a medium-wave oscillator coil, was trimmed for use in the VFO. The dial is a piece of Perspex drilled to a push fit on the epicyclic drive. The calibration marks were scraped on the material. These could be filled to make them more legible.

The PA coil is wound with 60 turns of 22g. on a small length of paxolin tube and tapped to suit. The remainder of a three-foot length of the material was retained to make the loading coil for a whip aerial. Additional materials for the whip are a fairly long standard car aerial and some suitable screwed rod.

At first no meter was built into the transmitter. A jack socket was placed in the cathode lead of the PA and an external meter plugged in here. The meter now used and seen in the picture was bought as " defective " for 5s. 0d.—subsequent inspection proved that the fault was merely a distorted plastic scale jamming the needle.

As the chassis is necessarily very shallow the main switch has to be mounted sideways. The change-over switch, Fig. 4, has a centre idle position, a left bank of four one-pole two-way positions, and the right one a bank of four one-pole one-way, connected as shown. This switch, too, is mounted sideways underneath the

Fig. 2. Receiver front end, for working into commercial IF/AF strips, as in block diagram. Values are: C1, C6, C7 .001 μF; C2, C8 100 $\mu\mu$F; C3, C4, C5 .01 μF; R1, 2.7K; R2, 10K; R3, 1.2K; R4, 1K; L1, Denco Blue, 3J; L2, Denco Red, 3J. Tr1, any suitable Top Band type.

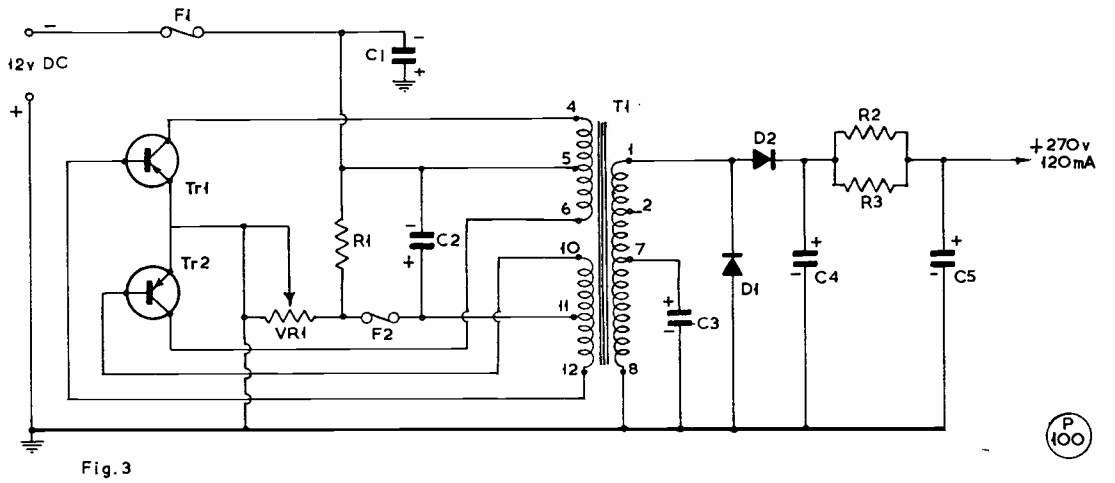


Fig. 3

Fig. 3. Suitable DC/PSU for the transmitter. Values are: C1, 75 μF; C2, 12 μF; C3, 50 μF; C4, C5, 20 μF; R1, 560 ohms; R2, R3, 68 ohms; VR1, 15 ohms; D1, D2, OA214; Tr1, Tr2, OC35; and T1, suitable transformer —see text.

chassis. Of course, the actual change-over configuration used will depend upon individual requirements. One "extravagance" was the panel light which pays for itself in the flat batteries it saves.

Once again, the main Tx chassis is U-shaped, as are the front and back panels. The case is the wrap-around variety. A rectangular hole is cut in the top of the case and covered with perforated metal, to provide ventilation. Total cost on the transmitter side was 66s.

Power Supply

The nucleus of this, Fig. 3, is the transformer, which, complete with circuit, cost 7s. 6d. GET 572 transistors could be used in place of those specified and component values modified to suit.

As before, a U-shaped chassis was made. The transistors were mounted directly on two L-shaped plates. These in turn were bolted to the chassis and insulated from it by a strip of printed circuit board and insulating washers. The transformer and the largest of the electrolytic capacitors were mounted between these plates. No connectors were used. The leads were directly soldered, and the unit covered with perforated metal in order to avoid accidental short circuits. Since writing this article the author has won (in a raffle at a mobile rally) one of the transformers specified!

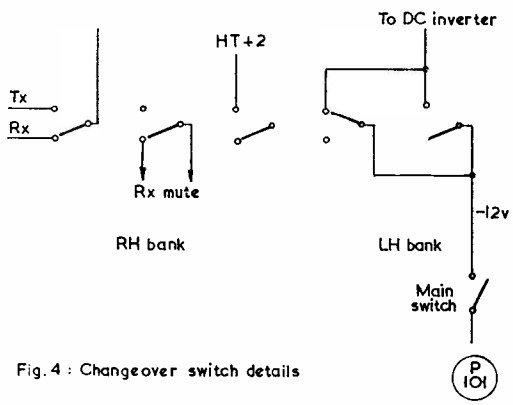


Fig. 4 : Changeover switch details

Total cost of the whole project—Tx, Rx and PSU—came out at £6 17s.

A friend has since duplicated this equipment using his junk-box—he wonders how the writer managed to spend so much! Yet less than £10 seems a very satisfactory price for the pleasure of being mobile on Top Band. Incidentally the local radio shop may prove a useful source of ex-equipment components, such as speakers and output transformers.

THE "NEW QTH" PAGE

For many years now a regular feature of SHORT WAVE MAGAZINE, this page is for the convenience of those newly-licensed, and also for those already licensed but who have had a change of address—so that they are not correctly listed in any *Call Book*. All such callsign-addresses are regularly forwarded to the Chicago publishers of the *Radio Amateur Call Book*, the world-directory of radio amateurs. It follows, therefore, that to ensure appearance in the world directory, you should notify your new callsign, or change of address, to us as soon as possible. Because it is our responsibility to ensure that the U.K. sections of the *Radio Amateur Call Book* are right up-to-date, we accept callsign data (for onward transmission to the publishers) from *any* licensed radio amateur, even if not a reader of the *Magazine*. In other words, to be *QTHR* (meaning, "My address is correct in the latest Call Book"), be sure we have the details.

SEMICONDUCTOR PSU WITH OVERLOAD TRIP

THE CONSIDERATIONS AND THE CIRCUITRY

C. SHARPE (G2HIF)

EVERY amateur who can claim to have achieved a successful circuit design incorporating a power transistor, be it an LF or VHF type, will have somewhere in his shack the inevitable graveyard wherein lie the pathetic remains of past misfortunes.

It does not require many such mishaps before the awful truth dawns—a fuse, no matter how conservatively rated, is seldom protection for a power transistor which is intent on committing suicide. One learns in time to accept such catastrophes to OC35's and similar types. But the sudden surge of amps through a " one and only " 2N3632 has a degree of finality about it and is quite a different matter from the financial point of view.

The solution lies in a PSU which decrees to the transistor load: " so many amps shalt thou pass, and that's your lot." Any overload current in excess of a predetermined value is accompanied by an immediate and complete removal of the supply voltage. The circuit shown provides a stabilised, positive 28v. rail at currents up to 2 amps. By the choice of one resistor, it can be set to trip at almost any value of current from a few milliamps to the full rating.

Speed of operation is somewhat dependent upon the size of any decoupling capacitor hung across the supply rail. The circuit cannot be expected to discharge a 100 μF electrolytic in less than a microsecond, but given a decoupling condenser of ·001 μF, which is adequate in most RF circuits, the supply voltage can be killed in a couple of microseconds—a time sufficiently short to protect a 100 mA fuse or a small transistor (base connected to collector) shorted across the 28v. rail.

Operation of Circuit

Tr1, Tr2 and Tr3 are connected as a conventional series stabilised arrangement. Tr1 is the series transistor delivering current to the load. It is controlled by the emitter follower stage, Tr2, amd amplifier stage Tr3. The amplifier feeds back the error signal generated by the difference between the supply rail voltage and the reference voltage (4·7v. zener) to Tr2 and Tr3. In normal operation, the diode, D1, is forward-biased by the collector current of Tr3. D3 is reverse biased.

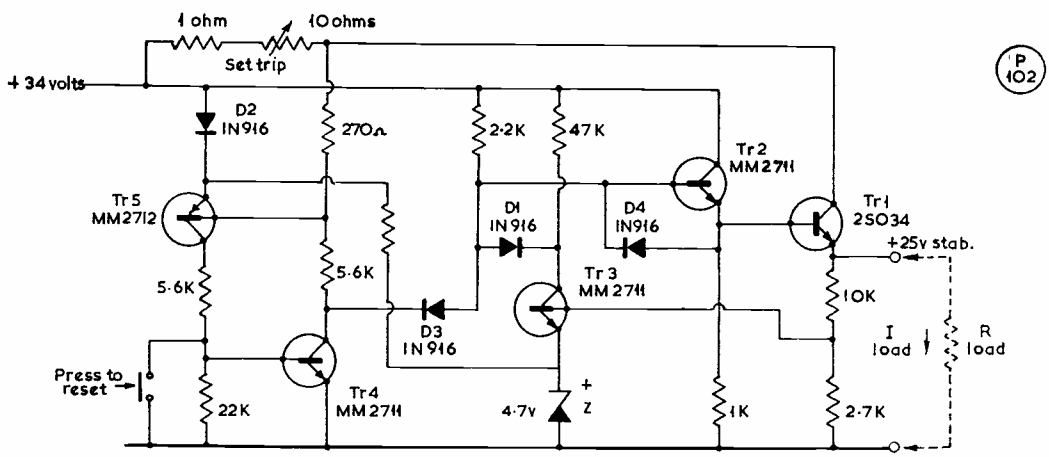
The output voltage, V, is determined by the zener reference voltage and the resistor chain.

(For rails less than 6 volts, a smaller reference voltage is recommended.)

In normal operation as a stabilised supply, the cut-out transistors, Tr4 and Tr5, are passive. The base of Tr4 is returned to the earthy rail and the base of Tr5 is reverse-biased by approximately 1·3 volts (this is the forward voltage drop across D2, plus the base emitter junction voltage of Tr5).

The trip operates by the load current flowing through the control resistors, thereby reducing the 1·3v. hold-off bias on the base of Tr5.

When the load begins to exceed a given value, Tr5 becomes forward biased and begins to conduct. The increasing collector current is communicated to Tr4, which in turn increases the forward bias on Tr5. Action is cumulative and complete in less than half a microsecond. The fall in potential of the collector of Tr4 over-rides the control of Tr3 on the base of Tr2 through D3. D1 thus becomes reverse-biased, isolating



Semiconductor Power Supply incorporating overload trip

(Note: In this circuit, the unmarked resistor is 3·3K and R5 is the 22K resistor across the reset switch.)

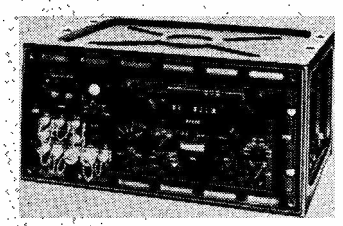
the collector of Tr3. The base of Tr2 is rapidly reduced almost to zero, thereby removing the control current from Tr1. Diode, D4, protects Tr2 from excessive reverse base-emitter junction voltage during switching.

The trip can be re-set by shorting out R5 momentarily. This restores Tr4 and Tr5 to the passive state. Tr3 thereby assumes control of the supply rail. *Warning.* Do not re-set without first removing the cause of the overload. Value of the control should be set manually to trip at currents which exceed the maximum rated current in the load by not more than 5 per cent.

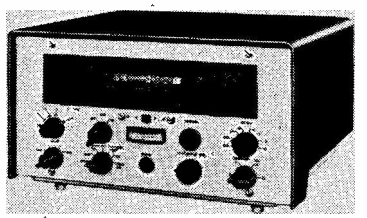
Equally the circuit will respond quickly to rapid overload conditions, or to the more gradual increase of current often associated with thermal-runaway. The primary supply should exceed the stabilised rail by fully 20 per cent, even under maximum load. It may be any conventional circuit with reasonable regulation. A high-value reservoir capacitor across this primary supply rail does not slow the speed of operation of the cut-out on the stabilised rail.

One final word of warning: RF pick up from a Tx can trip the cut-out! Screening is the correct answer. Do *not* hang small RF by-pass condensers over the hot points as they will slow up the action.

Editorial Note: The foregoing was an original contribution to a recent issue of Harwell's *QAV*, which is compiled by G2HIF.

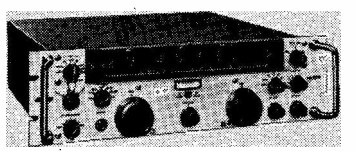


R.A.3348 MILITARY HIGH-PRECISION RECEIVER

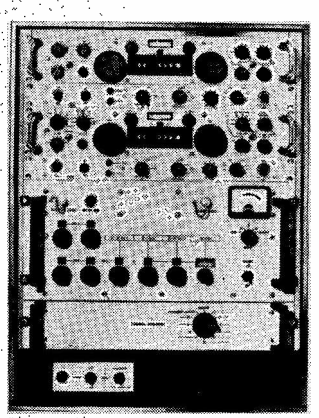


FULLY TRANSISTORISED H.F. COMMUNICATIONS RECEIVER TYPE R.A.217.

R.A.1217 TRANSISTORISED H.F. COMMUNICATIONS RECEIVER



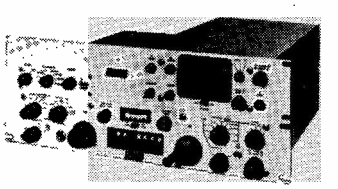
R.A.1218 TRANSISTORISED H.F. COMMUNICATIONS RECEIVER WITH ELECTRONIC FREQUENCY DISPLAY.



TYPE RTA.1419 DUAL DIVERSITY SOLID STATE RECEIVING SYSTEM

THE UNIQUELY EXTENSIVE RACAL RANGE OF MODULAR ALL-TRANSISTOR H.F. COMMUNICATIONS UNITS CAN BE SO COMBINED AS TO SATISFY ALL CUSTOMER REQUIREMENTS.

HERE SHOWN ARE TWO TYPICAL RECEIVING TERMINALS. LEFT, A DUAL-DIVERSITY, F.S.K. TERMINAL; RIGHT, A TERMINAL FOR L.F./M.F./H.F. PANORAMIC RECEPTION.



TYPE 6304 RECEIVER SYSTEM

At the three-day Exhibition and Symposium staged by Racal Electronics, Ltd., in London during October 31 to November 2, a great deal of interesting communication equipment was on view, some of it of quite new design and all employing the latest construction techniques. Though only a few items are shown here, the full catalogue lists a very wide range of equipment intended for the commercial market—transmitters, receivers, transceivers, aerial systems (including a rotatable log periodic for marine use) and a long list in the field of electronic instrumentation. The Symposium was very well attended and the formal proceedings were opened by Mr. John Stonehouse, M.P., Minister of State, Ministry of Technology. The chairman and managing director of Racal Electronics, Ltd., is Mr. E. T. Harrison.

BASIC AM MODULATOR

TO GIVE FULL SPEECH OUTPUT WITH A 50-WATT TRANSMITTER

A. S. CARPENTER (G3TYJ)

IN the circumstances of AM working (still in vogue) a modulator with an output capability of some 18 watts can be useful and particularly so if the associated transmitter is designed to run at inputs of up to 40-50 watts, as would be expected from a single 6146 in the final with 500 volts on its plate! Inexpensively constructed little 50-watt CW rigs still grin cheekily at their SSB brethren and go on working steadily around; it is nice, however, for their users to be able to say a few words occasionally!

To such an end the small modulator unit described here was built and it does seem to work quite nicely without requiring anything very ambitious powerwise to push it along. Physically, the modulator is small enough, for if stood on the front cover of this publication one could still read the words "*The Short Wave Magazine.*"

Operationally, plate-and-screen modulation of the PA is the preferred system with a crystal microphone.

Circuitry

The complete circuit of the modulator as revealed by Fig. 1 is of fairly standard form and may arouse little comment. The familiar speech-amplifier stages precede a phase-splitter from which are derived the anti-phase signals necessary to drive the output pair of valves.

The phase-splitter circuitry may seem a trifle odd at first. The phase-splitter anode load consists of resistors R8 and R9 in parallel while in the cathode circuit resistors R7 and R10 are also effectively in parallel due to C6 and both "pairs" of resistors are returned to the same earthy point (AC-wise) due to C14. This phase-splitter circuit, which has been used successfully in previous audio amplifiers, enables the preceding valve (V2A) to work more efficiently and into a higher dynamic load to increase its stage gain to several times that obtainable under normal conditions.

In the output stage the relatively puny EL84's can deliver some 17 watts of audio in Class-AB1 when

Table of Values

Fig. 1. The AM Modulator

C1	= 100 $\mu\mu$F	R2, R12	= 1 megohm
C2, C9,		R3	= 3·3 megohms
C10	= 0·01 μF	R4	= 100,000 ohms HS
C3	= ·002 μF	R5, R13,	
C4, C8,		R14	= 2200 ohms
C11	= 10 μF	R6	= 22,000 ohms
C5	= 470 $\mu\mu$F	R7, R8,	
C6	= 0·1 μF	R9, R10	= 47,000 ohms HS
C7, C12	= ·005 μF	R11, R15,	
C13, C14	= 32 μF, 350 volts	R16	= 220,000 ohms
V1	= EF95	R17, R18	= 6,800 ohms
V2	= ECC83	R19	= 47,000 ohms
V3, V4	= EL84	VR1	= 1 megohm (log.)
T1	= Woden UM1	VR2	= 50 ohms preset
R1	= 4700 ohms		

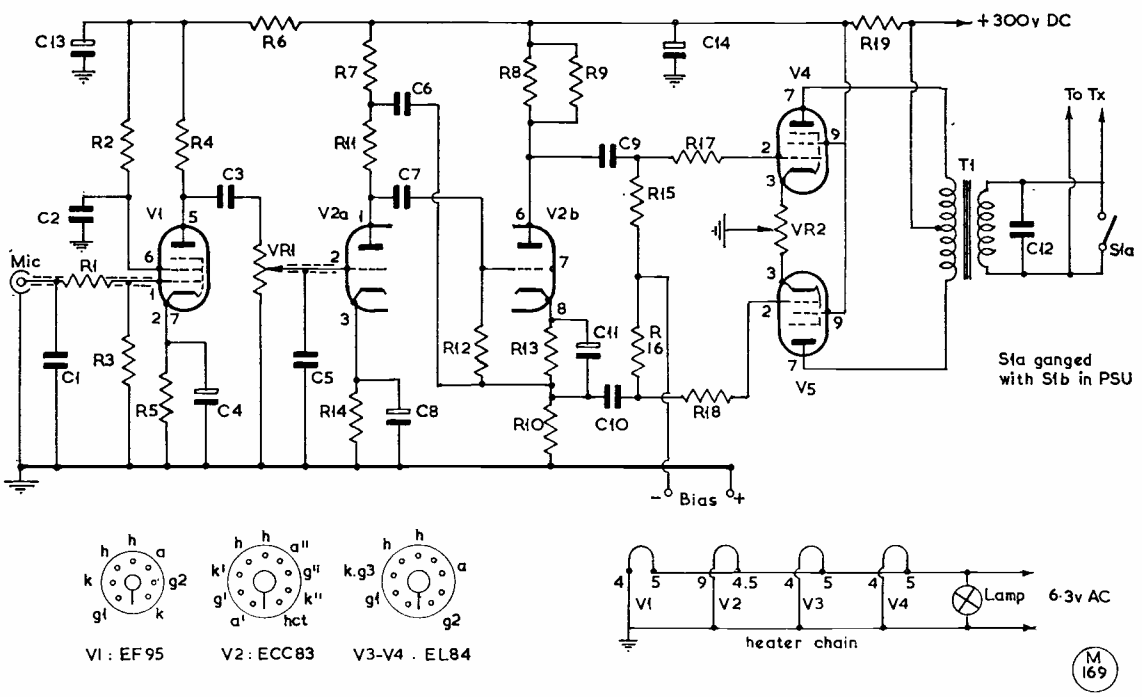


Fig. 1. Circuit complete of modulator. In operation, S1A opens automatically as S1B in the PSU (Fig. 3) closes to connect mains power.

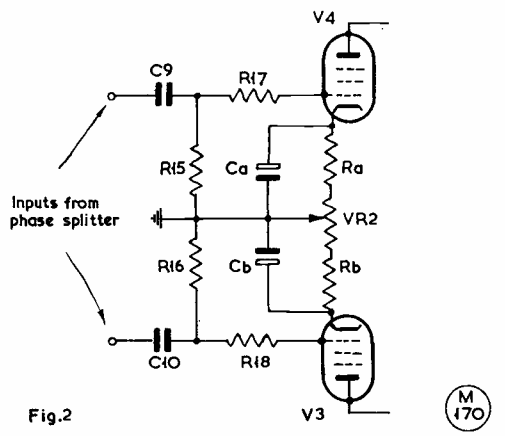


Fig. 2. Optional circuitry to incorporate cathode bias. Legend corresponds to Fig. 1, and Ca, Cb are 50 μF added, with Ra, Rb of 220 ohms. If this circuit is used, R15, R16 should be made 470K.

suitably driven and terminated—still more in AB2. Externally produced, and variable, bias permits maximum output in AB1 with no loss of DC volts across the valves, as occurs in a cathode bias system. Of course, cathode bias can be used if preferred whereupon resistors R15 and R16 may be increased in value. Revised output stage circuitry to accommodate cathode bias is shown in Fig. 2 where it is seen that four additional items are required. Capacitors Ca and Cb should be not less than 50 μF in value, preferably more, to bypass the added bias resistors Ra and Rb which may be 230-ohm, 1-watt rating. The inclusion of preset potentiometer VR2 is considered useful in either case, its purpose being to balance potentials about the output pair of valves—for, ideally, a zero volts reading should be obtained on a meter set to a low reading range and clipped across the primary of the modulation transformer under no-signal conditions. In practice a small meter reading may result initially but may be cleared by carefully setting VR2 to the correct point; a small degree of degeneration may also result due to VR2 but this may not be undesirable.

Safety Measure

One section of a DPDT toggle switch, S1A, can be connected to the modulation transformer secondary winding to function as a safety device since the other section, S1B, is placed in series with the mains supply, *see* Fig. 3. Connections to the switch are such that when S1A is open S1B is closed, and *vice versa;* due to this the associated transmitter can be operated in A1 mode immediately the modulator is switched off and no harm is done to the modulation transformer.

The Power Supply Section

PSU circuitry is shown in Fig. 3. The variable bias supply is obtained *via* the section around D1, the resulting maximum of 45 volts negative being considerably in excess of that normally required. As an alternative to the series diode arrangement, a shunt diode system may be used to provide a smaller voltage output. To do this the positive (cathode) end of D1 is lifted from its present point of connection and soldered instead direct to the chassis. The negative (anode) end of D1 where it meets resistor R1 is then connected to one of the rectifier valve anodes through a high-voltage capacitor of some 0·2 μF. The bias potential obtained depends largely on the value assigned to this isolating capacitor. Which-

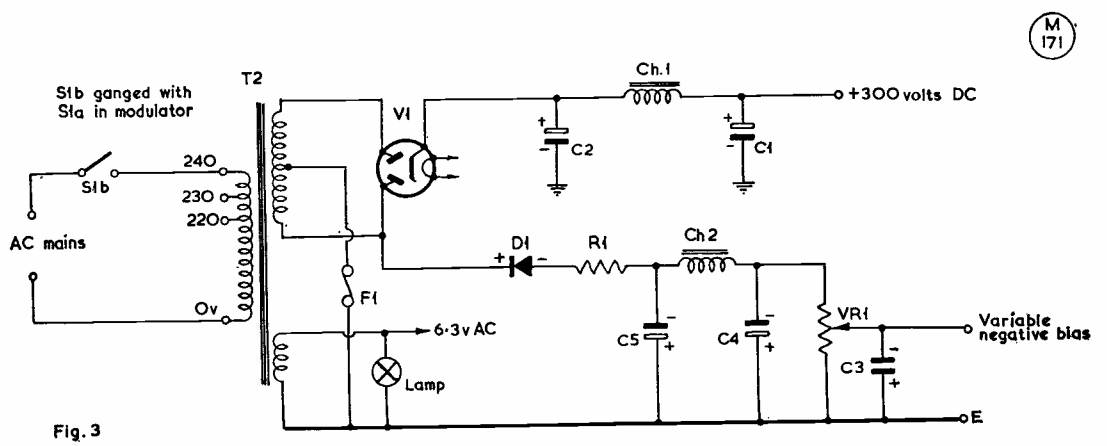


Table of Values

MODULATOR POWER SUPPLY

Fig. 3. PSU for the AM Modulator

C1, C2 = 32 μF, 450 volts
C3, C4, C5 = 100 μF, 100 volts
D1 = BY100
V1 = EZ81
F1 = 250 mA fuse
R1 = 5,000 ohms, 10 watt
VR1 = 3000 ohms wire-wound preset potentiometer
Ch.1, Ch.2 = 15 henries
T2 = Mains transformer

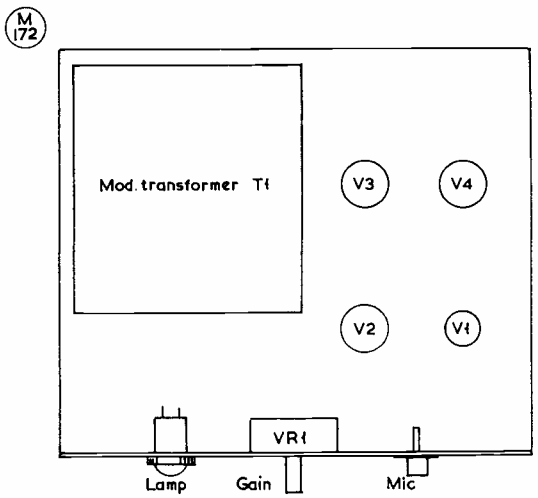


Fig. 4 a

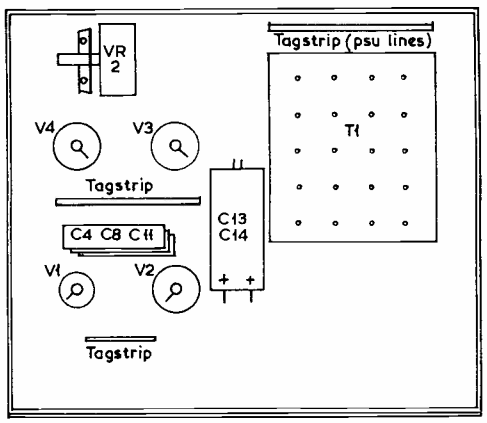


Fig. 4 b

Fig. 4. The general layout as used in the prototype. This is a good practical arrangement.

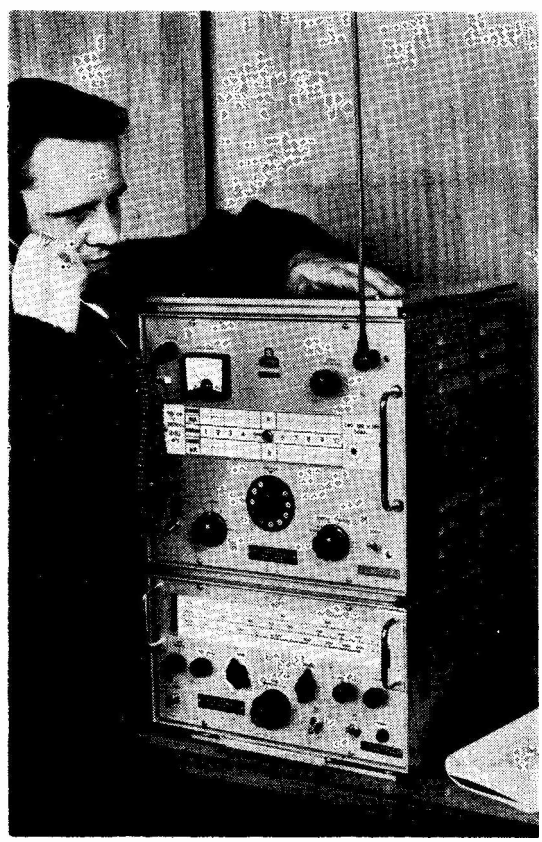
ever method is used it is essential to incorporate an adequately low shunt resistor across the output circuit to swamp it against variations in voltage; in the circuit of Fig. 3 potentiometer VR1 does the required duty.

Constructional

Although exact copies of the prototype are unlikely to be made it seems but necessary to include a layout, that used being shown in Fig. 4. It is unlikely that this layout can be improved on to any great extent since it does permit of very short connecting leads, particularly at the input. No random chassis connections are made and all earthy returns are taken to a point close to the input at V1. Heater lines are tightly twisted pairs and lie well clear of grid connections. Currents circulating in the chassis can hardly exist and the cumulative result is complete hum-free stability.

Bench and Air Tests

Such tests consist of the usual inspection, voltage and current checks for which the output must be suitably terminated and the input short-circuited. The bias voltage will need careful adjustment early on and may be set to 11 volts, read across the bias control slider and chassis. Under no-signal conditions the modulator takes about 80 mA from a 300 volt DC source. As mentioned earlier preset control VR2 may be adjusted to give a zero volts reading on a meter set to its 10v. range when connected across the full primary winding of T1. Later, the modulator may be air tested, taking care not to over-advance the gain control VR1. Reports of " basiness " if given may require coupling capacitors C9 and C10 to be made " thinner " in which case a value of ·005 μF may be tried. Thereafter it remains but necessary to place the modulator in a place of safety and, forgetting it, reach for the key to catch up on some CW!



The Marconi Marine Kestrel III Tx/Rx equipment, as used by Sir Francis Chichester to keep in radio contact during his round-world trip " Down the Clipper Way."
Courtesy Marconi International Marine Co., Ltd.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

THIS is the time of year when some well-known calls tend to disappear from the scenery of the bands for a time, returning later after either putting the aerial back up or clearing a fault due to condensation in an outside shack. Your E.P.E. well remembers the progress of the thermometer on the wall of the shack at G3FAU some years ago as it slowly crept *up* to freezing-point during the course of a winter's evening, thanks to the shack heater!

This sort of thing, apart from the discomfort, can often lead to equipment failures, usually when one particularly wants to be on the air—and it is worth considering what can be done about it. One cure for condensation in the gear is to leave the heaters running, although this is not really good for the valves. Another one, practised with some success (notably by G3JLA before he became EI6AS) is to leave a low-wattage lamp burning under the operating table, so that a gentle stream of warmth keeps the damp at bay on cold winter's nights. As for the shack heating, it is well to remember the obvious point that a hefty heater, say 3 kW, controlled by a thermostat, will get the temperature up to a civilised level quickly without excessive waste. The writer once had a small shack which was warmed by a heater of this type and it would raise the temperature up from near freezing-point in a matter of moments, and then loaf along at whatever temperature the thermostat said, very economically. A smaller heater with no thermostat was nothing like as effective. For those who suffer from cold feet in the shack, and are not addicted to dumping piles of magazines on the floor, there is a thermal underlay on the market which, though very low wattage indeed in the smaller sizes, is extremely effective in keeping the floor warm enough to prevent discomfort. This is quite a thought, as it is found that using an underlay means that the room temperature may be up to ten degrees lower at head level—with beneficial results for those trying to stay awake in contests, and to the size of the overall fuel bill.

On Top Band

On the question of Phone operation at the LF end of the band, the case for the defence is taken up strongly by G2HKU (Sheppey), who disagrees with a *Magazine* opinion for the first time since he has been a reader—and that goes back to issue No. 2, of April 1937! To be fair, the comment was worded somewhat loosely, and in fact Ted and your scribe are seeing things from almost the same point of view. What matters is the local natters which are being carried on in the LF area of the band—obviously if a station in a DX country where only a few kilocycles of the band (and that at the LF end) are available, comes up on Phone, then nobody is going to object to him being called on his own frequency and mode. Likewise, a local QSO going on, using frequencies where Trans-Atlantic Test contacts are being attempted, is just plain selfish. Agreed, there is no formal band-planning on Top Band, but as a general rule, the retaining of the local nets above, say, 1875 kc, reserving the lower end for CW and the odd case of the DX Phone QSO would seem to be commonsense and fair for all.

G3IDG (Basingstoke) chimes in on this one with the comment that when he was GW3IDG/A from Anglesey in 1956, it seemed to be the done thing to operate Phone right down to the bottom band-edge as a matter of course, even then—the conclusion being that some of the present-day "interlopers" do not consider they are in the wrong anyway. Fair enough, but it all adds up to a strong case for a certain amount of re-thinking of our attitudes, now that there is such an upsurge in the DX interest on the bands.

Turning to the rest of the 160-metre news, there seems to have been somewhat of a mixed bag. Several correspondents report QSO's with "VP8JD," notably G3VLT (Orpington) and GM3SVK (Unst); however, *he* turned out to be a pirate. Similarly, our thanks to G4FN (Southend) who shows that the "M1BB," mentioned last time by G3UXP, is also Ungood. What a life!

Turning to the Real McCoy type of QSO, there has been no dearth of these. GM3SVK reports contacts with ZC4RB, 6W8CW, and 9H1AM, all on CW, together with an SSB exchange with ZB2AP. As far as Fred's Orkney trip was concerned, conditions were none too good, but on the first night, 40 CW contacts were made, and the following evening 68 Phone QSO's. During the day, operation was confined to 80/40/20 metres, to a total of 243 exchanges with 31 countries. A landline contact with Fred, after the deadline, to clear up a couple of points, produced the information that he has at last got his new posting—for December 12—and, wonder of wonders, he is going to Rutland!

Andrew of G3VWC (Bishops Stortford) has now become the proud possessor of a Sphinx transmitter, and with it has made a resounding start to Top Band operations—EI4AN, GM3SVK and ZB2AP, the latter on SSB with a report of 5-6/7. There is only one snag to all this: Andrew used part of the time he was off the air to dig in a 120-foot radial-type thing and he now wonders which is doing the trick—the transmitter or the buried system?

Orpington is doubtless under a grey cloud now as a result of the contact with VP8JD turning out to be a phoney but, all the same, G3VLT has gone to 80/57 in Counties.

A bouquet for GM3SVK from

G3UGF (Manchester), who wanted a Phone contact with Orkney, even though he was to take an exam. the following day! Seems that several skeds were run with GM3SVK by various stations, notably G3VYF and G3VDS, as a result of which Richard was able to take the 2-hour 'bus ride home, grab the contact, exactly as arranged, at nine minutes past nine; and, no doubt, take the next 'bus back to Manchester to catch up with his cramming.

Conditions have been somewhat variable for G3VLX (Sidcup), but Deryck found three new counties, by way of GM3SVK/A on Orkney, GW3HVX/P (Radnor), and G3VYX in Cumberland. Thanks to shack rebuilding, Deryck is now reduced to a 40-foot wire twenty-five feet up, instead of the old two-hundred footer, on which the best DX has been Hounslow; however, all should be screwed back together in time for Christmas.

The Top Band score of G3WDW (Leeds) received a boost thanks to the welcome arrival of six packets from the Bureau, and some cards from the GM3PPU/P expedition, to bring the total up to 77/42. Similarly a QSL from the GM3GIZ/P expedition to Orkney gladdened the heart of G3HIW (Ilford) who has at last made the step from 97/97 to 98/98, and therefore takes his place with the Big Boys.

As for G3VYF (London, N.), sad to say, his claimed 18 countries takes a dive to 17 thanks to the defection of "VP8JD"—wonder what sort of swear-words the real VP8JD is using about all this?—but on the other hand there is 9H1AM, and a couple a new counties, with G3VYX/A, and GW3HVX/P to complete the roll of English and Welsh counties. Among the "North of the Border" ones outstanding, GM3SBB obliged to remove Angus from the total.

A new reporter is G3WIT (Newport, Isle of Wight), who runs a Panda Cub with a BC-348 to a 135-foot wire, end-fed. On this, GM3SVK has been hooked, and, when the new Tx is complete to replace the Cub (whose owner, perversely, chooses this moment to pass the Morse Test himself) and the aerial lifted to 50ft. and extended to 200ft., John hopes to be in there batting with the others. We look forward to hearing from him.

Another newcomer to Top Band is G3WWX (Old Glossop, Derbys.) who has got going, albeit under somewhat difficult conditions in comparison with his recent SWL location—being now married, with a new house and a new callsign, the QRM level is a bit high!

GM3UVL seems to have gone up one in Counties and heard most of the Countries, although he has come to the conclusion he is just not there when it actually comes to working them. Still, the onlooker sees most of the game, and in this case Bill has a few hard things to say about the wolf-pack—"A touch of DX fireworks, and not a few Guys too!" GM3UVL wonders whether an MC would not be the answer—Heaven forbid, most of them just make the QRM worse and ensure that people can get a card for what is virtually a non-contact, unless the MC is supremely competent and possessed of a really big signal.

Just as this was clearing for press an interesting (and amusing) letter came in from ZC4GM, who is G3MCY when in the U.K. Arriving at Episkopi, Cyprus, on October 28, he was on the air by the 29th, and any time now may be heard on or about 1825 kc, most evenings 2230-2330z (always on Fridays and Saturdays), with a 350ft. end-fed wire at a height of 50ft., and a clear take-off in all directions! U.K. stations already heard on Top Band (his letter was airmailed on Nov. 7) include G3LIQ, G3RPB (569!) and G3VYF. Gordon confirms that ZC4RB is on 160m., from Akrotiri, not far from Episkopi, and also remarks that 9H1AM can put a 599 signal into Cyprus. All in all, Gordon is looking forward to a lot of fruitful Top Band activity this winter when, with the static level not too intense, he considers that "conditions for the U.K. should be completely suitable." Fine!

FIVE-BAND DX TABLE

(New Cycle)

Starting date: January 1, 1967

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc
GM3JDR	198	—	170	107	—	—
GM3SVK	195	60	122	158	51	22
G3IAR	189	81	125	164	57	56
GM3JZK	132	75	80	91	43	11
G8DI	130	33	83	104	41	28
GM3KLA	124	43	78	75	48	46
G3VBL	111	—	—	111	—	—
G3NUT	110	—	65	71	26	—
G3PQF	101	58	26	38	44	27
G3VDL	100	25	68	65	34	7
VP8HJ	69	17	9	64	1	4
G3MDW	62	6	20	43	14	8
G3VOK	58	7	1	46	6	36
GI3GTR	44	1	12	35	12	9
G3VWC	40	4	26	21	22	5
G3TTG	38	—	—	38	—	—

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

The Ten-Metre Band

The earlier part of the period under review seemed to be the best,

although it has been tolerable most of the time. GM3SVK found things good to the Pacific and South-East Asia during the morning, from, say 0730 till 0930; after his NAAFI break, Africa was workable up to lunchtime. Early afternoon yielded East Coast W's and the odd South American, with the West Coast of VE and W after 1600. His 90 watts and a vertical dipole at 30ft. yielded, among others, on SSB: CE6CA, EP's, ET3JBP, IS1FOL, JA's, KG6, KR6, VK's, VQ9DH, VQ9JW (*Aldabra*), VK2ADY/VK9(*Cocos*), W6 and W7, XW8AX, VS6DO, YV, ZS, ZS9L, 5N2AAF, 5H3KJ, 5Z4KL, 7Q7LZ, 7XØAH, 8R1S and 9L1GQ.

Listening at the same set times in each day brings out the change in conditions with Season quite noticeably, in the view of G3NOF (Yeovil), who reports S.E. Asia and VK around 0900, with Africa later, together with the Middle East. The W's have been audible from 1130, and during the earlier part of the period have stayed in until 2000, albeit toward the latter end they were going out by 1900z. It boils down to QSO's with CR6DX, CR7DS, EP2GI, ET3JBP, HI8XJP, K7NNJ and K7PXI (both in Arizona) VK's, VK2ADY/9, XW8AW, ZD7DI, 5N2AAF, 9G1KG and all the W call areas. Interesting to compare the times Don mentions with the period given by GM3SVK for the same areas and to realise that there is almost a two-hour shift in the pattern of things as between the two locations.

The Quad has been hauled out of the garage and put into use by G3PQF for a string of contests, with suitable advancement to the score, but it is now " back in bed " as the mast is used also to support the 7 mc vertical; this lad must be a quick-change artist as well as a DX'er! VU2FM, VQ8CHR (Rodrigues), a VK9 on Christmas Island, and others fell into the diamond-shaped trap, but VK2ADY/9 was *not* raised—Dave is a little cross over the latter as he has it that there is not much likelihood of further operation for ten years or so. Possibly this is a little pessimistic.

Various folk picked up the point of G8DI's " BY5JB " last time out, including G8DI himself. The sage from Liverpool, in common with the others, now reckons it was probably 6Y5JB. As for this month, Bert mentions YN1MO/W4, and 5N2AAF. The latter escaped your scribe, who waited forty minutes, and then went to answer the 'phone, only to find upon his return to the rig that Mike had sunk without trace.

Reward for a QSL manager—on left, VK6RU, who has been going the job for the past 21 years on behalf of West Australian amateurs. The token took the form of VK6RU's own QSL card done in silver and mounted on a small stand with an engraved silver plaque.

All SSB contacts on Ten and no CW for GM3JZK, who hooked PY, CN8, K4IIF/KV4, 9I3AB, 4L7A, CE, 4M5A, 3V8, 9L1GQ, sundry U's and K2GL; the latter was the only W raised during the *CQ* affair, due to the poor take-off in that direction, although on Fifteen it was not too hard and on Twenty, no problem at all—this point illustrating the increasing nuisance-value of obstructions with increase of frequency. Incidentally, K2GL puts a whale of a signal down in Europe—through *eighteen* dipoles in phase, pointed our way—no wonder he pins the needle hard over!

SSB was also the favoured mode for G3GIQ (Ealing) who managed DU1FH, EP2AK, KR6TAB, VK9's DR and XI, VP1PV, VP9BK, VP6RG, VQ9JW (Aldabra), ZD7DI, 9G1KG, and 9I3AB. Henry has a lot of rude things to say about the current fashion for comic temporary prefixes, for which the present seems to be the silly season—they certainly cause more confusion and annoyance than they are really worth, and make it very hard to keep up unless one is firmly glued to the jungle telegraph. (Those 9I3's were our old friends from Zambia, who normally use 9J—*see* note p.650 this issue.)

Some of the Tit-Bits

The letter from G4FN regarding the " M1BB " character, has quite a lot of interesting side-lights. Jack did a trip earlier in the year which took him through fifteen countries, and M1B was the only amateur he met. It seems that M1B is mainly on the HF bands, operates SSB only from a superb site, and is, for the moment, the sole licensee in San Marino. Regulations there are quite a bit tighter than of yore, and only those of pure Italian blood and resident in San Marino, may hold calls; the old arrangement that visitors could hold temporary calls is now ceased. G4FN says that he did have a chance to find the Radio Club of Split in Yugoslavia, but there were none of the locals there at the time; he was told several would be around at midnight but could not be there then!

Hans Buehler, HB9XJ/MM is aboard the m.s. *Ariana*, and runs an HT-32 Transmitter and Collins

51J4 receiver, on CW, Phone, SSB and RTTY, with Hy-Gain dipoles for aerials. A pity the picture of Hans and the ship, on his card, was not suitable for reproduction, as it showed a fine array of gear and a fine ship, with the coat-of-arms of the city of Geneva as figurehead.

QUAX is the title of a news-sheet, covering the 28 mc band only, being issued by SM4DXL, Ulmar Qvick, Box 611, Skattkerr, Sweden, which was forwarded to the writer by Geoff Watts, to whom thanks are due. As its title implies, it covers all sorts of news and views of this band, and will fill a gap that most enthusiasts for ten metres will have long felt. Both subscribers and contributions are solicited, and it is to be hoped that support is freely given.

We hear from G3LAS that G3VZN, the station of Enfield College of Technology for which he is responsible, has arrived on the HF bands, with Drake-Line gear energising a Mosley TA-33 at 75 feet. John also mentions the station being set up on the *Queen Mary* for her last trip. She will be signing GB5QM, using a Swan transceiver and vertical aerial, on the following frequencies: 7·0 to 7·05 mc and 14·0 to 14·185 mc CW; and 7·05 to 7·1 mc, 14·2 to 14·23 mc, 21·29 ± 10 kc, and 29 mc ± 50 kc for Phone. A special card is available to all who make contact, and the exercise will end when the ship arrives on the West Coast early in December. However, at weekends and on special occasions, it is hoped to activate her for about a year to come, presumably under a W6 callsign.

The U.K. organiser of the JOTA activity (G3BHK, Wareham) writes to say that there is a feeling that the period between Jamborees is so long that informal contact at other times is to be developed, using frequencies at 50 kc intervals along the 80m. band—quite informal, and no certificates. And, as one of the 50 kc intervals covers the Sunday-morning news-bulletins, *please* keep clear when the news is being given—some people like to know what's going on!

Piracy is a pretty puerile sort of business, and there is no real excuse in this country where it is easy enough to obtain a proper ticket. Thus, it is not surprising that G3AME (Reigate) is very cross indeed to find he has a pirate version of himself who even gives his name, offers a card, and has the effrontery to quote his address. So—be warned, and don't waste pasteboard on this one, unless you work him on SSB—the pirate is AM only using surplus gear.

The LF Bands

Here the tale is somewhat dim; your scribe found time to look at Forty a few times, but with very little success, other than working the QRM. Eighty was used by G2HKU to raise some Europeans, among whom were DL5YQ in Hanover, whose father is G3EIY, and DL5YA, both of whom have applied for Top Band permits.

G3MDW (Halifax) dodged around a bit to "get in" when the nearby 11 kV line got tired to kicking up a row, and, on Forty, added several new ones to the total for the band, by way of EI, ZC4, OE, LA, CN8, F, OH, UA, HB, and EP2, which lifts his New Cycle placing quite a little.

G3WJS (Dorchester) is still firmly convinced of the DX potential of Eighty, from the things he has heard other people working, or which have escaped his grasp—true enough, but it's rather like banging head against brick wall—it's so nice when you stop! Seriously, though, there is no doubt at all that the stuff *is* around, and if there were more DX activity, no doubt more people would chase it. However, G3WJS worked mainly Europeans, with CN8AW and 9X5AW gota-way. One look at Forty showed

TOP BAND LADDER

(G3U-- and G3V-- stations only)

Starting date: January 1, 1966

Station	Counties	Countries
G3UTS	96	15
G3NMW	94	18
G3VGR	94	16
GM3UVL	93	13
G3UBW	85	18
G3VYF	83	17
G3VLT	80	16
GW3VPL	75	16
G3VMQ	73	15
G3VMK	70	11
G3UVT	68	12
G3UXP	67	9
GW3UUZ	66	15
G3VES	63	16
G3UGF	62	10
G3VOK	61	15
G3UJS	51	12
G3USE	51	12
G3VSL	51	9
G3VTY	49	9
G3VLX	47	8
G3UGK	43	13
G3UMK	39	7
G3UCS	36	?
G3VWC	30	7
G3VSI	19	4

". . . actually, the semi-automatic key used here is a bit unusual . . ."

Reporting the HF Bands

up a CR7 working a VK2.

Just to prove the point that the DX is there, G8DI offers a contact with ZL4IE, on 3508 kc, around 0700-0800. Forty gave him ZC4RB, OHØNI, with XE1CCW heard on 7056 and TI2NA on 7066 kc.

However, Forty in the evenings gave GM3SVK quite a lot of S. Europeans, Africa, and, oddly enough, later the S. Americans, who were joined by India and E. Africa. Thus, the story reads TF3TF, UM8BA and VU2GW on CW, plus VP9BDA, W's, and ZC4RB, also 4M5A and 4L7A. The former is a special YV prefix, and the latter is UP2KNP in Georgia using a special contest call.

Eighty for GM3JZK (Isle of Mull) was not all that much of a wow, although during the *CQ* WW Phone affair George came on for contacts with GM and DL. Yes, we did say Phone—George did as he threatened last time out and has now become the owner of an FT-100 transceiver! On 7 mc, CW was used to raise W's, VK's, F2CB /FC, and—nearly—ZF1DX; on SSB he booked in ZC4RB, EP2BQ, CN8AW, UF6, EI, UA9 (in Zone 17) plus an assortment of Europeans.

Twenty Metres

The general opinion seems to be that 14 mc has been well up to standard—a little gripe here and there but nothing to speak of, as it were.

GM3SVK found things excellent, with VK/ZL to 1100z, intermingled with Europeans; late afternoon produced Africa, followed by the West Coast W's, then South America and the East Coast. On SSB, the log shows CE1FC, CR6BX, CN8BV, HR1KS, JA's, KL7EFX, KL7BJC, KP4AKB, LU8FAO, PY's, TI4JP, VK's, VS9MB, YV7AV, ZL1AB, ZP5CE, ZP5JB, ZS5DC, 4M5A and 4L7A, 6Y5CB, 9K1KG, and ZS2MI.

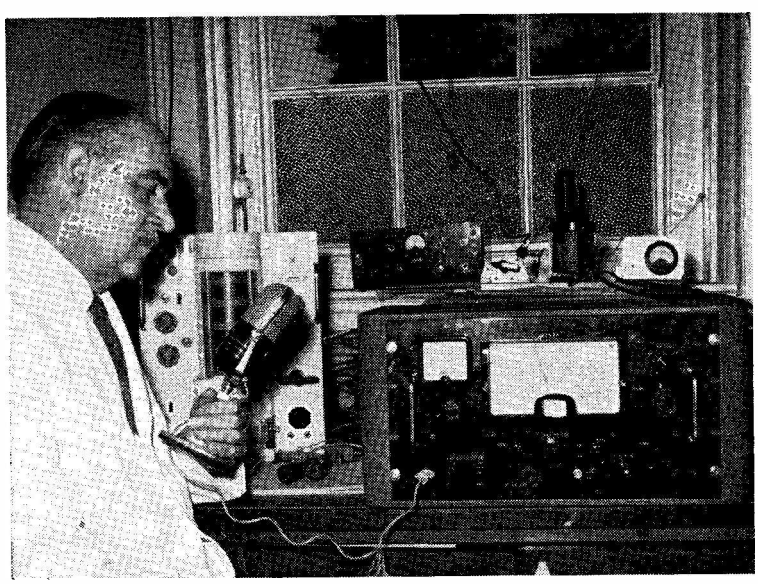
On the other hand CW was used exclusively by G3KTJ (Upholland) to amass his list, which includes ZP5CF, KL7MF, ST2SA, VP6AM, VS9AWA, VP7NQ, KV4AA, ZE1AE, TA1AV, TA2BK, OX3BS, HI7EJE, TI2PZ, VK2VA, FP8CT, 7XØAP, 5Z4SS and IS1SCB. Incidentally, Gerry was one of those who spotted the " BY5JB/6Y5JB " slip, and he enquires if G8DI worked him long path—saucy!

Over now to G3GIQ, where Henry used SSB to hook DU1FH, KR6KN, KZ5TW, VR2CC, VU2DKZ, XE3DE, ZP5OG and 9G1FF. But VK2ADY/VK9 was missed on this band after struggling for nearly an hour, as Don was operating split-mode and the G3GIQ separate Rx was not really man enough. However, when the DX went up to Fifteen, he was again heard, but this time in an area not covered by the SSB rig—and so, with much trepidation the old AM rig was fired up, with thoughts of TVI uppermost, and lo! VK2ADY/VK9 was raised on the second call. Henry *deserved* to get that one!

GM3JZK worked CW to exchange reports with numerous VK's and ZL's, including VK5XK/2 during the test, the latter being worked twice, VK9GN and VK2ADY/VK9, GI (all right, laugh, but have *you* worked one on 14 mc??), and innumerable JA's. SSB yielded EI—same comment as for the GI—VP8JI and 'IU, VK's, HV3SJ, OY4V, PY/LU/CE, 9G1KG, SVØWL, CR6, 5H3, 8R1G, VS9MB, 3A2MJC and DU1FH.

As ever, a detailed report on conditions, followed by the list, is the form from G3NOF; Don heard VK's around 0700, with sometimes FO8 and FK8, VK4HG (*Willis Island*) and YJ8BW. Later, the KL7's, and KM6BI and KX6AC, all around 0900z. Evenings have shown up VP8. QSO's were recorded with KG6ALY, VK2ADY/VK9, VK's, VP6WR, VP8's 'HZ (*Falkland*) and 'IE (*South Georgia*), TI4JP, YJ8BW, WA1ARS/KL7 (on *Fletcher's Ice Island*), ZL's, 6W8DQ, 9G1KG and 9L1JJ. A goodly haul, indeed.

Much shorter is the list from G8DI, who mentions ZS5UT/MM (m.s. *Bastion*), VP8JG, 9G1KG, CP5AB, as worked, with FG7XF heard. On the other hand, anything is DX to the new operator, and



Roy Ashby, G3NBR, is in charge of G6VJ, the club station of the Royal Naval College, Dartmouth, and works in the College electronics laboratory, where he has the use of the test gear and measuring apparatus. G3NBR lives nearby and the picture shows his own /A set-up in a corner of the lab. His main interests are mobile and solid-state Tx/Rx gear, and he has built more than 50 such receivers (for friends and visitors) and several semiconductor transmitters, with considerable success. There may be some old timers who would remember that in the late 1920's the then R.N. College amateur-band station used BVJ, a Naval callsign.

G3UYK (Stafford) who has just acquired an HF rig, is really making hay, and one has to admire the self-control which kept his list down to just the cream of the crop. Peter finds he has no TVI on 20 or 15 metres, even though the Box is quite close to the transmitter—lucky chap—which has made things definitely easier. VS9ARS, HV3SJ, ZP5JB, KL7BJC, LX1AF, SVØWL, 9Y4VP, CN8BV, JX3XK and YN1RTS were all worked on SSB.

GM3JDR (Golspie) enters at this point, with an almost exclusively-SSB month of activity to report. As far as Twenty goes this meant contacts with CN8BV, CR6BX, ET3JBP, HV3SJ, 19RB, KG6AQC, UA9KFS, UG6AW, OX3DM.

A new vertical aerial is up at the home of G3UGF (Halifax), but there is a slight snag—Richard is away at Manchester all the week and so gets little opportunity to use it. However, KR6GF fell into the net at the first call to provide the best DX of the month.

Our new reporter, G3WIT (Isle of Wight), runs a Panda Cub and BC-348 for the moment. Twenty has yielded—up to the time of writing—seven W's, while some /A operation from the home of a local SWL who has an AR88 gave 579 on Ten from WA1HRG when the 100-foot wire was all of four feet high at the far end. Brings back memories of the thrill of that first QSO, and of the first contact outside the U.K.—all of which makes your old scribe realise how time flies!

Up in Leeds, G3WDW mentions that he has been having a dabble on Twenty CW, although not on the higher bands, as the old CR-100 is not stable enough on its highest range, as it stands. Possibly an improvement would be made by stabilising the HT and the heater supply; this is not as complicated as it sounds as an external stabilised supply will do for the HT, and a transistor gadget for the heater line. It also helps a bit to prop the lid open an inch or two—for years, the CR-100 at G3KFE was propped open by a piece of firewood, before the receiver ended its days as a doorstop for the shack!

Running regular skeds is an interesting exercise; G2HKU does this with ZL2KP, and for this year has well over 100 in the log. In addition, SSB gave him a string of other ZL's, FK8BG, and CEØAE; CW produced FK8BG, VR7TT and VK4MY, the first named being a new one. Heard was KL7EBK, 9G1FF, VP8JD, KZ5NH and ZL3RW/M.

The New-Cycle table entry from Arthur, G3MDW, goes up a bit, by way of 7Q7, ZF1, PZ0 and EA8. Incidentally, Arthur has now put up a Hy-gain 12AVQ, of which he has high hopes—if only the power line noise will go away for long enough to try it out thoroughly!

Fifteen Metres

Top of the pile of letters is G3MDW, who managed to find a few fresh ones for most bands; KZ4 was an all time-new one worked on 21 mc. G3IDG (Basingstoke) mentions that he is rather more interested in WPX than just plain country-chasing; recently a couple of new PX to give him pleasure were UW9 and SP4—nothing exotic, but still, after sixteen years, new ones in this context. Another new one on 21 mc was a WN7, never even heard before. If the issue by various administrations of comic callsigns for even more comic reasons were to be controlled, then we would be well on the way to getting some sanity back into the game of DX-chasing. Or what about a real-man's version of DXCC—only change in the rules would be to ensure that no DX card would be acceptable unless the operator could write across his card that he was a resident of the area concerned, for, say, a year. On that basis, it would be hard to find many with the hundred up, let alone 340!

Arthur and Allan having stirred your E.P.E. into strong words, perhaps it would be as well to get back to work before the Editor notices—and to mention that G3WDW is using 15m. for his Phone DX'ing, mainly because, until a converter is completed, the receiver some more stability before it could be used on CW. The 21 mc aerial is quite a contraption; it produced a report of "four and one" no less, from a WØ—but one consolation for the report was that the man said G3WDW was the only European breaking through.

GM3JDR finds 21 mc is his favourite band, and SSB, for this month at least, the favoured mode. Thus he worked CR6DX, CR6II, ET3JBP, HP1AD, scores of JA's, KG6's, KL7's, KZ5SW, WA6FGT /MM (near KR6), OHØNI, OA4OS, PZØAA, UW9WR, VK9DR, VK9XI, VP8HZ, ZD7DI, ZD8RB, ZS, 4M5A, 5Z4, 9G1KG, 9Y4DS, 5X5JK, all W call areas, PY/LU and, of course a shoal of the less-exotic stuff.

Soon almost nothing will be DX, thinks G3UYK, commenting in the upsurge in conditions—quite a thought—but that did not prevent Peter chasing what was available. Singled out for special mention were 3V8BZ, VS9MB, FC3UH, YS2RU, 9E3USA, EA6BG, YA1DAN, CR6DO, VP1PV, all of which were worked on the new rig using SSB to a dipole only 15 feet above ground.

A New One for G8DI was 5X5JK, and Bert also got 7XØAH, 5N2AAF and CR6DX; only heard, to G8DI's regret, were ZD8JP and YA1DAN. G3NOF always gives Fifteen a good look-over, and found the VK/ZL stations about around 0800, albeit not too strongly, and in many cases with a strong echo. The U.S. appeared from 1100 onwards, and VK2ADY/9 was heard several times around 1400z. Apart from the W's, Don only worked VU2DKJ and 5X5JK.

GM3JZK seems to have found 15m. in quite good form—and it certainly came up trumps when he had a non-amateur visitor to show round the shack recently. The visitor was quite pleased to hear George work HBØAG, particularly as the girl-friend of one of them was in Liechtenstein at the time. As George says "it is not *always* like that!" CW produced contacts with HM9DC/1 and 6W8CQ, while the SSB was responsible for JA, UA9 (*Zone 17*), VU2DKZ, L9RB, 4L7A, VK2ADY/9, 8R1G, K4IIF/KV4, ZD8CC, 9Y4DS and numerous South Americans.

SSB was used by G3GIQ to work ET3JBP, F3UH/FC, PZ1CK, UD6BR, VK2ADY/9, VP8HZ, VS6FZ, VU2JM, XW8BZ, ZD8JES, 5H3KJ, 5X5JK, 7XØAH and 9H1R. CW, on the other hand, yielded UO5KBA and UG6AB.

All this SSB does not mean there is nothing doing at the CW end—far from it, in fact—as G3KTJ proves. Extracting from his long

list, we find TG9AC, 6W8DQ, HM1BW, VK and ZL, DU1CL, KS4, HL9KA, KR8, KH6's, KG4, VU2RQ, TU2CA, OD5EJ, HI8RB, TI2IA, HBØAG and FY7YN, all of which were worked on CW

Finally, let us look at the activities of GM3SVK, who has, to some extent at least, neglected 21 mc. However, he managed time to find the following SSB signals and work them: CN8FV, JA's, KG6ALY, KØILI/KG6, ZL1KG, and 4L7A. That must be about the shortest list ever from GM3SVK.

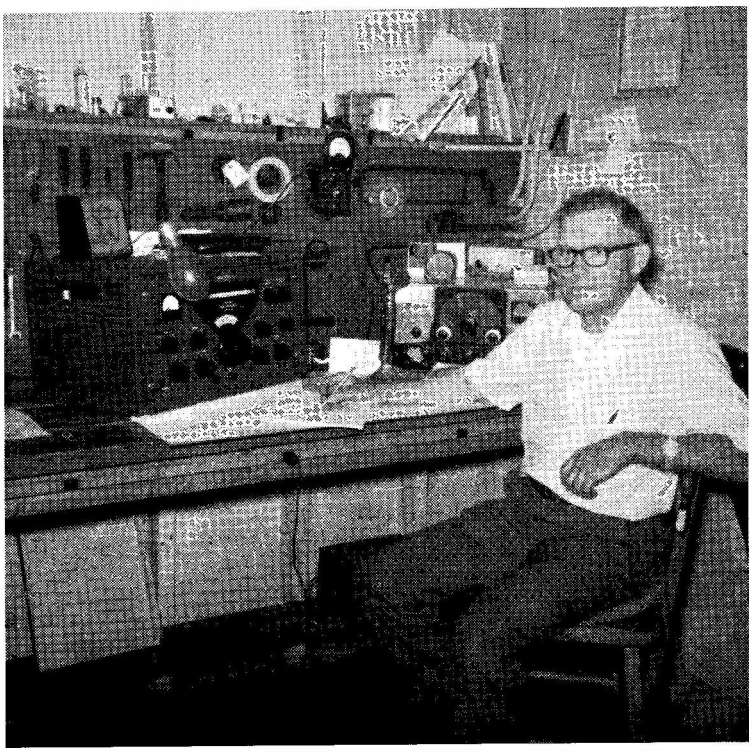
Here and There

G3NOF offers some comments on QSL's: For YJ8BW to W4NJF, who sent the G3NOF card by return . . . KV4EY to W3HNK . . . HI8XJP to the U.S. Embassy, Santo Domingo . . . 9L1JJ to G3HZP, which is his home call . . . FO8BS to B.P.910, Tahiti. VK4HG on Willis Island will be closed down by the time this is in print. VK8AV did not go to CR8 in October, but now hopes to be there in May or June next year.

Last month your scribe wondered why it was that places like Unst are so radio-active . . . GM3JZK gives an answer: " Here we are 15 miles from the nearest centre of social life, where once a week or so there is a dance, whist drive, ceilidh, or film show; there is also a pub, but the police wait outside with breathalysers, and there is no public transport. We can get BBC-1 TV, but even Forty during an opening to UB5 is preferable to *that!*" So now you know.

The first call in the new G3X-- series has been issued—to G3XAA, D. J. Howe, 7 Mayfair, Pedmore, Stourbridge, Worcs. (It does not seem so long ago that we were greeting the G3U/G3V's, and since then the G3W-- list has filled up.)

To clear up a few queries about the Aldabra situation: Sgt. J. Walker, G3UDU, of the Royal Signals Amateur Radio Society, is signing VQ9JW as radio operator of the Royal Society's Expedition to this extraordinary place—because it is one of the few remaining parts of the world still not contaminated by *Man* and his influences. The Royal Society is conducting a survey of the *flora*, and more particularly the *fauna*, of this unique atoll, in the hope of preserving the original life of Aldabra and preventing it from being destroyed for ever. The urgency of the problem has been much discussed in the intelligent press and on the BBC and need not be elaborated upon here. From the radio amateur point of view, the interesting thing is that VQ9JW is there with a KW-2000A, putting through a very good signal on the HF bands, and ready to try skeds on 160 metres. Those interested should in the first instance write to, or make contact over the air with, G4RS, the Hq. station of the Royal Signals A.R.S.—*QTH*, Blandford Camp, Dorset.



Herbert Strout, W1DEO of Portland, Maine, has his 160m. half-wave semi-vertical aerial suspended from a hill-top TV tower 325ft. high—too tall for the 265ft. length of wire ! A keen DX man, he runs a 75A-4 Rx and Ranger II transmitter, and was the only station to work 5H3KK when he was on 160m. last spring.

The very interesting and comprehensive report on the last BARTG contest—these are the RTTY boys, who operate in an esoteric *milieu* of their own—shows that they had 55 firm entries from 14 countries. The high-scorer was WA4LWE, with 104, 152 points gained from 136 contacts on the five HF bands. Looking for the U.K., we find G6JF (Kingsbridge, Devon) at 28th place with 24,380 points made from 67 contacts on three bands. The next in our section is John Curnow, G6CW (Nottingham), making 16,740 points for 36th place out of 30 RTTY contacts in four continents on *five* bands. The low scorer in this contest was W8YKW, who returned 2,270 points, using only the 14 and 21 mc bands.

Sign-off

So there you have it; thanks to all correspondents for their support, and particularly to those who were kind enough to assist in clearing up the pirate problem on Top Band, mentioned earlier. Thanks also to Geoff Watts, for that invaluable *DX News-Sheet* of his—and, of course, to all those who read this piece. To everyone, wherever you may be, all the very best of wishes for Christmas and the New Year, and the best of DX. Next time the deadline is rather tight, at first post **Friday, December 8,** addressed " CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM. *73.*

THE BREAK-THROUGH PROBLEM

CAUSES AND CURES IN MODERN RECEIVERS

BREAKTHROUGH on the IF side can be one of the most annoying troubles encountered in a communications receiver. It is the one form of signal interference which can appear over the whole of one or more tuning ranges, blanketing out weak signals, producing whistles and, in the case of broadcast breakthrough, causing speech or music background on the stronger signals. It is particularly annoying in CW reception, as even the weakest breakthrough will produce a continuous background heterodyne at all points on the dial. This article discusses briefly the causes of such interference and explains how a cheap and simple cure was found in a difficult case.

Causes and Sources

Breakthrough on IF can be traced to two causes. It is produced either by direct pick-up in the receiver wiring associated with the IF stages, or by a strong signal *at or near the intermediate frequency* coming in on the receiving aerial and then making its way through the RF and frequency changer stages. In the latter case the interfering signal will be greatly attenuated by the RF and frequency changer tuned circuits—but with a sensitive receiver only a very small signal at the grid of the first IF amplifier valve will produce an unbearable level of interference due to the high gain inherent in the IF stages themselves.

Actual sources of interference depend upon the intermediate frequency employed in the receiver and generally fall into two categories—breakthrough from ship-to-shore stations, and from broadcasting stations. As examples, receivers employing an IF in the 450-470 kc range are liable to suffer from coast station or ship breakthrough when used in coastal districts. Receivers with an IF in the range 1400-1650 kc are susceptible to interference from a number of British or Continental broadcasting stations.

Where IF breakthrough is due to a signal picked up *via* the aerial, it will normally be found that the nearer the signal frequency circuits are tuned to the intermediate frequency, the worse will be the interference, *e.g.*, in a receiver using a 1600 kc IF, interference due to breakthrough from a 1600 kc broadcast signal may be negligible when the receiver is tuned to 7 mc, but over-powering when trying to listen on Top Band. This is, of course, inevitable from the response curve of the receiver's signal-frequency tuned circuits.

Tracing and Curing the Interference

It is first essential to establish whether any of the interference is caused by direct pick-up in the receiver wiring. See that all normal screening is in place, switch the receiver to the wave-range on which the worst level of interference is experienced, remove the aerial and cover the aerial terminal with an earthed screening can. Then turn the RF gain control up to maximum and switch on the BFO.

In nine cases out of ten, it will be found that the interference disappears, indicating that the interfering signal is being received *via* the aerial. Where the signal is still audible, either at the same or reduced volume, the cause is direct IF pick-up, due either to poor screening and/or layout, or by an exceptionally powerful interfering signal.

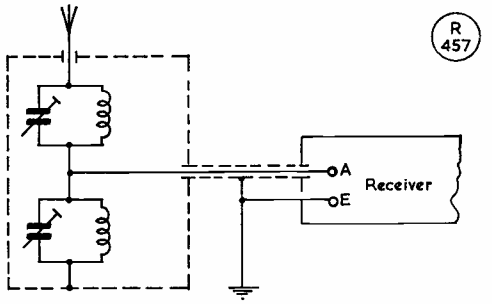
While interference of this type is common in cheap broadcast or television receivers, it should rarely be met with in a communications receiver. The cure lies in reducing the FC and IF valve grid and anode leads to a minimum length and screening them, seeing that the screening of the IF transformers is adequate and, if necessary, placing a screening plate over the bottom of the receiver. At the same time ensure that the spindles of any front panel controls—associated with IF circuit-crystal phasing condensers, mechanical selectivity controls, and so forth—are thoroughly bonded to earth, as any pick-up on such metal objects may add to the interference level. Should all these precautions fail due to the high field strength of the interfering signal, the only answer is to move the IF tuning 10 kc or so and then re-align the receiver. Before any attempt is made to do this, however, it is essential that the vicinity of the intermediate frequency be monitored, both during the day and at night, to ensure that there is a quiet spot to which the circuits can be returned.

The foregoing describes the worst possible case of IF breakthrough. In most instances it will be found that, when the aerial is removed, the interference disappears, indicating direct breakthrough from the aerial circuit. The writer recently met such a case when converting a BC-454 for multi-band, plug-in coil operation. During the evening hours breakthrough interference on the original 3-6 mc range was considerable, while reception on 1·8 mc using a modified coil pack was virtually impossible. A few moments' work with a broadcast receiver located the source of the trouble—a German broadcasting station operating in 1415 kc, which is the intermediate frequency of this particular model of Command receiver. Removing the aerial cut out the interference, so the answer was obvious—either move the IF or introduce some 60 dB or 1415 kc attenuation into the aerial circuit. The first course was impossible, due to equally loud broadcasting stations above and below 1415 kc, so the second course had to be tried.

There are two methods of introducing spot-frequency rejection into an aerial circuit connected to a receiver. A parallel tuned circuit can be connected in series with the aerial close to the aerial terminal, or a series tuned circuit placed between the aerial and earth terminals. In the former case the circuit presents maximum impedance at resonance, thus greatly attenuating the unwanted signal, while in the latter the circuit shows minimum impedance at resonance, thus letting most of the unwanted signal current flow to earth without entering the receiver. The two methods can be used either individually or in conjection with each other. Due to the shape of the response curves involved, signals more than 100 kc or so away from the resonant frequency of the

tuned circuits suffer little or no attenuation.

The answer to the problem was thus to introduce both types of rejection between the aerial and the receiver, using high "Q" circuits and screening the whole arrangement as shown in the diagram herewith. On opening the junk box in search of coils, the first component found was a spare 465 kc IF transformer and it was immediately realised that this provided an ideal basis for the wavetrap unit. Some 90 turns were removed from each of the iron-cored coils and the internal wiring was modified to correspond with the circuit shown here. The modified unit was then connected in series with the aerial and adjusted, first by tuning the parallel circuit for minimum interfering signal, then doing the same to the series circuit, after which a slight final adjustment was made to both trimmers.



The circuit discussed in the article, using an IF transformer modified for the purpose. If the screened lead is kept as short as possible and the circuits correctly adjusted for the interfering station, break-through should be virtually eliminated.

Results

With either tuned circuit used alone, the interference level could be reduced from S9 + to S5/6. With both circuits used together and properly tuned, the interference was eliminated completely. Inserting the unit causes a barely perceptible drop in signal strength on the 160-metre band and has no effect at all on the higher frequency bands. The attenuation at the unwanted frequency is estimated to be about 60 dB.

The idea suggested is felt to be an elegant solution to the problem, providing as it does a cheap, efficient and easily installed unit of good performance. This is particularly so in the case of receivers using an IF in the order of 460 or 1600 kc, as it should be possible to use an existing IF transformer merely by altering two of the internal connections.

THERE IS A BUOYANT MARKET

In amateur-band equipment, of every type, as our Reader Small Advertisement columns show. Indeed, the second-hand value of all kinds of commercial apparatus used on the amateur bands has been established, over the years, through our Small Advertisement section—which has become the market-place for radio amateurs throughout the U.K. For anything radio you may want to buy, sell, exchange, use Small Advertisements in SHORT WAVE MAGAZINE. Though we cannot, and do not, guarantee a result in each and every case, what readers tell us—and, as we can judge from the Box No. mail—is that the response is pretty satisfactory. This is because our "spread" in the Amateur Radio field in the U.K. is now by far the largest of any periodical touching upon the radio amateur interest.

IF YOU WANT TO SEE IT REGULARLY

All we can suggest is that—if you have any difficulty in getting it through a local newsagent, who should be able to supply on your firm order—you take out a subscription for SHORT WAVE MAGAZINE direct with us. The cost is 42s. post free for a year of 12 issues, starting any month, and we guarantee posting your copy on the day before publication.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NEW MAN AT S.R.D.E.

Down at Christchurch, near Bournemouth in Hampshire, the Army maintains the Signals Research and Development Establishment, for their own particular needs under these heads—though S.R.D.E. also concerns itself with practical problems connected with communication by satellite, and the use and application of the infra-red. The new Director charged with all these interesting research responsibilities, at the age of 51, is Mr. John Mills. As a junior, he entered what is now known as the Scientific Civil Service in 1939, and was promoted to the grade of Chief Scientific Officer in 1965. He was at one time head of the Radio Dept., Royal Aircraft Establishment, Farnborough, out of which many notable advances have come. The Scientific Civil Service offers interesting and worth-while career possibilities over a wide field in the public service.

". . . and standing by for the Final . . ."

FOR BETTER RESULTS ON TEN

CONVERTER FOR THE MAIN RECEIVER

WITH the trend of DX conditions rising into the 10-metre band, the need for a good 28 mc receiver is being felt at many stations. A number of the " surplus " types do not tune Ten at all, and some of those older receivers that are supposed to are not very effective above about 20 mc. This article discusses an efficient 10-metre converter which, used with any receiver capable of tuning across two megacycles round the 8 mc mark, will give very good results on our 28 mc band.

Once the primary adjustments to the converter section are completed it only remains to be switched in and out as and when required. Such a unit can easily be built and a circuit is shown at Fig. 1, with values.

The converter can be put together on a small screened chassis and operated either external to the main receiver or—with some constructional ingenuity—space might be found for it *inside* the cabinet of the receiver with which it is to work. In many cases, the power requirement of the converter, which is small, can be taken off the main receiver power pack.

Use of this type of converter with a receiver such as a BC-348, R.1155 or R.107, gives the equal in performance to many commercial sets specially designed to cover Ten.

Circuit Points

One section only of a 6J6 is used as a grounded-grid RF amplifier and a 6J6 is also employed as a combined mixer-oscillator, Due to the low value of cathode resistance required for the 6J6, care must be taken to obtain a correct match. The circuit given permits the matching of a wide range of impedances and causes little reduction in gain over a bandwidth of approximately three megacycles. The mixer circuit is quite conventional and follows the lines of others discussed by various writers in SHORT WAVE MAGAZINE. The oscillator for the 10-metre converter is on approximately 22 mc and permits the band to be covered over 6-8 mc on any communications receiver. Careful screening of the output *must* be ensured and it is advisable to fit a cover over the aerial terminal of the receiver in order to avoid, when tuning around 29 mc, picking up old G3 - - -, banging it out on 40-metre CW a few doors away. If the exact frequency range is required to be known, the oscillator can be put on to 20 mc and tuning of the receiver will then give the IF as from 8 mc to 9·5 mc—or by putting a " mental 2 " in front of the dial reading, direct calibration can be obtained. This avoids the 40-metre QRM, but does *not* mean that input screening can be dispensed

Table of Values

Fig. 1. Ten-Metre Converter for Main Receiver

C1 = 5 $\mu\mu$F, ceramic
C2 = 500 $\mu\mu$F, ceramic
C3, C6, C7 = ·002 μF, mica
C4, C9 = 50 $\mu\mu$F, mica
C5 = 15 $\mu\mu$F, mica
C8 = 100 $\mu\mu$F, zero temp. coeff.
R1 = 47 ohms, ½-watt
R2 = 4,700 ohms, ½-watt
R3 = 100,000 ohms, ½-watt
R4 = 47,000 ohms, ½-watt
R5 = 200 ohms, 1-watt
R6 = 1,000 ohms, 2-watt
R7 = 10,000 ohms, 1-watt

COIL TABLE

TEN-METRE CONVERTER

L1 12 turns No. 24 enamelled, tapped 2 turns from earth end for cathode. 3 turn link PVC 20 SWG, at earth end

L2 16 turns No. 24 enamelled, closewound

L3 7 turns, No. 16 bare, spaced 1in., tapped 2 turns from earth end

L4 30 turns No. 28 enamelled. with 5 turn link.

All coils on ⅜-in. dia. slug tuned formers.

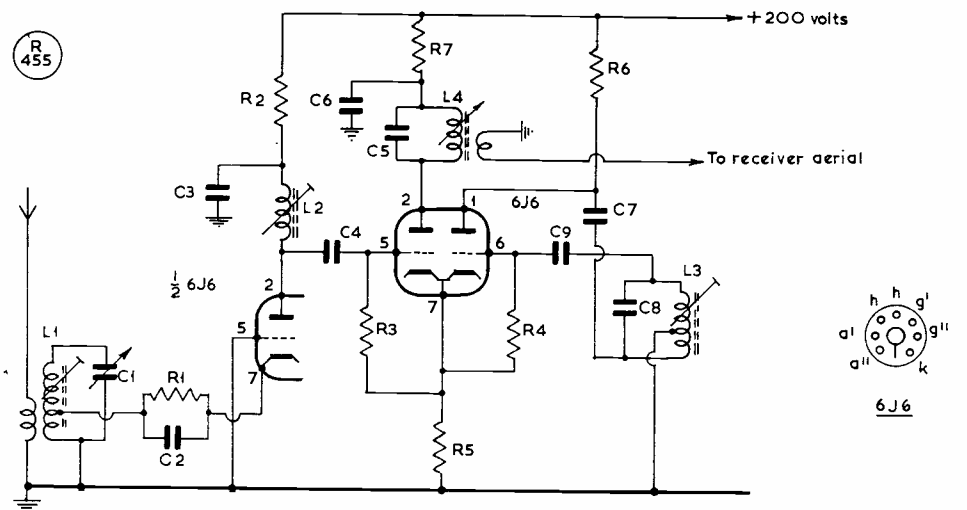


Fig. 1 Circuit of the ten-metre Converter.

Table of Values

Fig. 2. Alternative Input Circuit for Converter

C1, C6	= 500 $\mu\mu$F, mica	L1	= 28 turns 28 SWG, $\frac{3}{8}$in. diam. slug tuned former, 3-turn coupling coil.
C2, C7	= 300 $\mu\mu$F, mica	L2	= 6 turns 22 SWG, $\frac{3}{8}$in. diam. slug tuned former
C3	= 25 $\mu\mu$F, air padder		
C4	= 50 $\mu\mu$F, air padder		
C5	= 25 $\mu\mu$F, mica		
R1	= 100 ohms, $\frac{1}{2}$-watt		
RFC	= VHF choke		

with. In the case of the 20 mc oscillator, tune the output or IF coil to approximately 8·5 mc for most uniform response over the band. If the 22 mc oscillator is used, tune the output coil to 6·5 mc.

If the reader is interested in CW reception on 10 metres the best course then is to tune the output coil to the CW end of the band, although only a slight gain in sensitivity will be obtained.

Objections may be raised due to the possibility of beats between the receiver's own local oscillator and the converter, which may give rise to strong interfering signals. This is only likely to be noticed if the converter is contained in the same cabinet as the receiver and, if possible, the converter should be mounted in a case of its own, properly earthed. The choice of IF has, of course, a lot to do with this.

Setting Up

The suggested input circuit is similar to the famous " R9-er " and the adjustment required closely follows that for it. Preliminary checks consist of making sure that the oscillator is perking on the frequency chosen; then, with the oscillator working, the slug coil L4 is varied until a maximum in output noise level is obtained on the receiver output. L2 is then peaked for maximum noise and the aerial is connected to the input plug on the converter. All the slugs are then returned for maximum noise, the receiver having been set at that point which has been previously decided as representing 29 mc. The receiver should then be tuned over the whole band and checked for variation in noise level over the range.

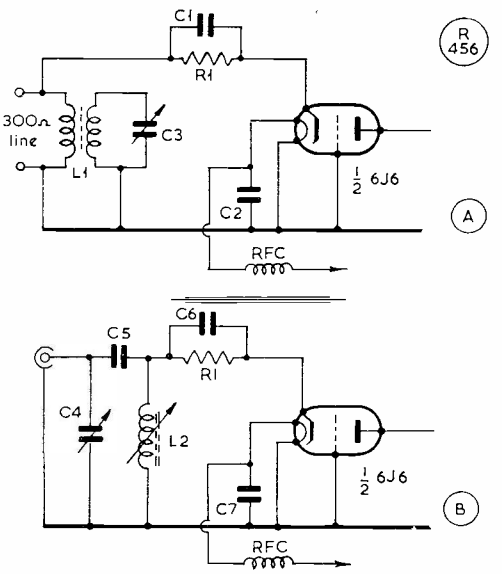


Fig. 2. Alternative RF input circuits for the 10-metre converter. (A) is for open-wire feeder, and (B) for a coax-coupled aerial. In each case, the remainder of the circuit from the 6J6 anode follows that of Fig. 1.

(In A above, C1, R1, should be connected to the top of C3.)

Stability can be judged by listening to a CW signal and noting any change in beat. It may be found necessary to introduce a voltage stabilising circuit across the power line (VR150 and VR105 in series), but this is not general. If this has to be done, a separate power supply will be required.

An alternative input circuit is shown at Fig. 2, and this may prove more satisfactory when using a co-ax feed line; the input impedance on 10 metres may vary from 70 ohms up to about 500 ohms without necessitating any " frigging " with the input, but if a low impedance input is desirable on the HF bands, the alternative circuit is recommended.

SOME AMENDMENTS AND CORRECTIONS

In his article in the November issue, G3LYY draws attention to the following points: In the circuit on p.542, R15 (390K) should appear between the free end of VR3 and the junction of C7, R10. The value for R9, R24 should have been given as 1K, and the 560K resistor shown in the table of values as " R4 " is actually R11. And in Appendix B, Note (5) should have read ". . . the results obtained in (3) and (4)."

In some recent issues, the telephone number of Radio Shack, Ltd. has been misprinted—it should be 01-624 **7174**. We regret the inconvenience caused them, and to the surgery which got the wrong number!

Messrs. Daystrom, Ltd. point out that the gear being used by the young Japanese SWL, as pictured on p.557, November, is actually their Heathkit Model HR.20 Rx and HP.20 power supply unit. An interesting case of Japanese buying foreign—and radio, at that!

BOOKS FOR CHRISTMAS

First, we have to explain that we cannot at the moment supply *Ham Antenna Construction Projects*, our immediate stock having been exhausted. A reprint is in hand, and it will be advertised again as soon as available. Otherwise, we would like to remind all readers of the truism that " Books are the best presents " and to draw attention to our extensive lists—selected titles covering the whole field—p.652, and the inside-outside back cover of this issue. With such a large selection from which to choose, we can only suggest as suitable presents the ARRL *Radio Amateur Handbook* (44s., or 54s. in the hard-back), or the *Call Book* (92s. 6d. in the two-volume edition, covering the whole world). Christmas business is beginning to build up, so early ordering is advised. Prices quoted are post free—all orders to: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for February Issue: January 5)

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

BY the time this reaches print the annual *Magazine Club Contest* will have been played off and the invigilators will be hard at it marking the logs and sorting out the placings. To judge by the number of additional requests for identification codes—about 60 at the time of writing!—this year's Contest could be one of the best-supported of the series—so now we must wait and see how it all turns out. As usual, the report on MCC will be taking the whole of the space devoted to this piece in the January issue, and this, therefore is a good point at which to remind secretaries, scribes, and those who keep us informed of Club events that normal Club reports are *not to be sent in for the January issue*, but held over to reach us for the **February** "Month with The Clubs," deadline for which will be first post on **Friday, January 5.**

This is also an opportune moment to wish all those connected in any way with the Amateur Radio Club movement, whoever and wherever they may be, all the very best of Christmas wishes, and a prosperous and successful New Year.

Round The Clubs

A Christmas draw, plus the annual quiz against the Plymouth group, at home, is the December fare for the **Torbay** chaps; this idea of entertaining other groups for a session once a year is a good one which could do to be used by many more clubs.

Hull are in session on December 1, 8, 15, and 29, for, in order, a Mullard Film Show, an Anniversary Social, a lecture on Field Effect Transistors by G3FCY, and a Construction Competition. January starts off on the 5th with the annual dinner at the Dorchester, Beverley Road, Hull. G3FCY is the action again on the 12th, this time talking about Beam Aerials, and on January 19, Part 4 of a series on Test Meters will be given. To round things off nicely, the annual general meeting takes place on January 26.

The difficulties mentioned by **Bishops Stortford** last time round over their programme are not entirely resolved yet; October was given over to the W1BB tape and slide lecture, while November, all being well, will see MP4MAX showing his slides of Muscat. The latter is slated for Monday, November 20, while December's lecture now goes into the melting-pot although it is promised that something of interest will be laid on—December 18, at the British Legion Club in Bishops Stortford, which is at the top of Windhill. January 15 is arranged to be the AGM, when members can vent their spleen on the officials by throwing them out neck-and-crop! At all of these, visitors will be extremely welcome.

One hardly knows where to start in discussing the affairs of the **Cornish** crowd; there are two R.A.E. classes, at St. Ives and Camborne, there is a main meeting, at the SWEB Clubroom, Pool, Camborne, and in addition there are VHF and SSB groups who get together at regular intervals. This month, one observes that as far as the VHF group—and so, presumably, the SSB section—are concerned, a problem seems to have arisen over accommodation in Truro, and so it would be advisable to contact the hon. sec., at the address in the Panel, for up-to-the-minute information.

Mansfield are going against the normal trend of things by reducing to one evening each month during the winter, as they have noticed that the more often they meet, the lower the average attendance. For the winter, then, the story is to be one of a get-together on the first Friday of each month, still at the New Inn, Westgate, Mansfield, kicking off at 7.45.

Trinity Congregational Church, Ifield, at 8 o'clock, sharp, on December 13, for the **Crawley** lads, who will be, on that evening, having their AGM—but no doubt visitors will still be very welcome.

There are two meetings on the **Lothians** sheet for December; on the 14th, GM3POK will talk about SSB Transmitter Construction, and on the 28th, Air Traffic Control and Radar is the theme to be taken up by GM3TSZ. Incidentally, Lothians were hosts to most of the central Scottish clubs on October 26, when they laid on a king-sized raffle, a showing of their NFD film, and various displays. This sort of entertaining seems to your conductor to be a fine idea which can be used far more than it is at present.

Visitors are welcomed at the **Grafton** evenings, and have been ever since the group has been in existence. Although the programme at the time of writing is a bit "up in the air"—which is unusual—they are still to be found every Friday in Room 35 of Montem School, Hornsey Road, London, N.7; the room is opened at 7.30, the canteen at 8 p.m., and the evening's programme starts at 8.30.

The lads at **Bangor,** Co. Down had a treat in November, when, on the 4th, they were addressed by Frank Robb, GI6TK. One would expect that Frank, in his usual manner, would make them laugh and in the process make them learn about whatever subject it is he chooses to tackle. However, for December, we have to suggest that visitors or prospective members contact GI3OLJ, as in Panel.

* * *

On now to **Hereford,** who like Bangor, are recently formed. December 1 is the date set aside for this month, but the programme is not mentioned in the otherwise excellent newsletter they have started to produce, although the hint is given that there will be some business matters to clear up. Both Hereford and Bangor, as we have said, are relatively new groups, and so far they really seem to be going great guns—which is another way of saying they ought to be joined by *all* the people in the area they cover!

Co-operative Effort

Splatter is the name given by its compiler to the **Purley** News-sheet, and a very good one it is too. From it we gather that the big event of the month takes place on December 16, when the three clubs forming SARA, *i.e.* Purley, Wimbledon and South London Mobile, all join together, along with Addiscombe, to have a Grand Christmas Party, at the St. John Ambulance Hall, Kingston Road, Wimbledon, which is a nice convenient centre for everyone as well as being a pleasant sort of place for a party. Incidentally, this one is a ticket affair, so contact with the Hon. Sec. G3FTQ is advised. As for the normal business of the month, this is on the first and third Friday, so December 1 is a Natter evening and the 15th is set aside for an exercise to check out the NFD gear, and also to see colour slides of Tunisia and Djerba Island.

Wimbledon have their Hq. at the St. John Hall already mentioned, and meet, on the second and fourth Fridays in the month. Ted, G3GKF, seems to have been pressed into service to give a lecture on SSB on the former occasion, and the latter is down as an "informal."

A similar pattern appears at **South London Mobile,** except that it is the first and third Saturday at the Clapham Manor Baths, Clapham Manor Street, programme being "Hotting up Receivers," by G8AMI, on the 2nd and a constructional contest on the 16th. Incidentally, some members of S.L.M.C. are prepared to give lectures to other Clubs "within reasonable travelling distance"—arrange with G3UYN, as in the address Panel.

The last of the four involved in the SARA party is **Addiscombe,** who are to be found in the Coal 'Ole, 158 Lower Addiscombe Road, East Croydon, on the second and fourth Tuesday of each month, from 7.30 till 10.30. Here, then, we have a group of four clubs all within fairly close proximity—so near, in fact, that most of the locals attend more than one of the Clubs, getting together in lots of ways, to ensure the well-being of all—as for instance in the neat way the meetings are spread over the month, the common activities, and the obvious close liaison between the committees. Perhaps the best thing of all is that there is a real attempt to publicise each other's meetings. This is a great idea, and more such tie-ups between groups serving adjacent areas would be to the benefit of everyone.

Nice to hear from **Southampton University** as to their doings; since the EI3SU/P affair recently reported in SHORT WAVE MAGAZINE they seem to have been recovering their breath a bit, and are only running the odd informal gathering in the Union bar. However, this state of affairs should soon change, as the Clubroom has to be redecorated and the new equipment budget has been approved.

At a recent Verulam (St. Albans) meeting, some 50 members heard G3DGN (left, glasses) talk about Optical Communication Techniques, himself in the forefront of research in this field. He demonstrated the "Luxphone," a light-activated walkie-talkie, and a flexible "light pipe," here seen in the hands of one of Verulam's younger members.

Cray Valley seem to be entertaining the South London Mobile crowd on December 7, at the Congregational Church Hall, Court Road, London, S.E.9, while their Natter evening, which is at All Saints Church Hall in Bercta Road, New Eltham, is slated for the 21st.

If you want a Surplus-Sale-With-a-Difference, all you have to do is to attend the one the **Midland** crowd are putting on in December; and these chaps usually keep any promises they make to create something "different." Unless otherwise notified, Midland always get together on the third Tuesday in each month, at the Midland Institute in Margaret Street.

Mid-Warwickshire had seemed to be really firmly glued to their Clubroom—but now, like so many other groups have found in the past, security has proved illusory. However, there is a hiatus between leaving the old place, which has already occurred, and getting in to their new home at 28 Hamilton Terrace, almost opposite, which occurs sometime in December. When this happens, the gang will once again be meeting each Monday evening. Just to complete their streak of ill-luck, the chairman has found it necessary to resign owing to his moving to South Wales.

Marconi College is the home of the **Chelmsford** group, who notify us of a change of Secretary (see Panel) and also tell us that on December 5 there is a lecture laid on, to be given by Mr. P. Williams of Marconi,

the subject of which will be " Echo Sounding." Further events are being fixed up for the New Year, and we hope to have details of these ere long.

The large numbers of amateurs who are still using the older receivers will be interested to hear what G3PZK has to say to the **Acton, Brentford and Chiswick** lads about his reconditioned CR-100 receiver, which he is to demonstrate on Tuesday 19th, at Hq., 66 High Road, Chiswick, London, W.4. Visitors are always welcomed here.

The PRO of the **Leicester** Radio Society, with the assistance of G3UQX and G3TRA, has been " pushing " Amateur Radio to local Scout groups. The scheme has been that he has given a talk, and taken along a receiver, so that, as the highlight of the evening, he has been able to tune around and " find " G3UQX and G3TRA having a QSO. No doubt quite a few recruits have been gained by this enterprise, and, possibly even more to the point, a favourable image created in the minds of those who hear the talks.

Now to **Greenford,** who write to say that they are still going strong, and hope to report fairly regularly in the future. Meetings are held on alternate Fridays, which means, for December, on the 1st, 15th and 29th, with the start at 8 p.m., at the Greenford Community Centre, Oldfield Lane, when either new members or visitors will be extremely welcome.

The routine of the **Salop** club is a meeting on each Thursday in the month *except* the third, which is on a Tuesday and given over to the Club Project, under G3UDA. December 6 is at the Technical College, and is a Mullard Lecture on Colour TV, and this is followed by a valuable talk, to be given by Mr. J. Stamp, the GPO Area Engineer, on " Radio Interference." Finally, the 28th will be a " natter night " operating the Club station, and Morse practice. Unless otherwise specified, all the meetings are at the Old Post Office Hotel in Milk Street, Shrewsbury.

* * *

It is surprising how few Clubs having a small potential membership meet in the home of a member; one that did this, at the home of a different member each time was Stevenage, and most enjoyable those meetings were. Now we hear of another, this time the **Isle of Man** group, who get together at the QTH of their Hon. Sec., GD3FBS, on the first and third Monday in each month—not, as previously, Wednesdays—at least until May of next year.

Another crowd, who for many years met at the home of G3ERN, their president, was **Harlow;** alas, their old place was swept away to make room for a new road, and they are now foregathering every Tuesday in the Old Barn, First Avenue, Harlow, where they have been for some long time.

Guildford enclosed with their *Natter* the menu for their Annual Dinner, decorated with the most delightful pair of radio-active cherubs supporting a great circle map—a fine piece of draughtsmanship on somebody's part. The dinner is booked for January 19, but before then, we see that on December 8 there will be either a talk by G3HWR, or a Construction Contest; a Natter evening on December 22; and a Junk Sale on January 12.

Over at **Echelford** the month is mainly informal, with a session at the Links Hotel, Fordbridge Road, Ashford, on the 18th, and another at Hq., The Hall, St. Martin's Court, Kingston Crescent, Woodthorpe Road, Ashford, on the 28th, at which it is hoped to put on a live demonstration of some VHF gear.

Somebody in the **North Kent** group has a twisted sense of humour—they recently held a Junk Sale, the raw materials for which were given the club by members, so that all the proceeds went into the funds. To rub this point home the back page of the newsletter asking for donations carried a picture of an AR88! *Grrr*—junk, indeed! Anyhow, turning to the future shows us that in December they have bookings for the 14th and 28th at the Congregational Church Hall, adjacent to the Clock Tower, Bexleyheath, starting at 8 p.m. The former date is devoted to RAEN, and the latter to G2CCD, who is to discuss the evergreen problem of " Aerials for DX." In addition there is to be a special session at the " Yacht " in Long Lane on December 19, with a buffet, at a charge of between 5/- and 7/6 a head; the Hon. Sec. would like to know as soon as possible who is going so as to sort out the catering arrangements.

December in **Mid-Sussex** means reserving the 6th and 20th for sessions at Lindfield Primary School, near Haywards Heath. The former date is set aside for a lecture on Codar equipment by Reg. Ireland, G3IRE, while the latter is an " informal," for details of which a quick contact with G3RXJ at the address in the Panel is indicated.

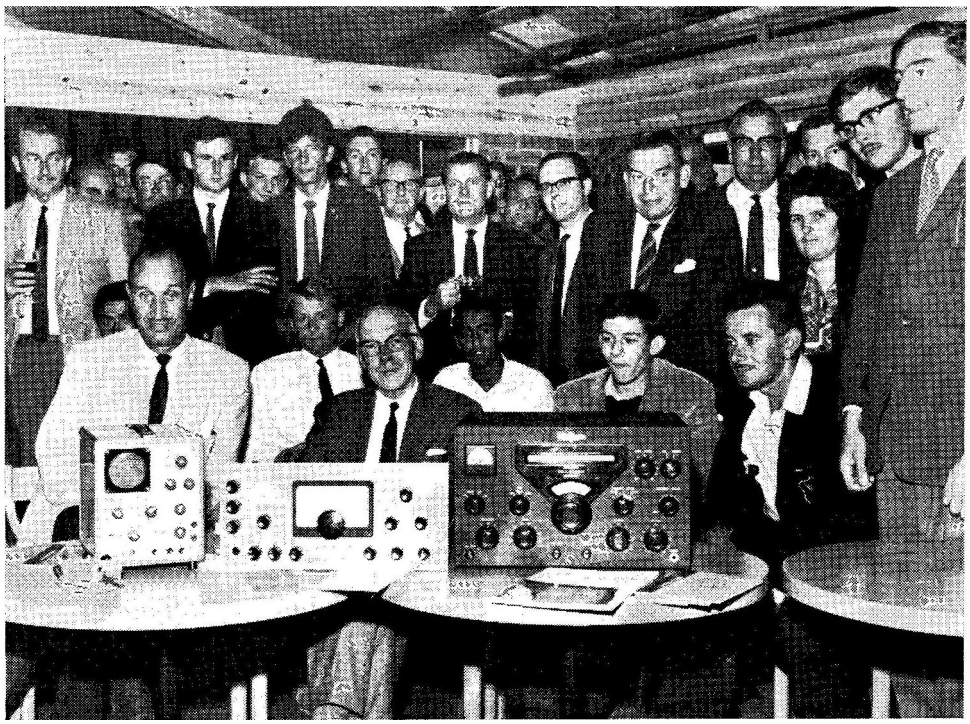
Now to the Radio Amateur Invalid and Bedfast Club, better known perhaps as **RAIBC,** which, by way of *Radial*, passes round all the news and views of our handicapped amateurs and their doings. The front page this month is devoted to a very funny yarn about a chap who " gets even " with the computer which he uses at work; and the inner ones to the usual collection of membership items. Reading this little magazine, one soon realises how much the group needs to rally round them all the " supporters " it can, and how essential membership is to anyone interested in radio and handicapped or blind.

After a gap, it is pleasant to hear once again from **Mid-Herts** that they are still alive and kicking; meetings are on the second Thursday in each month, and for details a contact should be made with G8ASP at the address given in the Panel. Incidentally, it was a lucky coincidence that the letter from this crowd arrived on the same day as a request for the details of a group in the Welwyn area from a prospective member—other Hon. Secs., take note!

* * *

British Rail sent us a copy of their *Newsletter* for September, from which we are sorry to see that quite a number of those who promised support during the early battles to get the Society organised have been notable for their reticence once the thing was going. Considering the enormous amount of hard slogging put in by the committee, it is no wonder that one senses a slight feeling of frustration—however, let us hope that they soon get them all roped in and things on the boil again.

Over at **Medway,** there is an " evening out " to Canterbury laid on for December 8, for a lecture on



In the pre-1939 period, there was a small but active club in the Eastbourne district, of which the late G5BW was a distinguished member. Recently, the idea of a new start was mooted, and the Southdown Amateur Radio Society now has no less than 95 members, of whom 29 hold tickets. Projected activities include a Club station signing G3WQK on all bands, with G3KLX as chief operator, also R.A.E. and Morse tuition classes. A Quad is being raised for the HF bands, and they have three 30ft. sticks for other antennae. In the meantime, G3WQK is in a Sunday-morning net on Top Band, and several members are on 1970 kc in the evenings from 2215z. Meetings are on the first Monday of each month, at the Beachy Head Hotel, and the hon. secretary is Leslie Tagliaferro, 9 Tugwell Road, Hampden Park, Eastbourne (54244). Incidentally, it was our picture of him on p.40 of the March issue of " Short Wave Magazine " that started the whole thing off!

Radio Astronomy, and on the 19th the Club station G2FJA will be on the air. After the New Year, meetings will be held every Monday evening, as an experiment.

The copy of the **Wolverhampton** *News Letter* which is to hand covers all the October and November activities —no less than twelve of them. For the immediate future, there are meetings on November 27, and on December 4, 11 and 18, with January 8 reserved for their New Year party at the Black Horse. This Club's third D/F contest attracted eight local entries, the winning pair being G3COI/G3EHG in 14 minutes, with 87 mins. as the longest time logged to find the hidden Tx! Wolverhampton also have a Club Constructional project in hand (a GDO), and arrangements for this are to be finalised on December 18—be at Hq., Neachells Cottage, Stockwell Road, Tettenhall by no later than 8.0 p.m.

The December information does not appear in our copy of the **Reigate** *Feedback*—but what *does* is rather an important point—and that is, very simply, the attitude of the lads to any newcomers at their first visit, which basically is the one that determines whether they come again and pay a sub., or whether they decide never to darken the Clubroom doors again. Reigate mean to see that the latter *never* happens to *them*. A late report gives it that Reigate's next meeting is on December 13, with G3MVZ demonstrating and talking about his transistorised SSB transceiver—sounds an enterprising piece of gear. This will be at the George & Dragon, Cromwell Road, Redhill, for 7.30 p.m. The ninth annual dinner-dance is booked for Friday, February 2—note the date, and see G3NKS about tickets as soon as possible.

The **Surrey Radio Contact Club** is organised and lined up until next April—December 19 will feature Mr. A. Browne of Mullard Research Labs., who is to talk about the Stellar Interferometer at Narrabi in Australia. On the 22nd, the " Blue Anchor " Hq. in South Croydon will be the scene for a Club Dinner and Social. The January meeting will be a Club Members' Receiver Forum, which rather sounds as if the intention is to compare various receivers.

Nailsworth is a Club that we hear from at rare and irregular intervals—but, like, say, Shefford, here is a group that, although they are somewhat " out in the sticks," manage to keep thriving in a way that makes the weaker of the big-city clubs look rather sickly. One is inclined to feel that a period as an ordinary member

of Nailsworth or Shefford or a similar group should be part of the training of anyone who aspires to be Secretary of *any* group in a large city. Coming back to the point, the lads at Nailsworth are to be found on Tuesdays at the Boys Club, where they have a shack and gear for the LF bands—and they would like a few QSO's, so keep an ear open for them.

If you live in the **Southampton** area, then you have a local radio society that not only publishes a newsletter which is as keen on " grinding axes " as some of the national dailies, but also holds a twice-weekly session in the clubroom, at 20 Carlton Road, Southampton, the selected evenings being Wednesday and Friday; in addition to all this there is a monthly " do " in the Lanchester Building of the University.

Over in **Harrow**, they are going through that most Important Event, a Twenty-First Anniversary, and it is for us all to congratulate them on reaching the majority. October has seen a special programme, and of course a suitable coming-of-age party; and *QZZ* has seen another of those delightful little bits of reminiscence with a point from the able pen of G2UV, that same G2UV who was the originator of the QSL card, still at it and enjoying his radio as much as ever. For December, there is G2TA on Linear Amplifiers on the 1st, followed a week later by a Practical, and on the 15th there is the Annual Christmas Party. Naturally enough, the 22nd is " no meeting," while the 29th will be given over to one of those Junk Sales. We have only the first part of the January affairs but that is a most important one—the Annual General Meeting—on January 5 at Hq., Roxeth Manor School, South Harrow.

A *change of venue* is to be noted by those who are located in the " catchment area " of the **Bury and Rossendale** group; they now have their once-monthly meetings at the George Hotel, Market Street, Bury, where the 12th is booked for the AGM.

Recently the lads of **Crystal Palace** had a Hi-Fi evening—an event which they repeat once each year with, where possible, different equipment. G3FZL, in the newsletter issue to hand, discusses the gear and has a few very pertinent things to say about the present craze for transistorised amplifiers, only *one* of which has a performance as good as the better valve devices! For December, the date to reserve is the 16th and the programme is a Junk Sale and Christmas Party rolled into one.

Spilsby Hamfest is, as many will know, a pretty regular event, to which the lads of **Skegness** look forward through the winter. To find out what else they do, get in touch with G2ABK at the address in the Panel.

* * *

Every other Friday there is a get-together of the **Saltash** crowd at the Burraton Toc H Hall, starting at 7.30. The detail of the December activity is not, at the time of writing, to hand—possibly because there has been an AGM recently and someone has to do some organising—but certain it is that in the event something of interest will occur.

At the **Verulam** AGM on December 20, there is also to be a Fun Quiz, and seasonal refreshments, so there should be no lack of attendance on this occasion. Earlier in the month, on December 6, is the Informal, for which (it is firmly stated) the secret plan will remain secret until the night! Sounds rather intriguing, both these sessions are to take place, as usual, at the Cavalier Hall, Watford Road, in St. Albans.

Just up the road from Verulam is **Hemel Hempstead,** who have a change of Hon. Sec. to record and who advise that they are to be found at Rucklers Lane Hall, Kings Langley, on the first and third Friday of each month.

* * *

From **Edgware** we hear that they recently had a talk on a subject which never could be over-played—that of the Stable VFO—given by G3ONS; as for the coming dates, these are for December 11, and in the New Year, January 8 and 22. For further details, contact G3RAA, as Panel.

Plymouth sent in their *QUA* just on the deadline, from which it is noted that recent events have included the Annual Dinner, a Junk Sale, and a return visit with the Saltash lads, this time at headquarters. Hq. to the Plymouth gang means the Virginia Settlement, which is near Breton Side Bus Station; here they foregather every Tuesday evening at 7.30 p.m., alternate weeks being given over to a Constructional class.

" Out of Luck " has been the state of things for the **Northern Heights** programme, due to lecturers being ill or having other commitments; however G3MDW, as usual, managed to switch his lectures round at the last minute, and so all was well. For December, there is the Annual Dinner slated for the 6th, while the 20th is given over to a Ragchew evening. The first lecture of the New Year is to be given by G3OMM, her topic being " Radio on Stamps," followed on the 17th by a joint session at which they will be joined by the Bradford group to hear an officer of Wakefield CID talking about Fingerprints. The month will be rounded off by a Film Show on the 31st.

Their chairman's notes in the **Southgate** *Newsletter* for November draws attention to members' lack of support in the sense of contributed material for it, and announces that he will be unable to seek re-election at the AGM on December 14. A brighter note is struck by mention of the fact that they have been able to contrive a good aerial system for all bands at his new QTH. Southgate run an annual constructional contest for their " G6QM Trophy " and we shall look forward to seeing the results in the next *Newsletter*.

As usual, there is some good stuff in the current issue of the **A.R.M.S.** *Mobile News*—which, says a footnote to members, is being " produced under exceptionally difficult conditions." Nevertheless, they are doing good work for the Mobile interest.

The latest *Bulletin* of the **Ex-G Radio Club** includes the current membership list, showing that they now have more than 100 members; the list also gives the original QRA of each member, *e.g.*, London, Grimsby, Glasgow,

SECRETARIES PSE NOTE!

The next " Month with The Clubs " will be in our issue dated February, due out on January 26, for which the closure for Club reports will be Friday, January 5—addressed " Club Secretary," Short Wave Magazine, Buckingham. In the January issue, publishing on December 29, we shall be using the space to report the recent Magazine Club Contest, MCC.

MCC—LATE FLASH!

The comparative peace at the LF end of Top Band was shattered at 1700z on Saturday 11th by the crescendo of stations calling " CQ MCC "—and we were off to another terrific Contest. So far as can be judged at the moment of writing, MCC was again a very well supported event—some 60 additional and unlisted Clubs applied for identifications—with a high level of activity and some very slick operating. Full story next month.

or whatever. The Club meets over the air on 14346 kc every Sunday at 1900z for telephony QSO's, and on 14065 kc each Saturday at 1900z for CW contacts. There is also an 80-metre net on 3820 kc (outside our band) for SSB working, on Tuesday nights at 0030z. The ex-G Radio Club is run largely by W3HQO (hailing from Kidderminster) who devotes much time and effort to it, producing a chatty and informative monthly compilation.

The latest *Newsletter* of the **R.A.F. Amateur Radio Society** reports a heartening increase in membership—now standing at 430, and still rising—and its finances are shown to be in a most healthy state. Unfortunately, however, the unhappy dispute with the R.A.F. authorities about the status of the Society still drags on—briefly, the Hobbies Board demands that if R.A.F.A.R.S. is to be accorded official recognition and support, it must first discharge from membership all the civilian element. Whatever the reasons may be for this ruling, it is a preposterous attitude for the Ministry to take in the case of the R.A.F. Amateur Radio Society, which was founded long before Hitler's War, and has a long history of achievement. In any event, all its " civilian " element is, or has been, directly connected with the Service.

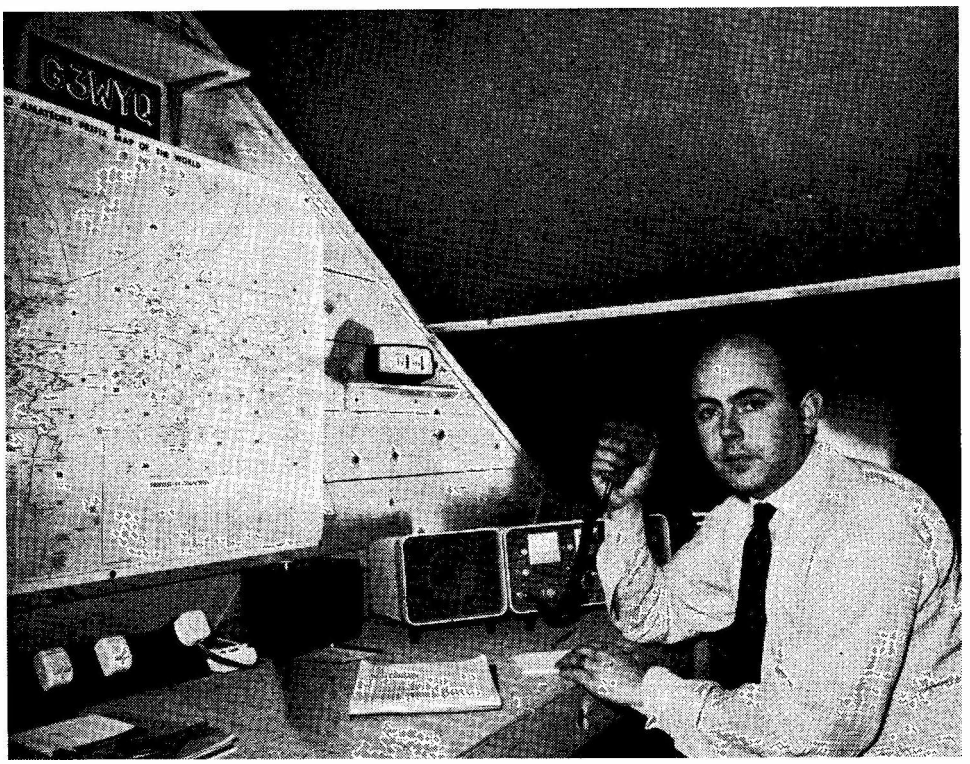
Peterborough report that they are organising a series of lectures throughout the winter, to be given on the first Friday of each month at the local Technical College. The first one will be by G3RED on the Heathkit SB-101 Sideband rig, as noticed on p.560 of our November issue. The shake-up at the recent AGM still produced G3KPO as their hon. secretary!

Deadline

And that about wraps it up for this time—any further reports coming in " by this afternoon's post " will be too late! Please don't forget that the next " Month with The Clubs " will be in our February issue, because January's Club space will be devoted to Matters Arising, *viz.* the MCC Report. Deadline for February is first post on **Friday, January 5,** addressed: " Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM.

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.
BANGOR: J. W. Campbell, GI3OLJ, 48 Abbey Drive, Bangor, Co. Down.
BISHOPS STORTFORD: A. Marriott, G3VWC, 21 Thorley Hill, Bishops Stortford (*4796*).
BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
BURY & ROSSENDALE: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, nr. Bury.
CHELMSFORD: G. C. Cutting, G3GNQ, 35 The Street, Galleywood, Chelmsford.
CORNISH: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.
CRAWLEY: R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley (*23359*), Sussex.
CRAY VALLEY: D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent (*ELTham 6945*).
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23. (*FORest Hill 6940*).
ECHELFORD: D. Walmsley, G3HZL, 153 Worple Road, Isleworth, Middlesex. (*POPesgrove 3239*).
EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middlesex.
EX-G RADIO CLUB: R. H. Cherrill, W3HQO, 8005 Palmetto Street, Philadelphia, Penna. 19111.
GRAFTON: E. A. Rudolph, G3SIL, 29 Pangbourne Drive, Stanmore, Middlesex.
GREENFORD: F. C. Reid G3VMD, 34 Carlton Avenue, Greenford, Middlesex.
GUILDFORD: A. Wilkes, G3SLH, Schiehallion, Hookley Lane, Elstead, Godalming, Surrey.
HARROW: R. C. Ray, G2TA, Wintons End, Springfield, Bushey Heath (*1762*), Herts.
HEMEL HEMPSTEAD: A. Lex-Arnold, 13 Little Road, Hemel Hempstead.
HEREFORD: B. Edwards, G3RJB, 5 Powys Lane, Hereford.
HULL: D. J. Peacock, G3NOP, 336 Cottingham Road, Hull.
ISLE OF MAN: H. Grist, GD3FBS, Ravenscroft, Greeba, St. Johns, Isle of Man.
LEICESTER: J. T. McAllister, 239 Sturdee Road, Eyres Monsell, Leicester. (*Wigston 6157*).
LOTHIANS: A. J. Masson, GM3PSP, 20 Merchiston Park, Edinburgh, 10.
MANSFIELD: F. N. F. Bewley, G8HX, 116 Westfield Lane, Mansfield, Notts.
MEDWAY: P. Carey, G3UXH, 29 Miskin Road, Hoo, Rochester, Kent.
MID-HERTS: H. R. Thornton, G3PKV, 43 Fordwich, Welwyn Garden City.
MIDLAND: C. J. Haycock, G3JDJ, 29A Wellington Road, Handsworth, Birmingham, 20.
MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
MID-WARWICKSHIRE: M. Spencer, G3UOD, NBS 3rd Line, Royal Air Force, Gaydon, Warwick.
NAILSWORTH: F. J. D. Hills, G3VVV, 1 Oxlease Close, Tetbury, Gloucestershire.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (*44329*).
NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, (*8655*), Kent.
PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
PLYMOUTH: G. Clark, 19 Beverston Way, Widewell, Roborough, Plymouth.
PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey. CR4-6DB.
R.A.F.A.R.S.: Hon. Secretary, Amateur Radio Society, R.A.F. Station, Locking, Weston-s-Mare, Somerset.
R.A.I.B.C.: Frances Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
REIGATE: D. Thom, G3NKS, 12 Willow Road, Redhill, Surrey. (*Reigate 45033*).
SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
SALTASH: J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.
SKEGNESS: N. Hodgson, G2ABK, 26 Raithby Road, Hundleby, Spilsby, Lincs.
SOUTHAMPTON: A. Partner, G3HKT, Tekhi, Hound Road, Netley.
SOUTHAMPTON UNIVERSITY: A. R. Cross, G3WEA, c/o J.C.R., The University, Southampton.
SOUTHGATE: A. Dutton, G3TIE, 77 South Lodge Drive, Southgate, London, N.14. (*Tel. LABurnum 3390*).
SOUTH LONDON MOBILE : C. E. Malcolm, G3UYN, 41a, Cambray Road, London, S.W.12.
SUSSEX: R. Morrison, G3KGA, 33 Sefton Road, Croydon CR0-7HS, Surrey. (*01-654-5982*).
TORBAY: D. T. Hind, G3VNG, 46 Thurlow Road, Torquay, Devon.
VERULAM: J. Thomas, G3RXA, 9 Highland Drive, Hemel Hempstead (*55136*).
WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton.



THE OTHER MAN'S STATION G3WYQ

INTEREST in Amateur Radio was aroused by coming into contact with G3KZU and in fact without his help and encouragement over the past two years, I feel sure I should not be the proud holder of G3WYQ. The R.A.E. was tackled by attending the very excellent course at Brighton Technical College run by Richard Canning, G6YJ. When in September the small brown envelope arrived bearing the letter " P " in the top right-hand corner of the enclosed yellow slip, a concentrated effort was made on the Morse, with the aid of oscillator, key, tape recorder and G3WQQ and his son Gavin. It will be a long time before I forget the feeling of elation when at last the Morse pass slip was in my possession, and I realised that all there was between me and my own callsign were a birth certificate and £2.

It has been some four weeks between receiving a Licence and the station getting on the air which I am sure, on reflection, has been a good thing; it has allowed time to put the finishing touches to the shack—built in the attic, as shown in the picture—and to put up the 30ft. aluminium aerial pole at the end of the garden, with a " 5RV " between it and the house. My first QSO was with GM3SVK while operating /A from G3WQQ's QTH. This was on Top Band, first with CW and then Phone. The first contact from the home QTH was with LA3UL on 20 metres at 12.55 p.m. on October 29. Since then many new friends have been made over the air and a picture is slowly being built up of just how the KW-2000A and the 5RV aerial get out and on what bands.

I consider myself very fortunate in that since I first became interested in Amateur Radio there have always been people only too ready to help and advise, and that no matter how silly my questions may have seemed to them, they were always answered with tact and consideration. (QTH: *R. J. Allbut, G3WYQ, 67 Downland Road, Woodingdean, Brighton, Sussex.*)

BIT OF A CELEBRATION

During the period October 20-29, AT-stations in Zambia were permitted to use the prefix 9I3 (instead of 9J), by way of celebrating Zambia's independence day, the third anniversary of which fell on the 24th. The " Worked Zambia Award " is involved, scoring being double-points for working stations using the 9I3 prefix. According to the *DX Call Book*, there are about sixty 9J's licensed.

NEW QTH's

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

G3VMQ/A, P. A. Tory, c/o 12 Johnstone Street, Bath, Somerset.

G3WKP, P. King, Nirvana, Comprigney Hill, Truro, Cornwall. (*Tel. Truro 4788.*)

G3WOE, M. A. White, 25 Green Park Avenue, Skircoat Green, Halifax, Yorkshire.

G3WPK, R. A. McCowatt, 70 Heath Road, Hounslow, Middlesex.

G3WRS, Wakefield and District Radio Society, c/o E. Price, 23 Elmwood Grove, Horbury, Wakefield, Yorkshire.

G3WTQ, P. C. Angold, 8 Graysands Road, Hale, Cheshire. (*Tel. 061-ALT-4589.*)

G3WUA, B. R. P. Lindop, 47 High Street, Eccleshall, Stafford.

G3WUQ, G. W. Oswin, 64 Whitehouse Crescent, Sutton Coldfield, Warks.

G3WVU, N. Harrison, 11 Carlton Road, Benton, Newcastle-upon-Tyne, NE12 8BE. (*Tel. Newcastle-upon-Tyne 661395.*)

G3WVZ, P. Smith, 18 Plowden Road, Wythenshawe, Manchester, 22. (*Tel. 061-MER-6913.*)

G3WWC, C. J. Carroll, 117 Oak Lane, Upchurch, Sittingbourne, Kent. (*Tel. Medway 33184.*)

G3WWF, I. R. Firth, 6 Eastfield Drive, Woodlesford, Leeds, Yorkshire.

G3WWI, R. E. Oxley, 1 Elm Grove, Maidstone, Kent. (*Tel. Maidstone 58182.*)

G3WWK, J. W. Searle, Nautico, Kingsale Road, Salcombe, Devon.

G3WWL, B. D. Tipper, 271 Blackberry Lane, Four Oaks, Sutton Coldfield, Warks.

GW3WWN, G. W. Evans, 18 Mount Pleasant, Tonna, Neath, Glam.

G3WXN, L. McKown, 16 High Lee Street, Werneth, Oldham, Lancs.

G3WXS, M. D. Calvert, Syreford Wood Cottage, Andoversford, Cheltenham, Glos. (*Tel. Andoversford 439.*)

G3WXT, H. C. Pryse, 36 Hart Road, Byfleet, Weybridge, Surrey.

G3WYC, A. Durbin, 3 Milton Road, Weston-super-Mare, Somerset.

G3WYF, C. W. Heigh, 20 Highfield Road, Daventry, Northants.

G3WYG, E. P. Gooding, 39 St. Georges Road, Felixstowe, Suffolk. (*Tel. Felixstowe 4236.*)

G3WYI, G. J. Simpson, 1 Marsh Terrace, Darwen, Lancs.

G3WYN, J. K. Gibson, 13 Chillis Wood Road, Haywards Heath, Sussex. (*Tel. Haywards Heath 2420.*)

G3WYQ, R. J. Allbut, 67 Downland Road, Woodingdean, Brighton, Sussex, BN2 6DL.

G3WYR, P. Newman, Summerside Cottage, Finsthwaite, Ulverston, Lancs.

G3WYS, P. Routledge, 36 Oak Hill Close, Woodford Green, Essex.

G3WYV, F. Chatterton, 13 Inchfield Close, Rochdale, Lancs.

G4JS, J. Simpson, 1 Marsh Terrace, Darwen, Lancs. (*re-issue.*)

G8AIE, P. W. Willcocks, 27 Manor Road, Barnet, Herts.

G8BDB, J. E. Berry, Highfield, Kirkhead Road, Grange-over-Sands, Lancs. (*Tel. Grange 2485.*)

G8BDU, D. McFisken, 11 Thames Avenue, High Halstow, Rochester, Kent. (*Tel. Hoo 397.*)

CHANGE OF ADDRESS

DL2AH, J. T. Worrall, 6 Inf Bde HQ & Sig. Sqn., B.F.P.O.17, c/o G.P.O. London, England.

EI8BL, C. E. Davies, 52 Abbey Street, Bangor, Co. Down.

G2ALO, R. P. Munn, Redcote, Chalfont Lane, Chorley Wood, Herts.

G3CZS, A. Whatley, Little Orchard, Manor Road, Claybrooke Magna, Rubgy. (*Tel. Leire 555.*)

G3DMN, L. E. Flint, Decoy Cottage, Marlesford Road, Hacheston, Woodbridge, Suffolk.

G3FCB, E. D. Melville, 6 Vicarage Close, Grove, Wantage, Berks.

G3FPD, R. Surman, Dumble Dore, The Drive, Ifold, Billingshurst, Sussex.

GW3FQZ, D. F. Ireland, 10 Bishops Park, Pembroke, Pembs. (*Tel. Pembroke 3299.*)

G3HGR, P. Knight, 7 Meadowlands, Seal, Sevenoaks, Kent. (*Tel. Sevenoaks 62227.*)

G3HQP, L. S. D. Christian, 10 Forgefield, Bethersden, Kent. (*Tel. Bethersden 405.*)

GI3ILK, H. C. Manning, c/o Belfast Banking Co. Ltd., 22 Market Square, Lisburn, Co. Antrim.

G3JQE, A. Wormald, B.Sc.(Hons.), 18 Ashleigh Gardens, Highley, Bridgnorth, Salop. (*Tel. Highley 358.*)

G3KXB, D. E. Pantony, 6 Longtye Drive, Chestfield, Whitstable, Kent.

G3LZQ, J. Dunnington, 73 West Hall Garth, South Cave, Brough, Yorkshire E.R.

G3NKL, R. M. Jones, 5 Highfield Drive, Longridge, Preston, Lancs., PR3 3SN.

G3NNW, K. Taylor, 9 St. Marys Road, Manchester 8.

G3RML, D. W. Trowell, The Bungalow, Willow Lane, Watford, Herts.

G3SGX, R. E. Bona, 265 Yeading Lane, Hayes, Middlesex.

G3TNQ, C. R. Davis, 5 Shaftsbury Way, Burtonwood, Warrington, Lancs.

G3UYD, E. T. Clarke, 65 Oakmount Road, Chandlers Ford, Eastleigh, Hants.

G3VLD, T. A. Denney, Rosemary, Hillway, Outwood Common Road, Billericay, Essex.

G3VUV, E. J. Smith, 8 Talbot Road, Albrighton, Wolverhampton, Staffs.

G3VXF, B. E. Ellis, Cornwalls, Felden Lane, Boxmoor, Hemel Hempstead, Herts. (*Tel. Hemel Hempstead 55460.*)

G5KW, K. Ellis, Mount Pleasant, Well Hill, Chelsfield, Kent.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

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

TRADE

AERIAL Masts: To 40ft. in six 7ft. sections, 2in. diameter alloy, few left at £5 10s. Two-section 20ft. wooden masts, 1½in. dia., 20s. Load resistors, 200-ohm 25-watt, three for 6s. Photostat copies R.220 and R.1392 circuitry, 3s. 6d.; others available for VHF. New Codar A.T.'s, £25 inc. PSU. See our October adv. p.519 for other items still available. Postage paid on all orders. Open Saturdays and Sundays p.m.—**Jim Fish, G4MH, 18 Town End, Golcar, Huddersfield (52653), Yorkshire.**

XTALS, 39 to 41 mc. overtone, HC6U mounting, three different frequencies at our selection, price only 8s. 6d., post paid.—**Glasgow Electronic Services, 21 Old Dumbarton Road, Glasgow, C.3.**

STANDARD Design QSL Cards: Prices 250 @ 22s. 6d.; 500 @ 34s.; and one thousand at 48s. 6d. In two colours at 7s. 6d. extra. Log Books, 5000-entry in 10 pages, stiff-backed, 12s. 6d. Prices include tax and postage. Send s.a.e. for samples.—**Beaumont, 8 Ashfield Avenue, Morley, Leeds, Yorkshire.**

FOR TRIO Communication Receivers it's **Glasgow Electronic Services**, 21 Old Dumbarton Road, Glasgow, C.3. (H.P. available.)

QSL Cards: Two-colour, attractive design, variable features, from £3 3s. per 1,000 (inclusive). Send foolscap s.a.e. for samples.—ARA Press, 46 Moat Avenue, Coundon, Coventry.

IN GM-land for Halson Mobile Aerial systems it's Glasgow Electronic Services, 21 Old Dumbarton Road, **Glasgow, C.3.**

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

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

READERS' ADVERTISEMENTS

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

SALE: Linear Amplifier, KW-500, with two spare rectifiers, £45. Sphinx Tx, with Delta control unit, £50. National NC-98 Rx, £15. HRO, in fair condition, with coils and PSU, £7 10s. All with manuals and operating data.—G3OQU, QTHR or ring Kinver (Staffs.) 2642.

SELLING: Two 21ft. aluminium scaffold poles, £4, plus radio-junk clear out.—O'Connor, 3 Ingle Close, Northway Estate, Headington, Oxford.

WANTED: Home-built crystal controlled converter for 10-15-20m. Full details and delivered price, pse. (Stirlingshire).—Box No. 4568, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS. READERS—*continued*

FOR SALE: Collins 75A-2, modified completely to the 75A-4 specification, with 2·1 and 6 kc mechanical filters, £125. Labgear LG.300 transmitter, complete with high-level Mod/PSU, £25. K.W. Viceroy Mk. III SSB/CW Tx, £90. AR88D receiver, £30. Three-element beam for 20m., £20. Collaro 3-speed tape recorder, £10.—Pilkington, G3NNT, 1 Deansgate Lane, Formby (2778), Lancs.

WANTED: Urgently, for VK6KK, the first IF transformer for a CR-100.—Bird, G3GZE, 14 Old Bank Lane, Blackburn, Lancs. (Or ring Blackburn 58312, evenings.)

OFFERING: Hammarlund HQ-145X receiver, very little used and in excellent condition, with crystal calibrator, manual and servicing instructions. Offers over £100.—Clague, Dreemlang, Victoria Road, Castletown, Isle of Man.

WANTED: Mosley TD-3Jr. Dipole for 10-15-20m., also an AR88 speaker.—Jenkins, 2 Dunvegan Close, West Molesey, Surrey.

SELLING: A super Heathkit station, SB-300 and SB-400 complete, at £230. Also the HO-10 'Scope, £25. And a linear amplifier, running 4/811A, £40. Creed 7B Teleprinter, with Terminal Unit and PSU, £20. Or the lot for £300.—G3NMR, QTHR or ring (London) 01-550 0882.

OFFER For Fishermen! Will Exchange fishing gear, comprising two fly rods, one glass-fibre rod, one 6ft. boat rod, complete with four reels, including large surf-caster, landing and keep nets, plus all accessories (such as flies, hooks, weights and such) for a Complete 70-Centimetre Station (Rx, Tx, etc.).—Fiskén, G8BDU, 11 Thames Avenue, High Halstow, Rochester, Kent.

SELLING: Heathkit Mohican GC-1U receiver, with manual, price £25. carriage paid.—Gillen, 2 Napier Drive, Dundee, Scotland. (Ring Dundee 66304, evenings).

FOR SALE: Receivers Eddystone 840 at £30, and Eddystone 840C £48. Both in excellent condition and recently completely overhauled by Eddystone Radio, Ltd. Can be seen and tried by appointment (ring Reading 82325) or write.—Thompson, 174 Shinfield Road, Reading, Berks.

WANTED: In good, clean condition, copies "Short Wave Magazine" for November 1965 and Jan.-Feb. 1966. State price required.—Bunting, 34 Bowerfield Avenue, Hazel Grove, Stockport, Cheshire. (Tel. POYnton 3956.)

SALE: Front end, new, for R.107 Rx, with IFT's, speaker and cabinet, £4. Spares for R.1155A, coil pack and IFT's, 20s. Several valves suitable for R.1155A. (Monmouthshire).—Box No. 4569, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WHAT Offers? For a Minimitter MR-44/11 dual conversion receiver and a Heathkit OS-1 'Scope. Both in first-class condition, with their handbooks. —Ralph, 59 Church Road, Earley, Reading (61262), Berkshire.

SALE: Sphinx Tx and its control box, £42 10s. Eddystone 840A Rx, in excellent condition, £18 10s. Labgear Tx for 160m. mobile, with PSU, £14 10s. Test Meters, Taylor at £4 10s. and Avo, £8 10s.—Derrick, 218 Winchester Way, Bolton, Lancs.

WANTED: Heathkit DX-40U Tx, and a reasonably priced communications receiver, also a suitable wavemeter.—Axon, G4PM, 31 Beechwood Avenue, Blackpool, Lancs.

WANTED: Copies "Short Wave Magazine," October 1958; April-May 1959; July 1961 and December 1965.—Hibbert, 126 West End Avenue, Harrogate, Yorkshire.

SALE: Eddystone EC-10 receiver, with mains PSU. at £39.—Taylor, 52 Beaulieu Avenue, Sydenham, London, S.E.26. (Tel. 01-778 9741.)

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: The seldom-offered K.W. Victor Tx, running 150 watts AM/CW, coverage 10 to 80m., in good condition, price £55, buyer to collect.—Roth, G3DMJ, 4 Camden Road, Somerton, Somerset.

REAL SALE: Contents of my Shack, lots of useful items and No Junk! Either call or send your s.a.e. for a list.—Plumtree, G3OSP, 1 Salisbury Road, West Bromwich, Staffs.

EXCHANGE: **Eddystone S.640 for Hallicrafters SX-28A** in workable condition. The S.640 is immaculate, has been resprayed and realigned, with stab. BFO/Osc. and S-meter. Selling price £25, or near offer, buyer to collect.—Clarke, 8 Elizabeth Avenue, Fairfield, Buxton, Derbyshire.

WANTED: Hinged-lid type cabinet for AR88 receiver. Condition not important.—Fill, G3UBB, Candleford, Brook Close, Packington, Ashby-dé-la-Zouch, Leics., LE6 5WA.

SALE: Heathkit RA-1 in mint condition, factory built, with CL-1 calibrator. Price £30, buyer to collect or pay carriage.—Harris, G3VUI, 20 Durham Crescent, Bulwell, Nottingham.

WANTED: Urgently, manual for the AR88LF, your price paid. (West Wales).—Box No. 4570, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Marconi CR-100 Rx, in excellent condition, £18 10s. Transformers, rated 60 and 100w., for transistor mobile/portable DC-DC converters, s.a.e. for details. Crystals, 10X type, 1926 and 1942 kc, 6s. 6d. each. Zener diodes, 3 to 12v. in 1v. steps, choice of 5w. stud, 2w. wire-ended or 250 mW miniatures, 2s. each or 15 for 20s., to choice. Ferrograph Series 5S Tape Recorder, with Reslo microphone, price £65 or near offer. Buyer to collect CR-100 and Ferrograph, or could deliver to 60 miles.—Sandall, G3LGK, 21 Dale View, Ilkeston, Derbyshire.

EXCHANGE or Sell: Pérdio "Town & Country" transistor Rx, only 11 months old, in excellent working order, coverage 150 kc to 4·5 mc, cost £20 new, asking £12, or Exchange for AM/FM transistor Rx.—Sangster, 13 Danestone Terrace, Bridge-of-Don, Aberdeen, Scotland.

SALE or Exchange: 4X150's, sockets and fittings; BC-453 with manual; 90 crystals; and RTTY manual. Wanted: Converters for Green TMR-5, any frequency bands.—Brown, G3LPB, Marlborough Farm, Falmouth, Cornwall.

SELLING: Heathkit DX-100U, in very good condition, with manual, used one year, price £50. E.M.I. Type 3031 Tape Player, walnut cabinet, speed 7½ i.p.s., in very good condition, with manual, £15. Signal Generator Type CT.218, AM/FM, 85-30 mc, very clean and in good order, with manual, £55. T.1403 transmitter, new and unmodified, with PSU and as original circuit, with full modification circuitry for 40-80-160m., price £7. (Berkshire, 35 miles London, buyer collects or shares car delivery.)—Box No. 4571, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Heathkit HW-32 20m. Transceiver, 200 watts p.e.p., incorporating HWM-32/1 modification and in mint condition (no PSU available) price £35.—Whelan, 44 Synge Street, South Circular Road, Dublin 8, Eire.

SALE: Nine crystals, all amateur frequencies, for bands 40-80m., 40s. Reslo microphone Type RBH/TS Hi-Z, brand new in original packing (14 gns. as purchased) bargain at £8. Marconi Signal Generator Type T-144G, £10. Mod-percentage output meter, in Eddystone die-cast case with Elliott movement, £3. 'Scope for modulation testing, with spare valves (new) and CRT, £5. (Last two items home-built, working order.) Call, or write with s.a.e., pse.—Smith, 46 Cow Heys, Dalton, Huddersfield (32280), Yorkshire.

FOR SALE: Marconi 52 Set, complete Rx/Tx, with ATU, etc., price £20 or near offer.—Dacey, 35 Long Lane, Aughton, Lancs.

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: Heathkit Mohican receiver, aligned by Daystrom, in excellent condition, with manual, price £25 or near offer, delivered London area. Also Eddystone bug key, 30s.—Davis, G3IUZ, 84 Tomswood Hill, Hainault, Ilford, Essex.

SALE: Collins 75S-1 receiver, with 500-cycle CW filter, manual, etc., in mint condition, £120.—French, G3LGL, QTHR.

WANTED: A BC-640 VHF transmitter. Must be immaculate in appearance but not necessarily working. State condition and price, will collect.—Reekie, 4 Baswich Lane, Stafford.

WANTED: Withers "Communicator 160" or similar Top Band Transceiver, or would consider separate Rx/Tx. Also wanted a mobile-type microphone and antenna. All letters answered.—Perks, G3VWX, 65 Grange Road, Dudley, Worcestershire.

NEW! 6146 in tuned-grid linear, with screen stabilising, covering 10 to 160m., 90 watts p.e.p., less PSU, £5.—Hamer, G3LMQ, 7 Arundel Road, Cheylesmore, Coventry, Warks.

WANTED: Joystick aerial and tuner. Also a two-metre converter, home-built considered. Details and price, please.—Coutts, Bogward Farm, St. Andrews, Fife, Scotland.

ASKING £34 for Eddystone EC-10 receiver, with PSU.—Corbett, 1 Maybank Street, Glasgow, S.2, Scotland. (Tel. POL 7975.)

MOBILEER? Twelve-volt 45 amp. alternator, universal mounting bracket, illuminated ammeter, with regulator, price £15.—Sutherland, G3IES, 336 Charlton Road, W-o-T, Bristol.

SALE: Collins 120w. AM/CW transmitter, 32V series, with Geloso R.209G amateur-band receiver, both in first-class condition, £25 each or near offer?—Tyler, Tudor Farm, Littlewick, Berkshire.

FOR SALE: **KW-77 Receiver**, with matching speaker, perfect working order, £70 or near offer?—Jacobs, G3OGB, 41 Queenborough Gardens, Ilford, Essex. (Tel. CREscent 1697.)

SELLING: Marconi CR-150/6 receiver, coverage 2·0 to 32 mc, double-conversion, 14 miniature valves, 100 c/s to 13 kc variable bandwidth, six spot frequencies. Superb receiver complete with original AC/PSU and Marconi technical manual, price £55 or near offer.—Elkin, G3AMT, 10 Winterslow Drive, Leigh Park, Havant, Hampshire.

EXCHANGE: A Hallicrafters S.27 VHF Rx, covering 27 to 145 mc, for AM/FM, with S-meter, 250v. AC mains, For a Lafayette HE-80 Rx or Trio JR-60 receiver. (Northumberland).—Box No. 4572, Short Wave Magazine, Ltd., 55 Victoria Street, London. S.W.1.

FOR Modification to Four Metres, a 71 mc Marconi transceiver, using QV04-7 PA, with separate mobile PSU, price 70s. Prefer buyer collects, otherwise carriage extra.—Cotter, 4 Radstone Court, Hillview Road, Woking (62277), Surrey.

SALE: Type C.52 receiver, with case, PSU and spares, price £9. Collaro tape transcription unit, £5.—Kenway, 73 Pellatt Grove, Wood Green, London, N.22.

£5 OFFERED for good Geloso VFO covering 10-80m. Another fiver for a Joystick with a Type 4 tuner. Alternatively, could offer £15 for good home-built 10-80m. AM/CW Tx.—McIntyre, G3WLC, 3 Firs View Road, Hazlemere, High Wycombe, Bucks.

MAGAZINE for January due out December 29. Single-copy orders, 4s. post free, despatched the day before publication, to reach us by Wednesday 27th. All Small Advertisements to appear in January issue should be with us as soon as possible.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London S.W.1.

FOR SALE: Eddystone 680X receiver, in good condition. £45.—Beaumont, G5YV, 8 Ashfield Avenue, Morley, Leeds, Yorkshire.

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: SSB Station, comprising G2DAF Mk. I Rx, transmitter also G2DAF Mk. I (2/TT21 in PA), complete with PSU and spare TT21's. £55 or near offer? Delivery arranged up to 100 miles. —Ring Brough, Macclesfield 7981.

FOR SALE: Heathkit RG-1 Rx, with speaker and in immaculate condition, price £28. Command-type Tx's, 3-4 mc and 4-5 mc, 60s. each, plus carriage. Three 400ft. coils 7/·029 aerial wire (the nice stuff!), 70s. per coil, carriage paid. (North Wales).—Box No. 4573, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Transmitter running 120w., with Geloso VFO and 4D22 in PA, in two-deck table cabinet, with separate modulator and PSU on standard rack-and-panel, price £30. Codar PR-30X preselector, at 90s. Buyer collects, or carriage extra.—Davidson, GM3ATB, QTHR, or ring RUTherglen 6178.

NEW Computers, in grey crackle case 17in. x 8in. x 9in., with counter tube and valves 5Z4G, EL84, EL81, EF91, 85A2 and 3/12AU7's, with stabilised HT and incorporating 3in. 0-1 mA meter scaled 0-25 over 250 degrees of circular dial. Price 50s., plus 12s. for carriage/packing.—Cooper, 13 Churchfield Road, Outwell, Nr. Wisbech, Cambs.

FOR SALE: Lafayette KT-230, fitted stabiliser (no other mods.), 8 months old, price £18. Heathkit VF-1U, VFO. £5.—Notschild, G3RSF, QTHR, or ring Harlow 21043, evenings.

SALE: Heathkit Mohican GC-1U receiver; Bendix TA-12G Tx; Type W.1191 Wavemeter; two power packs; various valves and other oddments. Take the lot for £35.—Gorst, 5 Lea Croft, Crowthorne, Berks.

SELLING: R.C.A. AR88D receiver, with manual and trimming tools, in excellent working order, £30.—Phillips, 10 Oaklands, Swiss Valley Park, Llanelli, Carms., West Wales.

FOR SALE: An HRO with Q5'er and ten coils including bandspread for 10-15-20-40-80-160m., valve line-up 6BA6-6BA6-6BE6-6C4-6BA6-6BA6-EBF80-6AQ5-VR105/30-BFO, 6AK5, with 1 mc/100 kc xtal calibrator, stabilised PSU using 5U4G-6L6-EF80, and/or National PSU type 697, also matching speaker, price £20. Frequency Meter BC-221M, £15.—Maddox, G3JBA. 1 Montpelier Road, Sutton, Surrey. (Tel. 01-643 2845.)

SELLING: R.C.A. AR88D in very nice condition, grey hammered-finish cabinet, with trimming tools and IF outlet for FSA, and small separate speaker. Price £40, o.n.o., buyer collects or carriage extra. (Dorset).—Box No. 4574, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Withers Communicator for 160m. band Mobile, complete 12-volt transceiver with G3FIF whip and loading coil, price £40.—Lewis, 7 Marden Crescent, Whitley Bay, Northumberland.

FOR SALE: Labgear LG.300 transmitter, with rack-mounted modulator and PSU's, price £40. Buyer inspects and collects.—Parsons, G3MIX, 96 Blackamoor Lane, Maidenhead (26723), Berks.

WANTED: A Hallicrafters SX-28A, SX-42 or SX-43. Must be in mint condition and unmodified. Full details, please.—Wise, 64b Beach Road, Newton, Porthcawl, Glam., South Wales.

DISPOSAL: Transciever for 80/160m., 90 watts, Phone/CW, price £30. Pye two-metre Phone transmitter, 20 watts, £33. All perfect equipment.—Ring Sawyer, G3OQM, Bournemouth 58376.

BARGAIN: A Lafayette KT-340, in good condition, at £18.—Adkins, G3SEV, 72 Courtenay Avenue, Harrow Weald, Middlesex.

FOR SALE: Codar PR-30 preselector, brand new and unused, 60s.—Robinson, 9 Rotherfield Road, Sheldon, Birmingham, 26.

WANTED: Avo Signal Generator, model covering 50 kc to 80 mc. Also an R.216 receiver with PSU.—Higgins, 23 Ayres Road, Brooks's Bar, Manchester, 16.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Cossor Type 1035 **double-beam oscilloscope,** in excellent condition, with manual, £24. American **AM-913/TRC VHF converter,** slow-motion tuning 95-200 mc, output 30 +/– 2 mc (receives SSB!), with stabilised mains PSU, price £19. **Hallicrafters SX-24** receiver, coverage 550 kc to 40 mc, with xtal filter, amateur bands spread, re-valved and in good condition, with speaker and circuitry, £14 or offers? **Two-metre transmitter, phase modulated** (high quality and no TVI!), balanced triplers/doubler driving from 8 mc xtal into QQV03-10 PA, in **small 19in. rack,** price £15; a suitable generously-rated **PSU** in two units, £6 10s. **BC-455** receiver, 6·0 to 9·1 mc, unused and unmodified, 90s. **B.44 Tx/Rx,** modified for 4 metres, with tunable Rx side, 80s. All these items can be demonstrated. **WANTED: Eddystone EC-10 or Heathkit RG-1.**—Street, G3TJA, 117 Parkway, London, N.W.1. Ring 01-387 2158 or 01-743 8000 (BBC TV, extension 3713/2919).

SALE: Transformers, Woden 50-watt output, primary 4K CT, secondary includes 16K, 4K, 16K, suitable for modulation, 30s. Driver transformers, Type DT3, push-pull input with split secondaries, match into foregoing, 17s. 6d. Mains transformers, conservatively rated at 450-0-450v. 220 mA, 6·3-0-6·3v. 3A, primaries tapped 0-110-210-230-250v. and 9-0-9v., 40s.—Coleman, G8AZU, Monksbridge, Thames Street, Sunbury-on-Thames, Middlesex.

WANTED: Urgently, an SSB Transceiver, SB-100 preferred, cash waiting for mint example. Also a Tri-Band beam and suitable Rotator.—Nias, G3VRB, 49 St. Margarets Road, Bishopstoke, Eastleigh, Hants.

OFFERING: Codar T.28 mobile Rx, as new. Codar 12v. PSU and remote control unit. G3FIF whip with 80 and 160m. loading coils. Heathkit RF Signal Generator, latest model.—Sanderson, G3UQZ, 175 Johnson Road, Birmingham 23.

SALE: R.206 Mk.II receiver, covering 50 kc to 30 mc, AC mains input, with handbook and perfect, £24. Type 53 transmitter, for 1·0 to 18·0 mc, runs 300 watts, for AC mains, price £25.—Gadeke, 7 Malvern Drive, Ilford, Essex. (Tel. 01-478 8141).

EXCHANGE OFFER: Absolutely new Rolex Oyster Tudor Royal stainless-steel wrist-watch with Rolex s/steel bracelet, cost £32, FOR a good general-coverage receiver—Hallicrafters, Eddystone or similar. Cash adjustment either way as necessary. (Manchester).— Box No. 4575, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: DAF-type Exciter, working FB 10-160m., with mechanical filter, Cathodeon crystals, Electroniques coil packs, Eddystone 898 dial and TT21 PA, in unit construction, with three meters, Vox, etc., asking £50 or near offer. A good AM Tx, consisting of Miniciter 10-80m., into 2/TT21 PA with 2/KT88 modulator coupled by Woden UM3, can run 420w. CW and 300w. AM. TVI clear (GPO certificate), will load into TV aerial, any channel (Club demonstrated), price £40 or offers? Heathkit GDO, £6. Heathkit OS-1 'Scope, with mu-metal screen and visor, recently overhauled by makers, in perfect condition, £15. Dow-Key relay, 6·3v. actuation, price £5. Linear to run 650 watts p.e.p. over 10 to 80 metres, 4/TT21, with two spare TT21's and three meters, £15. Mobile installation for 80/160m., comprising 40w. Tx, Class-B modulated, with 80/160m. converter for MW car radio, Eddystone dial, commercial coils and suitable whip, £12. Pye "Reporter" rig, with Cathodeon crystal on 70·375 mc in Tx and VFO Rx, price £8 or offers? KW Low-Pass Filter, 80s. All items buvers collect or plus carriage.—Taylor, G3OFN, QTHR.

SELLING: Type MC-661C "Technica Electronic" Field Strength Meter, VHF-UHF coverage 41-65, 65-108, 155-270 and 465-800 mc, transistorised, new in leather case complete with stethoscope headphones, price £50 plus 15s. post/packing (normal price £62).—Hill, 19 Station Road, Tadcaster (2253), Yorkshire.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: Murphy B.40 Model D receiver. Also a Cossor Type 1035 Mk. III 'scope and a modern Wobbulator. All items must be in excellent condition. Have For Sale a manual for the Pye "Ranger," 45s. (Lancs. area).—Box No. 4576, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Two C.52 Set receivers, one a good one and the other in fair condition, built-in xtal calibrators, with PSU, spares including coil-pack, and circuitry, price £20 or would split. AM/CW Tx for 80/160m., excellent mod. quality, with spare valves, ATU and microphone, £8 or an offer? A TBY-8 transceiver for 4/10m., with all attachments, spares and charts, £6 or offer? Heathkit DX-40U Tx, including VF-1U VFO, in good condition and modified for 160m., £25 or your offer? Also a quantity of valves and components, including 813's, etc. Send s.a.e. with enquiries and offers.—G3VKM, QTHR, or ring Nottingham 232915.

SELLING: Tiger TR-200HF transmitter, virtually mint appearance, asking £50. Buyer to collect but it won't go into a Mini!—Moon, G5MN, 774 Holderness Road, Hull (77832), Yorkshire.

AUDIO Amplifiers, 2/off, made by Douglas Aircraft Co., rated 80 watts, rack mounted, 4/6146 output, priced £10 each, buyers to collect.—Humphries, Old Rectory, Gazeley, Newmarket, Suffolk.

SALE: A KW low-pass Filter for Ch.4, 75-ohm coupling, price 40s. post free.—Lawrence, G3RL1, 44 Elizabeth Road, Leamington Spa, Warwickshire.

GO Mobile in a Peugeot Estate Car! This one is fitted with a National NCX-5 and has worked about 130 Countries, including a couple of VK mobiles. Reluctant to split this unique /M installation, standing 5th in the World Mobile/DX ladder. Everything works, from the over-drive to the Vox. Outlay on rig and vehicle over £1,500. Asking £485 only.—Jolly, G3TJY, Little Russel, Lytchett Minster, Nr. Poole, Dorset. (Tel. Lytchett Minster 142, or 0201-22 142).

OFFERING: Receivers SP-600JX/6, tuning 540 kc to 54 mc; Hallicrafters S.27, 27 mc to 145 mc; HA-350 for amateur bands; APR-4, 35 to 1000 mc; Tuner, 19 mc to 160m. Transceiver, 60-90 mc. Frequency Meter, with charts, covering 300 to 1000 mc. Also new AR88 spares, tuning gear, tools, manual and such.—Wright, 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

CLEARING Shack! Superb SSB Tx filters, McCoy 32-B1 xtal, 9mc, with two carrier crystals, £10. Set of six matched QCC filter crystals, B7G glass mounted, plus carrier xtal for 2/half-lattice filter on 461 kc (giving 3 kc bandwidth), in original QCC packing, will throw in matching Electroniques IF transformers, at £10. HC6U crystals: 4/1396·5 kc, 4/1399·4 kc and 4/1399·5 kc, the lot for 60s. Also xtals 7·0 mc, 8·996 mc, 26·626 mc, 26·666 mc, 11·725 mc and 11·6627 mc, all in at 35s. Two new 813's, with bases, 70s. Two matching mains-check moving iron meters, 3½in. diameter, reading 0-30 amps and 0-300 volts AC 40s. the pair. An Eddystone Type 898 dial, 50s. Transformers: 6·3v. at 12 amps. twice, 40s.; Gresham potted oil-filled 410-0-410v. 1300 mA 6·4-0-6·4v. 8 amps, 5·1-0-5·1v. 7 amps., price 60s. another, rated 0-80v. 40 mA, 0-300v. 520 mA, 6·45v. 16 amps, 6·45v. 6·5 amps, 40s. And a Heathkit RG-1 receiver, in mint condition, at £25. All letters answered. — James, 109 Windermere Drive, Worcester.

SALE: AR88D, £28. Also an Eddystone S.740 with two-metre converter, transmitter and rotary Yagi suitable for loft installation, at £25.—Henson, 11 Potters Croft, Horsham, Sussex.

FOR SALE: An Eddystone EC-10, in mint condition and only two months old, price £36.—Bradley, 6 Linden Grove, Folkestone Street, Beverley Road, Hull, Yorkshire.

SALE: Eddystone S.640, in excellent condition, price £20. Call evenings only, or write.—Carter, 9 Gibbs Close, Cheshunt, Hertfordshire.

SMALL ADVERTISEMENTS, READERS—*continued*

I AM Selling The Actual CR-100 as featured in the August issue of the Magazine in the article "Souping Up The CR-100." First cheque for £20 gets it.—Gray, 25 Milbank Road, Darlington (5301), Co. Durham.

DISPOSING: TW-4 Transmitter, £16. TW-4 receiving converter, 2·1 to 2·7 mc IF, £8. KW-2000 mains PSU, £20. New and boxed Mullard QQV03,-20A, 30s. Three new 6GJ5's, boxed, 10s. each. Set of Labgear wide-band couplers, 10-160m., 20s. FT-243 type crystals for 7200, 7250, 7275 and 7300 kc, 7s. 6d. each. Hy-Gain mobile whip mount, 25s. Avo C/R Bridge, £5. 12v./350v. Aveley Toroid, 30s. Three-element 4-metre J-Beams, one new, at 40s., one used 20s. Issues "CQ," 1961-'62; "QST," 1961-'62-'63; "Short Wave Magazine," 1961-'62-'63, all at 7s. 6d. per year. Carriage extra.—Meaden, G3BHT, 14 Aulton Road, Sutton Coldfield, Warwickshire. (Tel. 021-308 4764).

INSERTIONS in this space are charged at 3d. a word, with a minimum of 5s., which allows 20 words including QTH. Even if your adv. only counts up to 15 words, it still costs 5s. Bold face (like this) is 25% extra, making it 6s. 3d. if you are up to or within the 20 words minimum. Advertising in these columns, through which £1000's worth of equipment changes hands each month, guarantees that your sales-exchange-wants are given the widest possible coverage in the U.K. radio amateur field. We carry more paid small advertising than any other radio periodical circulating in this country. We do not give space away but we use what we have as economically as possible. Draft your advertisement carefully, to convey the most meaning in the fewest words. If you wish, send in your adv. with a blank cheque (endorsed "not more than £2," or whatever) and you can leave it to us to charge you the minimum for an attractive presentation. With our hands on our hearts.—The Small Advertisement Department, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Eddystone S.504 receiver, professionally rebuilt, cabinet in grey-hammer finish, in first-class condition throughout, asking £28 or offer?—Ring 656 9882, after 8 0 p.m.

FOR SALE: Solartron PSU Type AS-517, 250-300v. at 100 mA fixed, + 6·3v., £4. Also Solartron PSU Type 776, 500v. at 200 mA variable, 6·3v. AC, £12 10s. Solartron Oscilloscope CD.568, £20. Avo C/R Test Bridge, £6 10s. Stack table, 20s.—G3OUX, QTHR. Tel. Crawley 23890.

SALE: In mint condition, a KW-2000A with AC/PSU. Will start the haggle at £170, or take KW-77 or Drake-2B in part exchange. (Notts.)—Box No. 4577, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Eddystone 840C, complete with original packing case, price £40.—Ring Kosidowski, 01-542 2760, 8-10 p.m., ask for Flat G.

REQUIRED: AR88D with manual and tools, or an HRO. Excellent condition essential. Will consider other offers, and all letters answered.—Pryse, G3WXT, 36 Hart Road, Byfleet, Weybridge, Surrey.

OFFERING: Heathkit RA-1 amateur-band receiver, in FB condition, at £33 or near?—Merriman, G3SIP, Peddars Way, Clipstone-on-the-Wolds, Nr. Plumtree, Notts.

SALE: Lafayette HA-230 (factory-built version KT-340), little used, in original carton, with manual, £20 or near offer?—HF-1012 speaker, as new, 20s.—Taylor, 45 Greenfield Road, Brunton Park, Newcastle-on-Tyne 3, Northumberland.

FOR SALE: Trio 9R-59 receiver with Codar PR-30X preselector, in FB condition and giving first-class performance on all bands. £30 complete with headphones.—Kyle, 59 Bathurst Walk, Iver, Bucks. (Ring Iver 963 evenings, or Staines 55281 day.)

SELLING: Eddystone S.640 Rx, tunes 1·6 to 30 mc, in good condition and recently serviced, price £15 or near offer? Prefer buyer to collect.—Lloyd, 70 Heath Drive, Ware, Herts.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Codar CR-45 receiver, mint condition, with five coils to cover 10 to 2000 metres, including speaker and headphones, £6. Buyer to collect.—Fryer, 52 Montfort Place, Princes Way, Wimbledon, London, S.W.19.

FOR SALE: National HRO, grey hammer finish, with PSU and GC coils for 1·7 to 30 mc, also BS for 10m. and 20m., in case, professionally realigned, including black speaker plinth, superb Rx at £30 or near offer?—Miller, 56 Queens Road, Chelmsford, Essex.

SELLING: Hudson mains-operated radiotelephone base station, with Rx, Tx and PSU in one smart table-top cabinet, p-t-t operated, running 8w. AM on one xtal frequency in range 70 to 170 mc. Receiver has built-in speaker, with volume and squelch controls. Facilities for remote operation using handset or mic./LS control. Easily converted to multi-channel operation. Includes new QQV03-10 PA valve, manual, crystals near 4-metre band and all plugs, etc. Price £15 only. Prefer buyer inspects and collects, or carriage extra.—Adamson, Woodend, Victoria Road, Kingsdown (288), Deal, Kent.

FOR SALE: Collins 30L-1 linear amplifier, £150. Mosley A.315 beam, 3-element for 21 mc band, £10. Hy-Gain balun for Tri-Band beam, new in carton, 80s. Ham-M rotor, perfect condition, with indicator, £50. AR88D, with S-meter, manual, speaker and spare set valves £35. Offers invited for following: Xtals 1782·5 kc, 8006·667 kc, 8025 kc, 8027 kc, all perfect in holders; pair 805's and 6/866A's; two Advance aerial relays, DPDT, for 115v. AC operation.—Edwards, G3DO, 33 Ladywood Road, Sutton Coldfield, Warwickshire.

SALE: KW-2000, with PSU and set of spare valves, £127 or near offer? (North Yorkshire).—Mrs. Frances Woolley, G3LWY, QTHR, Tel. Wigan 41774.

SWL Aspiring to own Ocean-Going Yacht must sell existing equipment to raise finance. Any sensible offers considered. send s.a.e. for list of more than 30 items. including—Eddystone EA-12 Rx, 18 months old, asking £150; Lafayette A1/A3 5-band transmitter, £25; T.W. nuvistor two-metre converter, 28-30 mc IF. £8; Pye VHF Tx, £8; Pye VHF Rx, £4; Reflectometer, 0-10w. and 0-120w., Taylor meter, £5; Hi-Fi 25w. amplifier, complete with AT6 turntable and Goodmans Axiom 301 speaker in (rough) cabinet, £45; Radio Control model equipment, such as Merco 35 and 61 engines at £3 and £8. servo's, etc.; Hornby Dublo scenic layout with three locos., etc.. £15: shack-to-house telephone link (standard GPO pattern). £6. For reason stated I wish to convert my investment in Amateur Radio into cash. I have lots of odds-'n-ends. All must be cleared, and I will be pleased to hear from anyone interested.—Robinson, 7 Stone Row, Wortley Road, Deepcar, Nr. Sheffield, Yorks.

FOR SALE: R.C.A. AR88 receiver, in excellent condition, price £35, will deliver to 50 miles. Also Miniciter exciter unit, as new, £6.—Lord. G3PHN, Newfield House, Moira, Burton-on-Trent, Staffs. (Tel. Swadlincote 7537.)

SELLING: Heathkit SB-200 linear amplifier, in perfect condition, £75 or near offer?—Kenrick, G3RDW, QTHR, Tel. 021 STR 7427.

GOING QRT: Elizabethan Tx, 150 watts AM/CW/FM. covering 10-80 metres with pi-output, fully metered and relay controlled. also Mosley Tri-Band beam, 20ft. dural mast. HRO receiver, etc., etc. Seen working, price £47. Write or phone.—Nield, G3GOA, 9 Prime Close, Walberton. Arundel, Sussex. (Tel. Yapton 369.)

SALE: R.209 Rx Mk. II (12v. version), covering 2·0 to 20 mc, perfect condition. with spare valves and vibrator, price £12. Thirty-foot portable mast, with whip end. in canvas carrying case, unused. 60s. Alternator, 1500 r.p.m. 240/1/50 300 watts, separate excitation (about 20v. required), unused. price £10. Buyer collects or pays carriage.—Farquharson, G4IK, QTHR, Tel. Winsham (Somerset) 295.

SMALL ADVERTISEMENTS. READERS—*continued*

SALE: Eddystone 770R receiver, just overhauled and recalibrated, bargain at £65, buyer collects. —Ring Hunt, Walton-on-Thames 21842 after 7.0 p.m.

OFFERING, for a mere £85, a K.W. Viceroy Mk. II SSB transmitter, in immaculate condition. Please write. — Clemmetsen G3VZJ, 19 Hillfield Road, London, N.W.6.

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