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FOR THE EXPERIMENTER AND THE RADIO ENGINEER

The SHORT-WAVE Magazine

EDITORIAL

Harmonics

The remarks in this space in May have brought an interesting correspondence showing that in some parts of the country the advent of TV is causing some extraordinary—not to say ridiculous—local interference difficulties.

In the Brighton area, for instance, where the BBC has established a TV booster station (Truleigh Hill) to improve reception, receivers tuned to this new station interfere with older sets already working on Alexandra Palace direct! The reason is, of course, radiation from the local oscillators of the Truleigh Hill receivers. Interference from this cause has been proved at distances up to 400 yards—so one can imagine the chances of getting, in the Brighton area, vision signals from A.P. on an old receiver when a new set for T.H. is installed next door!

It is astonishing that such a situation should have been allowed, officially, to develop: apparently, the possibility, if not the certainty, of mutual interference of this kind was never foreseen when the Truleigh Hill project was conceived. The only remedy officially offered to afflicted A.P. viewers is that they buy themselves a T.H. converter at a cost of eleven guineas.

As the interim and long-term programme of the BBC for increasing TV coverage develops, so difficulties due to interference of this sort will arise in other parts of the country—to say nothing of the complications to be expected if commercial TV ever becomes a reality. The first move in any such interference problem will be to round on the local amateurs, who will themselves be plagued (on the VHF bands) by harmonic squeaks and chirps from the unshielded and free-running oscillators of near-by TV receivers.

The fact is that these complicated harmonic relationships, which now demand a high standard of TVI-proofing in TV receivers themselves, so widen the possibilities of mutual interference that the degree and extent of the TVI caused by amateur transmitters has already become insignificant and relatively unimportant.

Austin Forbes G6FO.

Simplified Communications Receiver

DESIGN AND CONSTRUCTION FOR GENERAL COVERAGE AND FOUR BANDS, INCORPORATING ALL ESSENTIAL REFINEMENTS

W. N. STEVENS (G3AKA)

The receiver fully described in this article shows how, by using a commercially available switched coil pack, a gooa general-purpose design in the communications category can easily be constructed. Such a receiver is capable of giving a performance comparable with many commercial and ex-Service types now in regular operation. The design as discussed here is not claimed to be "communications" in the strict sense, but it does incorporate all those refinements normally considered desirable, as well as a few not found on several commercial receivers. Our contributor has used throughout parts that are readily available and the model, as described and illustrated, has performed very well on test under practical operating conditions.—Editor.

TAKING advantage of the poor general conditions, it was decided to proceed with several of the constructional jobs which had been in the pending tray for some time. One of the most important of these was the construction of a good stand-by receiver; one which would be available in case of breakdown and which would not disgrace itself when pressed into service.

The job was further given priority as a result of discussions on the subject of home-built communications receivers. Two of the objections voiced against the practice of "rolling your own" were (*a*) Time, and (*b*) Cost. Both cases have, in the writer's opinion, been if not demolished at least sadly mauled. The actual time spent on the receiver (discounting some last minute modifications) was around 40 hours. That is to say, anyone wishing to construct the receiver from the finished circuit should be able to do so in that time, which is not excessive. As to cost, the only luxury is the coil pack—all other parts are standard components of the type most amateurs can lay their hands on in the spares cupboard or can purchase cheaply. Valves are all common octal types, and the IFT's are standard.

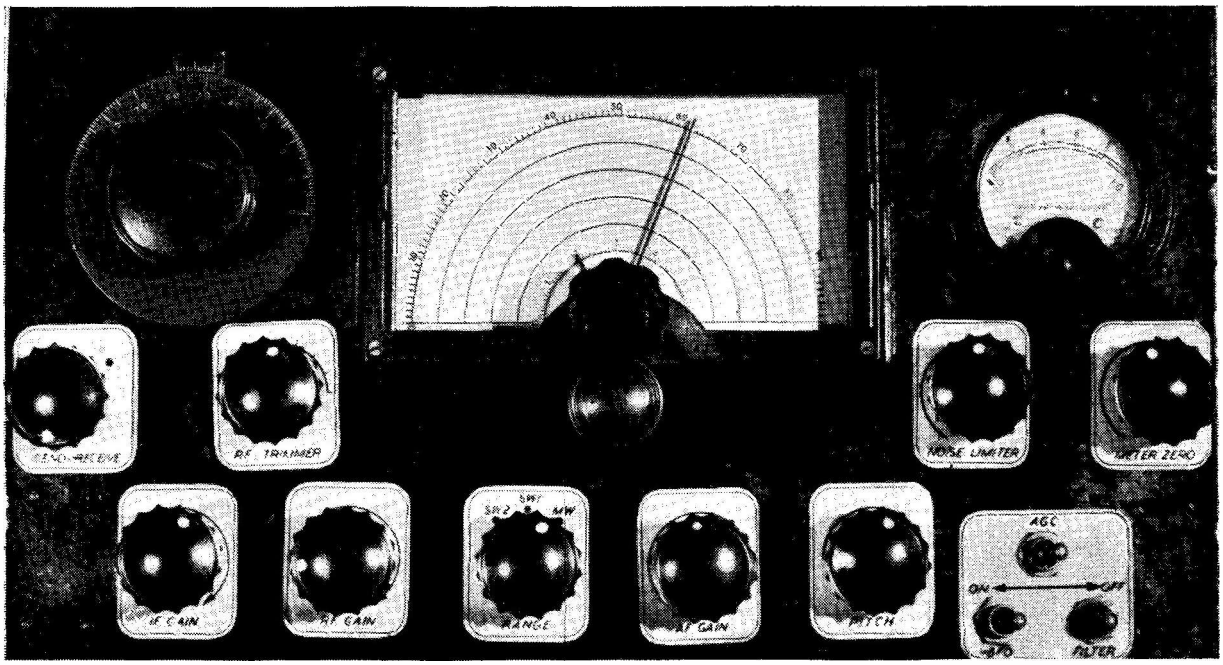
There were criticisms, naturally, but the writer contends that he achieved what was intended—the inexpensive and quick construction of a communications receiver to suit particular needs. These included: (1) Good sensitivity, (2) Good selectivity, (3) Coverage down to 21 mc and of the full medium wave broadcast band, and (4) The obvious requirements such as stability, CW reception and so on.

As the receiver was intended as a constructional design for the newcomer, a switched coil pack was considered desirable for obvious reasons. The one chosen is the Osmor unit which gives the following coverage in three ranges: 570-1580 kc, 3-8.8 mc, 7.8-21 mc. One disadvantage is that Top Band is not available which, while not in the least concerning the writer, may be inconvenient for many prospective builders. The answer is, of course, to use an alternative coil pack which *does* cover the band. A converter is to be added to cover the 28 mc band; this will also include 21 mc as performance is not of the highest order and an additional range for 1.8 mc will be provided. All this, however, is to fit in with personal requirements and the actual tuning coverage is best left to individual preference.

The main object of this article is to show that an effective superheterodyne receiver *can* be built quite easily and cheaply. No extravagant claims are put forward in respect of performance, but the finished job has been compared to two well-known communications receivers in the medium price bracket, one American and one British. In both instances it showed itself to be superior. Obviously, it will not out-perform receivers in the AR88 class, but nobody in his senses would expect it to! On the other hand, it will put up a very creditable performance and would be an improvement on many main station receivers now in use.

The Circuit

At least one RF stage was, of course, necessary, to improve signal/noise ratio and selectivity. To simplify tuning arrangements, only one stage was provided. In this position, the best valve on hand was the 6AC7 (V1 in the



Front view of the simplified general-purpose communications receiver, showing panel layout — see Fig. 3. The short wave coverage is 3.0 to 21 mc in two switched bands, and the receiver has such useful refinements as send-receive switching, RF trimming, noise limiter, S-meter and separate AF, IF and RF gain controls.

circuit) which gives considerable stage gain even on the HF bands. The circuit is conventional and a manual RF gain control is fitted in the cathode circuit (VR1). The tuned circuit arrangements may be of interest to prospective users of the Osmor unit. On the medium wave range, bottom-end coupling is used whereby the input signal develops voltages across the impedance of Ca and as this is also in the grid circuit coupling is achieved by this common impedance. On the short wave ranges, conventional HF transformer coupling is used—the impedance being so small on the higher frequencies that no coupling takes place *via* the "bottom end."

Although by no means ideal, the frequency changer is a 6K8 triode-hexode. But pursuing the object of simplicity, a separate oscillator was not chosen; in actual fact, the triode-hexode is not *that* undesirable if care in circuit details is taken. The oscillator anode supply should be extremely well regulated for best results and the hexode screen voltage is quite critical for maximum conversion. For the 6K8, both these voltages are 100v. These have been fed, through their appropriate dropping resistors, to a stabilised supply of 120 volts. For further stability, the anode circuit of the mixer has its own decoupling components as do the following IF amplifiers. This is a great help in achieving freedom from inter-stage couplings *via* the supply line.

It will be noted that AVC is fed to the mixer stage only on the medium wave range. Also, the standard padder condensers provide bottom-end coupling on the medium wave range, transformer coupling being used on the short wave ranges. The components Ca, Cb, Cc, Cd, Ce, Cf are all fitted to the coil pack. Connections to the Osmor unit are shown clearly (being identical to those on the maker's data sheet) so that alternative arrangements can be easily made if required.

The IF Amplifiers

Although double conversion is desirable in the ideal receiver this was ruled out for reasons already mentioned. However, by using two IF amplifiers at the standard 465 kc frequency, a great improvement in selectivity (not to mention a useful increase in gain) can be achieved and was felt to be worth-while as the only extra parts required were a pentode valve and one IF transformer, plus a few resistors and condensers.

Further to assist in the aim of improved selectivity, the first IF amplifier (V3, 6AC7) was made regenerative. This is achieved by

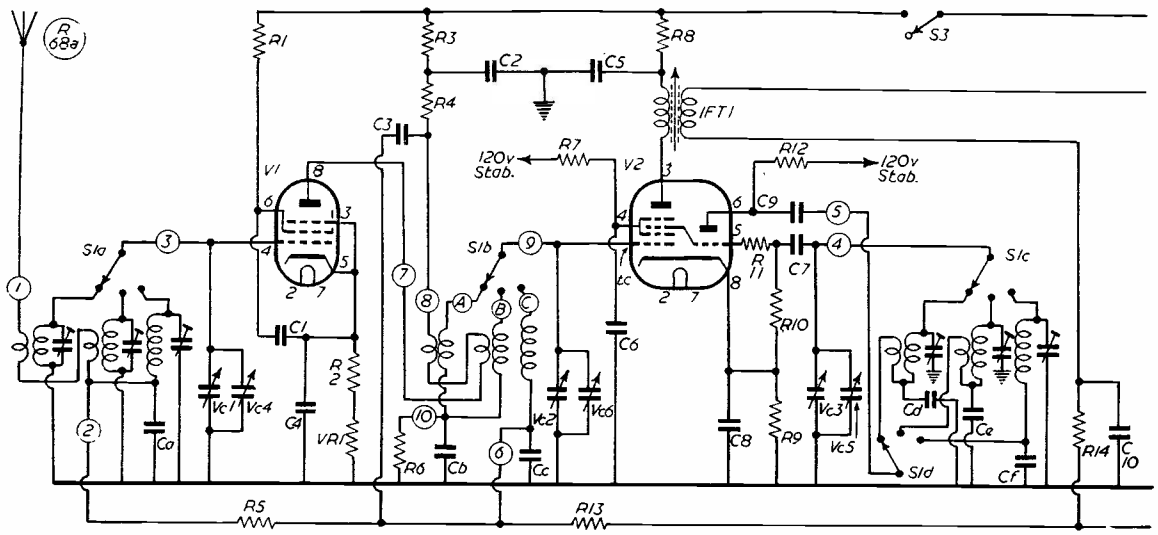


Fig. 1. Circuit complete of the receiver designed and described by G3AKA in the accompanying article. An Osmor switched coil pack gives convenient coverage of the amateur bands 3.5 to 21 mc, and band-spread tuning is fitted for close searching over these ranges. The circuit is quite conventional, but there are a number of added refinements to make the receiver suitable for amateur band working. *See facing page for continuation.*

Table of Values

Fig. 1. Circuit of the Simplified Communications Receiver

Resistors

R1 = 68,000 ohms.
R2, 9, 18, 23, 48 = 330 ohms.
R3, 8, 16, 24, 46 = 4,700 ohms, 1 watt.
R4 = 6,800 ohms.
R5, 13, 14, 20, 33 = 270,000 ohms, ½ watt.
R6, 47, 50 = 1 Megohm, ½ watt.
R7 = 3,300 ohms.
R10, 32, 45 = 47,000 ohms.
R11 = 33 ohms, ½ watt.
R12 = 4,700 ohms.
R15, 17, 21, 22 = 47,000 ohms, 1 watt.
R19, 26, 31 = 68,000 ohms, 1 watt.
R25, 27 = 470 ohms.
R28, 34, 44 = 27,000 ohms, 1 watt.
R29 = 33,000 ohms.
R30, 35 = 100,000 ohms.
R36 = 150,000 ohms.
R37 = 220,000 ohms.
R38, 39, 42 = 470,000 ohms.
R40, 41 = 2,200 ohms.
R43 = 240 ohms, 1 watt.
R31 = 2.2 Meghoms, ½ watt.

(All resistors half-watt unless otherwise stated)

Condensers

C1, 4, 6, 8, 12, 13, 16, 36 = 0.1 μF, paper.
C2, 5, 10, 11, 14, 15, 17, 20, 22, 27, 29, 32, 33 = 0.01 μF mica.
C3 = 500 μμF, mica.
C7, 18, 19, 30 = 100 μμF, mica.
C9, 25 = 150 μμF, mica
C21 = 0.5 μF, paper.
C23 = 8 μF, electrolytic, 350 V wkg.
C25, 26, 28 = 52μF electrolytic, 25 V wkg.
C31 = 20 μμF, ceramic.
C34 = 270 μμF, mica.
C35 = 0.001 μF, mica.

Variable Condensers

Vc1, Vc2, Vc3 = Three-gang variable, 450 μμF swing.
Vc4, Vc5 = Two gang variable, 20 μμF per section.
Vc6 = Midget air-spaced variable, 50 μμF.
Vc7 = Midget air-spaced variable, 120 μμF.
Vc8 = Midget air-spaced variable, 10 μμF.
Ct1, Ct2 = Compression type trimmers.
Cx = Approximately 2 μμF (*see text*).

Variable Resistors

VR1 = 10,000 ohms, wirewound.
VR2 = 10,000 ohms, wirewound.
VR3 = 1,000 ohms, wirewound.
VR4 = 10,000 ohms, wirewound.
VR5 = 200,000 ohms, carbon.
VR6 = 10,000 ohms. wirewound.

Valves

V1	6AC7 (or 6AG7).	V5	6SN7.
V2	6K8.	V6	6SL7.
V3	6AC7 (or 6AG7, or 6SG7).	V7	6V6.
V4	6K7.	V8	6J5.
		V9	6SN7.

Switches

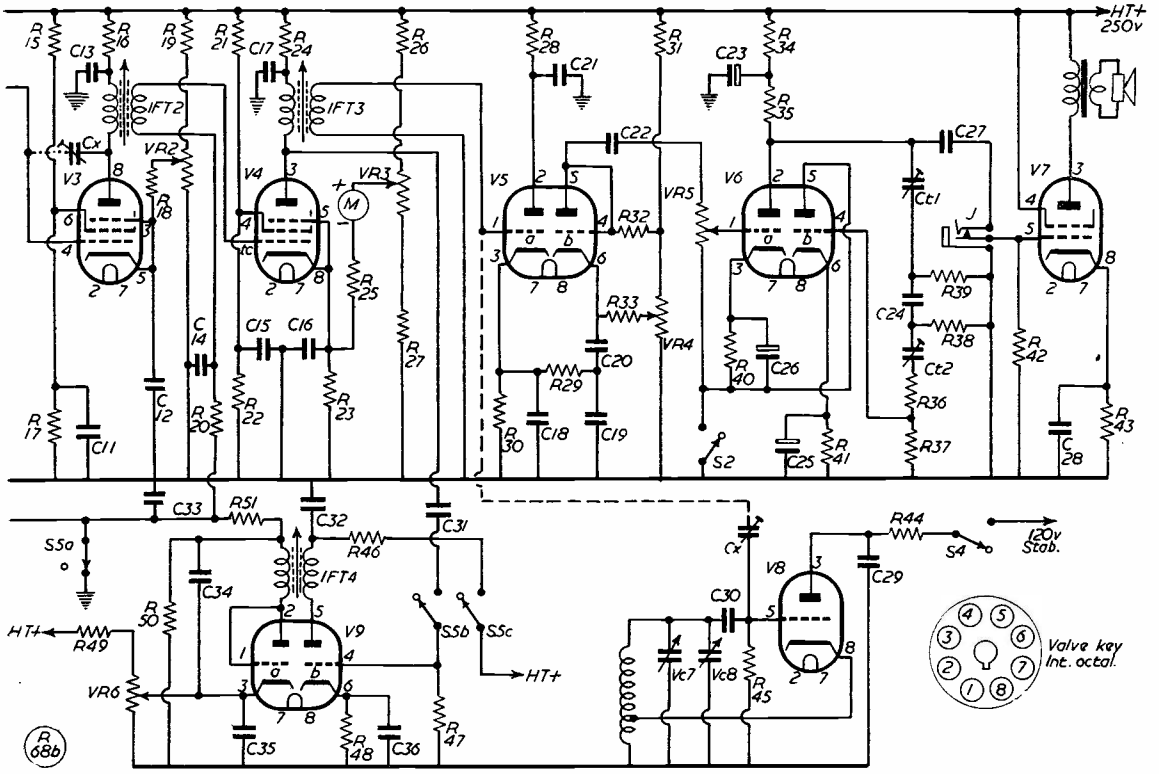
S1 Range switch supplied with coil pack.
S2 SPST toggle switch.
S3 SPST toggle switch.
S4 SPST toggle switch.
S5 DP C/O toggle switch.

Miscellaneous

IFT1, 2, 3, 4 = 465 kc IF transformers, preferably permeability tuned.
M = 0-1 mA moving coil meter.
Ca-Cf = Padding condensers already assembled on coil pack.

introducing a small amount of feedback between anode and grid, manual control being adjustable by VR2, part of a potential divider across the cathode. With the control set just below the point of oscillation the selectivity (and gain) is at its highest, and with careful adjustment some would say that it can be made comparable to that obtained with a simple crystal filter.

The second IF amplifier is a conventional arrangement with a forward-reading S-meter in the cathode circuit.



Second Detector and Noise Limiter

The second detector is in the infinite impedance circuit, the advantages of which are well known. It is more linear than the typical diode detector and moreover has the important advantage of imposing negligible damping on the preceding tuned circuit, IFT3. The consequence is a great improvement in selectivity at this point and less attenuation of high frequencies. The anode is by-passed for RF and AF by means of the filter R28/C21. The load resistor R30, being common to grid and anode circuits, provides negative feedback at AF. C18, C19 and R29 form an RF filter, the remaining audio voltages being fed to the following stage *via* C20.

Since a triode is used for the second detector, it was convenient to have a 6SN7 in this position, using the second triode as a series-type noise limiter. Domestic and car ignition interference is not a pressing problem at the writer's QTH and the simple type of noise limiter shown was found adequate. It uses the well-known system of a diode with adjustable positive cathode bias. Cut-off point, *i.e.*, when the cathode is swung positive in regard to the anode, is determined by the setting of VR4 which is brought out as a manually operated panel control. It provides good limiting action for high amplitude noise pulses, without giving spectacular suppression.

The Audio Stages

The audio output from V5 feeds into a 6SL7, the first half of which is the 1st AF amplifier. The second half of the valve is arranged as a simple AF filter, a device greatly to be desired under certain CW reception conditions. The circuit (which is due to G6DH) operates in the following manner:

In the "off" position S2 grounds the cathode and grid returns of V6a and it functions as a normal audio amplifier. In the "on" position, the cathode and grid returns are switched in series with the second triode V6b and appreciable regeneration takes place. If part of the R/C network between the grid of V6b and the anode of V6a is made variable, the time constants can be adjusted so that attenuation affects all frequencies except those within a small band at 1,000 cycles. In practice the two trimmers Ct1 and Ct2 are pre-set to give the desired effect, which is to give improved selectivity for CW reception and attenuation of extraneous noise.

The output stage is a conventional tetrode arrangement using a 6V6. Loudspeaker output is off the 6V6 and high-impedance headphone output is off the first AF stage.

AGC and the BFO

An electron-coupled oscillator of normal design is used for the BFO (V8). Injection to the second detector is taken from the oscillator grid, the anode being by-passed to ground. The supply voltage is taken from a stabilised source.

The provision of AGC was made difficult by the use of an infinite impedance detector. Taking the AGC feed from the grid of the detector in a normal diode arrangement would have imposed considerable damping and thus cancelled the advantages gained by the use of a high resistance detector. There was also the question of AGC application for CW reception. Eventually it was decided that the added complication of amplified AGC would be advantageous from many points of view.

Another 6SN7 was pressed into service, one half acting as a triode IF amplifier and the second as a diode AGC rectifier. The diode has a potential divider network in the cathode circuit, one arm of which (VR6) is variable. The setting of this potentiometer determines the delay voltage and it can be preset according to the amount of control required. With complete screening of the BFO unit, good AGC action is possible on both phone and CW.

Power Supplies

Power requirements of the receiver are 250 volts at 120 mA, 6.3 v. at 4 A, plus a stabilised supply of 120 volts. The original receiver is powered by a supply incorporating several stabilised outputs. Alternative arrangements can easily be made by fitting a regulator tube on the receiver chassis to take care of the stabilised voltage required for the mixer and BFO stages.

Construction

Details of construction can be seen from the photographs and layout diagrams. The receiver is built comfortably into a chassis measuring 16 ins. x 10 ins. x $2\frac{1}{2}$ ins., with a panel of 17 ins. x 9 ins.

With the tuning gang mounted in a central position, the valve line-up can follow round it in a more or less logical sequence, as can be seen from Fig. 2. Although not necessarily adding to the actual efficiency, a balanced layout is a pleasing feature providing nothing is sacrificed in the performance.

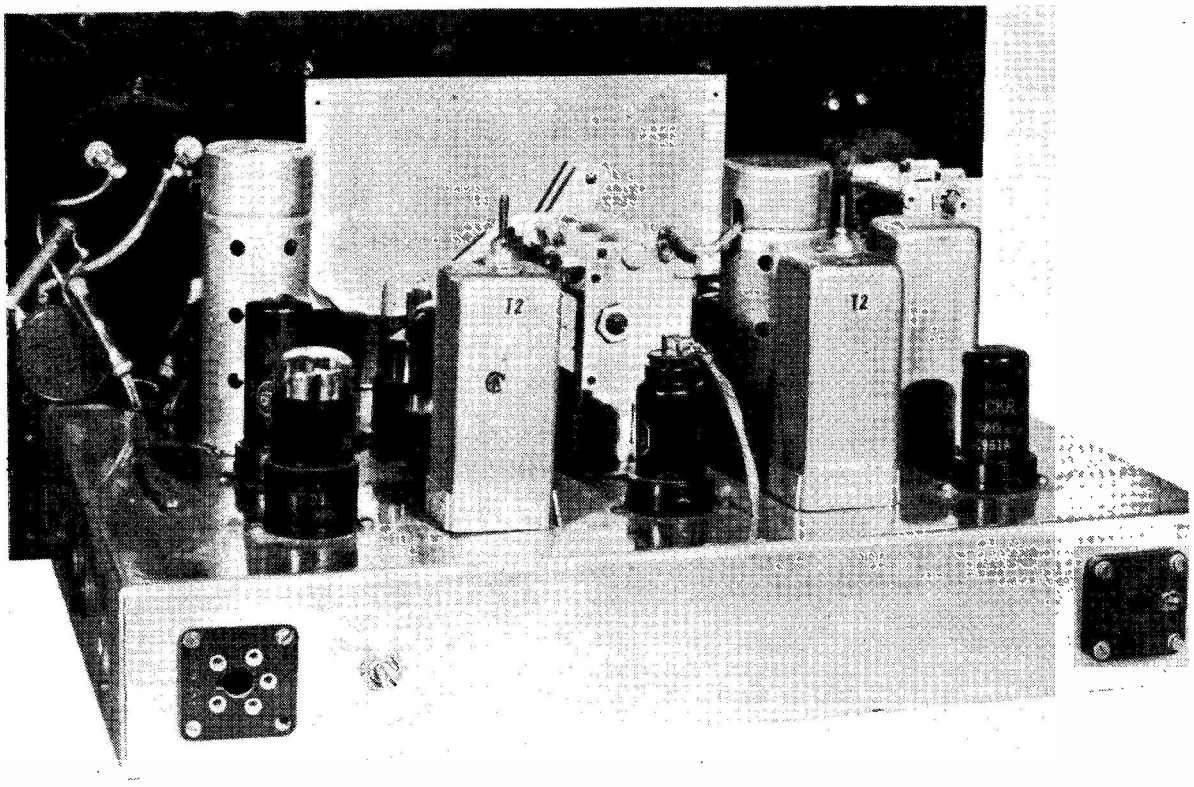
With the coil pack used in the original model a standard 450 $\mu\mu$F swing tuning gang is required and bandspread of some sort becomes necessary when tuning the amateur bands. A normal parallel arrangement is used, the two-gang bandspread variable being mounted on a bracket and fitted with an Eddystone slow motion drive assembly. The main tuning drive used is a two-speed affair marketed by Jackson Bros. (" Caliband "). Readers who use this drive on this or any other piece of equipment may be interested to hear how the control action can be vastly improved. The original unit is fitted with a small knob for the upper (or low reduction) spindle and a larger knob for the lower (or high reduction) drive. In practice it is extremely difficult to rotate the low reduction knob by virtue of its small physical size and the position of it above the larger knob. To get from one end of the tuning range to the other is hard work !

This has been completely overcome by a simple expedient. Remove both knobs and store the smaller one in the spares box—we don't need it. Then replace the larger knob, but fit it to the upper spindle. Next, mount a solid spindle coupler and short length of quarter-inch rod on the lower spindle and fit any sort of large knob to suit. By doing all this, the two knobs are clear of each other (one in front of, and below, the other) and we have a nice easy action instead of a rather cramped affair.

Between the tuning gang and bandspread unit can be seen the inter-stage section of the coil pack, which is supplied separate from the main assembly. It is, of course, wired to the main range switch. The three trimmers associated with this section (also supplied separately) are not used ; instead, a small air-spaced variable is mounted as a panel control which enables the mixer stage to be peaked for optimum whenever necessary. This is quite a useful arrangement and can help a great deal to bring up those weak signals.

The remaining components to be seen above-chassis are the Send/Receive switch (to the left), the S-meter and associated components, and the noise limiter control. The send-receive switch is simply wired in series with the HT positive line as this met the needs of the writer ; other arrangements can be made where direct monitoring on the receiver is required.

Metal valves were used where possible (in the receiver shown they are V1, V3, V4 and V7), but only glass-type valves were available for the frequency changer (V2) and BFO (V8) and so screening cans were needed. Good



Rear-chassis view of the receiver designed and constructed by G3AKA, showing general layout — and see Fig. 2. Octal valves and easily obtainable parts are used throughout. The switchable coil pack is an Osmor unit.

screening of V1, 2, 3, 4 and 8 is highly desirable. Screened wire is used for above-chassis grid circuit leads.

Below Chassis

Under-chassis wiring should not present any major problems, but a certain amount of care is necessary. The disposition of the main components is shown in Fig. 2. To keep wiring short and direct, much of the connections can be made direct to valveholder pins and soldering tags fitted to the valveholder bolts. It was found that five tag strips placed strategically provided most of the remaining anchoring positions required.

Along the front inner face of the under-chassis are disposed most of the controls, but the IF gain control is mounted on a bracket close to the V3 valveholder and fitted with an extension rod, being taken through the chassis and front panel *via* a bushing.

The BFO section is completely screened as it is extremely important that direct or harmonic radiation from the oscillator does not leak into the IF amplifier. An aluminium box, mounted directly over the valveholder encloses *all* the BFO components including the anode by-pass condenser, and the pitch control is mounted on one of the walls of the box. The pre-set control is mounted to enable screwdriver adjustment to be made initially.

The AGC amplifier and associated components are fitted in the back corner of the chassis, with the transformer mounted to the side face of the chassis—adjustment of the trimmers being effected from the " outside " of the chassis. Permeability-tuned transformers are used for the main IF stages and they are more efficient. However, the only spare IFT available for the AGC amplifier was a standard condenser-tuned type and this was used in this position. Along the rear inner face of the chassis are two power plugs of the 5-pin variety. They are wired in parallel so that power can be plugged into one and, if necessary, taken out of the other. This is useful

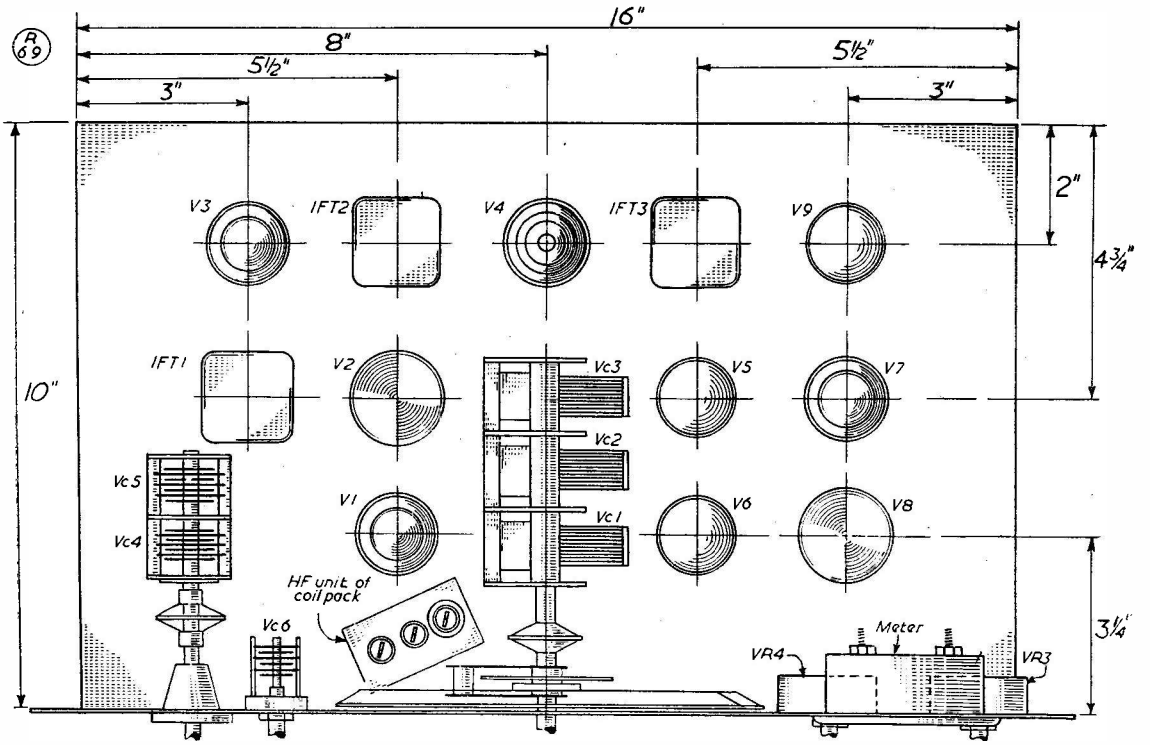


Fig. 2. Chassis layout drawing, showing general arrangement of main components. If a shell this size is used it will be found convenient to follow the layout given.

where the possibility of converters, preamplifiers and so forth is envisaged. The five-pin plug-and-socket arrangement used at the writer's QTH follows a standard coding. In this way power may be supplied to various units from the same (or similar) power packs providing that the input sockets are wired according to the predetermined coding. The advantages of this system are obvious — no more puzzling about how to lay on power for a certain piece of equipment, no more haywire connections " just for the time being " . . .

To the side of the input power socket is the AGC delay control, the tags of which in conjunction with the IFT4 tags anchor all the components for this stage not accommodated on the valveholder itself. And down the side are the two jack sockets for phones or speaker output.

Screened wiring has been kept to a minimum for obvious reasons. Screening does its job, but excessive screened leads results in too much by-passing to chassis in the RF sections. All IF grid leads *must* be screened, as also must AF grid leads. Decoupling condensers must be wired in with very short leads and common earthing points established for each stage. Particular care must be taken in wiring the first IF amplifier V3. Here we are going to introduce *deliberate* feedback—and easy, stable, control action will not be possible if the amplifier is liable to " take off " without a deliberate feedback path.

Leads which pass through the chassis from the V1 and V2 stages to the tuning gang above deck should not be screened. The best method is to drill large clearance holes (say $\frac{3}{8}$ in. diameter) and make the necessary connections in heavy gauge wire, which should also be used for all anode and grid wiring in the oscillator section to reduce lead inductance.

Final Adjustments

A cynic once remarked that when the last solder joint had been made and the last bolt tightened up, you were all set to start work on your superhet. While there is, of course, a grain of truth in this statement, the troubles are largely exaggerated. However, it is certainly true that one cannot expect to get the best out of a superhet without adequate

auxiliary equipment—mainly a reliable signal generator. The cores of commercial coil packs are generally pre-aligned, but need final adjustments in any particular receiver owing to differing circuit capacities and other factors. If a signal generator is not available it is strongly recommended that the cores be left strictly alone. If a generator is to hand (or can be borrowed) the makers supply full instructions for alignment procedure.

The IF transformers are also pre-aligned but will require final adjustment—sometimes slight, sometimes considerable. No amount of twiddling the cores and relying on your ears can peak up the transformers to the degree possible with a generator. However, the S-meter can be used for IF alignment and is very useful in this respect.

The AGC amplifier can be peaked by feeding in a signal from the signal generator and measuring the output across the rectifier load resistor, or noting the effect on the S-meter. An external strong signal can be used successfully in the same way. Once the transformer is peaked the delay control can be adjusted to the level at which AGC action is desired to start. With the very small coupling capacity between the second IF amplifier and the AGC amplifier there should be little detuning effect, but it is well to re-trim IFT3 after the AGC amplifier has been adjusted.

The regeneration action of V3 requires some adjustment. In brief, one aims to introduce sufficient coupling between anode and grid so that the valve oscillates when the potentiometer is about three-quarters in. The capacity required to introduce feedback is very small and can be effected by running a very short length of wire from the grid pin to the vicinity of the anode pin. Half-an-hour of trial and error adjustment can make quite a difference to the performance. If the adjustments have been made correctly it should be possible, practically to eliminate one sideband on phone signals with a pronounced peak on the other sideband.

The BFO circuit needs little adjustment. The trimmer is set to give the required beat note and further pitch control effected from the panel condenser. Coupling to the second detector is made in the usual way—by a small concentric trimmer, or by twisting two insulated leads together.

The audio filter is adjusted by setting the two trimmers to values which give the desired pass-band. With the correct capacities, a CW signal will remain at constant strength with the filter on or off, but it will have a "cleaner" sound as the extraneous noises are attenuated.

The S-meter may need slight modifications to obtain satisfactory action. If the sensitivity is too high or too low it can be varied by altering the value of R33. To obtain proper zero settings consistent with sensitivity it may

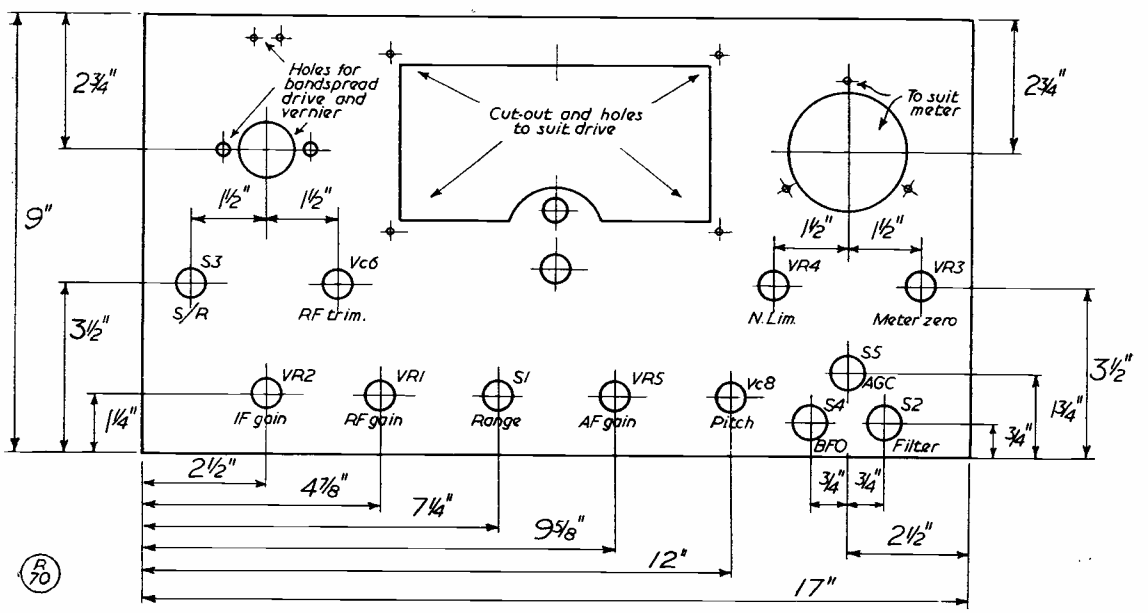
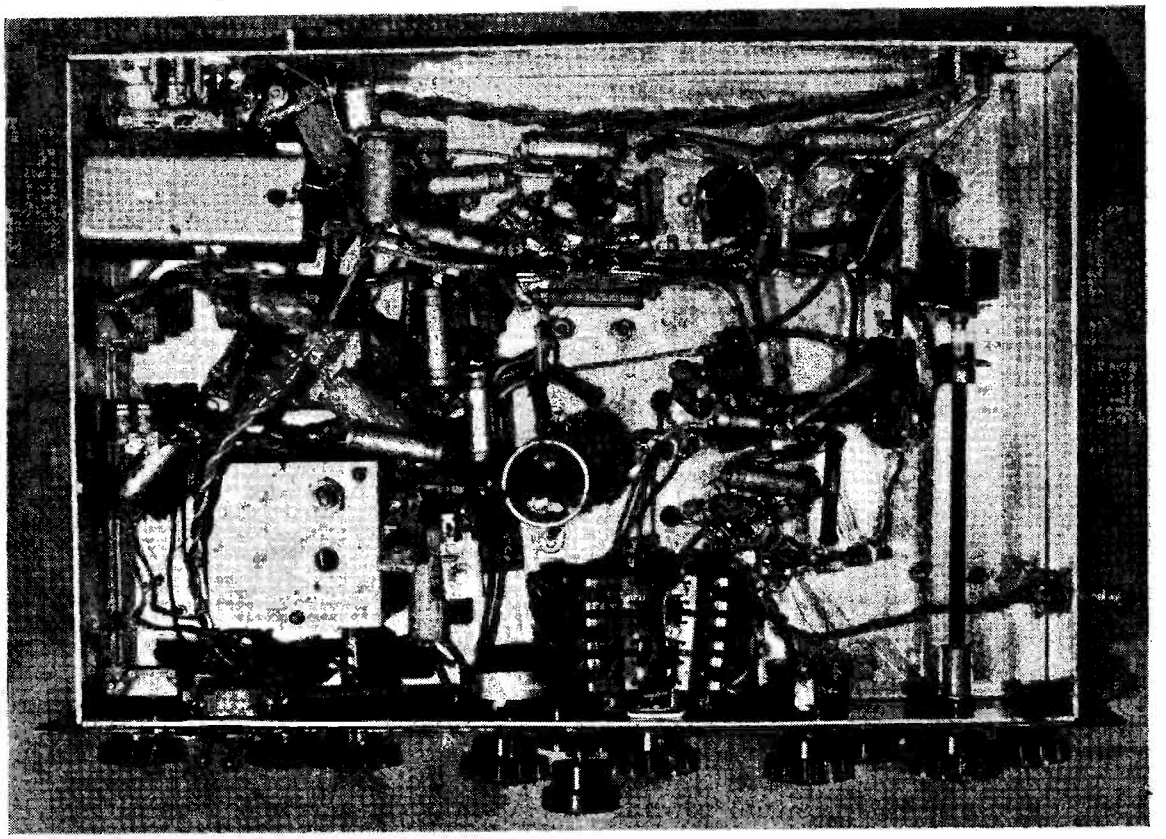


Fig. 3. Details for panel drilling, to match up the chassis layout shown in Fig. 2.



Layout under-chassis of the G3AKA receiver. All necessary constructional details are given in the article and it can be said that a receiver built to this specification will be an adequate performer on four amateur bands.

also be necessary to experiment with various values for R24 and R25. When using the S-meter it should be realised that readings will vary according to the setting of the IF and RF gain controls. Therefore, normal zero adjustment should be made at predetermined setting of the gain controls under average reception conditions to enable comparisons to be made day by day.

It will be noticed that no tone control is fitted. Two reasons dictated this : (1) The receiver will be used mainly for CW reception and plenty of " top " is required ; and (2) No room could be found on the panel for the control ! There is no reason why a standard top-cut control should not be installed by those who find it desirable. If the slight inconvenience can be tolerated, the control could be fitted on the side of the chassis next to the output jack sockets.

Final Comments

Although stress has been laid on the fact that the receiver had economy in cost as one of its objects, one should not be cheeseparing in regard to components. That is to say, in a high-gain receiver of this type small defects can have alarming consequences. As an instance: On test it was found that the AGC action was not satisfactory. The trouble was found to be due to defective AGC filter condensers. These were " surplus " components, but were brand new and unused and looked in the same pristine state as any proprietary condensers " straight off the shelf." On test, however, they showed a heavy leakage. Their companions, still unused, were submitted to the leakage tester and showed the same defect. Luckily, all other decoupling condensers in the receiver were above reproach, but if they too had been of the same type one shudders to think of the consequences !

Use economy by all means, but take care it does not turn out to be double edged.

There is really little more to say, but as the

receiver is one intended for the newcomer perhaps it is well to mention that the final results of any home-constructed receiver depends largely on the merit of the mechanical details. A neat wiring layout is certainly pleasing to the eye, but it does not *necessarily* indicate electrical efficiency. The components should be wired with due appreciation of the circuit details and what they imply. Another point is that no two receivers built from the same design will give an identical performance. One reason has already been stated (the engineering of the receiver), but component tolerances must be taken into account. If one wishes to get the utmost from such a receiver it may be necessary to experiment with various resistors and so forth, until the optimum is reached.

There is no short cut to efficiency. One must be prepared to take time to get everything "on the beam." As already briefly mentioned, the prototype has proved to be up to the writer's requirements. It might be mentioned that tests have also been made in comparison with other receivers in the district with the home-built job running off a short indoor wire and the commercial receivers from, respectively, a 14 mc dipole and a 66 ft. end fed—both high and clear outside wires. Results in both cases show a performance quite as good.

A simple Pi-coupler is used as an aerial tuning device on the HF bands and this is certainly a great asset, bringing up signals a good couple of S-points. The receiver should be operated, whenever possible, with the RF gain at maximum as this improves the signal/noise ratio. The IF gain control (which also affects selectivity) should be set to a level depending on reception conditions and the type of signal being received. The IF and RF controls should also be well advanced when AGC is in use as this ensures maximum control action.

There is another aspect to be touched upon. Whether a home-built receiver is worse, the same, or better than its commercial counterpart there is no doubt that there is a great satisfaction in the knowledge that its "all my own work."

Panda PR-120-V Transmitter

SELF-CONTAINED ALL-BAND TABLE TOPPER

STAFF TEST REPORT

IT is now well over a year since the first Panda Table-Top Transmitter was placed on sale, and we have recently had the opportunity of making an extensive "on-the-air" trial of the newest model, which has sundry advantages over its predecessors.

The latest PR-120-V is indeed an improvement on the early productions, chiefly in matters of detail—but important detail, such as VFO stability and keying characteristics.

More and more amateurs are turning to the self-contained table-topper style of design, largely because it is far easier to make such a transmitter really TVI-proof; and this style has practically everything in its favour. The only disadvantage that springs to mind, in fact, is that it is probably more difficult to service than an open rack-and-panel arrangement. Against this must be set the advantages of compactness, tidiness, dust-proofing, appearance, and, most of all, the complete screening *in one unit* of everything, including power supply.

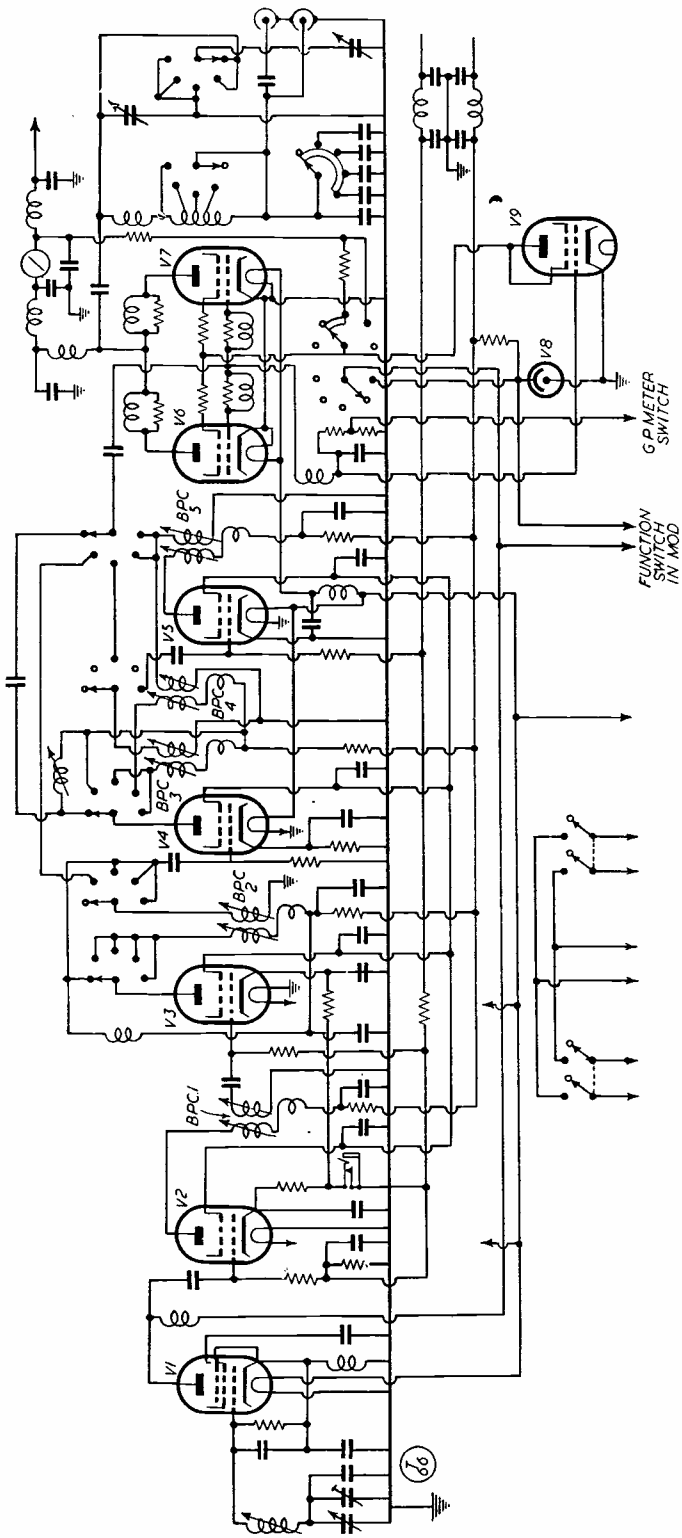
Thus it was logical that the Panda transmitter, based on a well-known TVI-proof design, should be all built "under one roof"—and a very successful policy it has proved.

Layout

Inside a steel cabinet of generous size (21 ins. wide, 18½ ins. deep and 13½ ins. high) are two separate chassis—the power pack and the transmitter proper. The latter is divided into two assemblies, one comprising the modulator and the other the exciter and PA stage.

The power pack is firmly secured to the cabinet with bolts, but the main transmitter chassis slides out forward after the removal of the eight bolts holding the front panel in position. Servicing, if necessary, is thus a matter of no great difficulty.

The PA stage is completely screened in a copper-plated box, with a "meat-safe" section immediately above the two 807's for ventilation. This is removed for the purposes of the photograph which shows the 807's and part of the tank coil.



Skeleton circuit of the RF section of the Panda transmitter. V1 is the VFO, using an EF50 and BPC1-BPC5 are wide-band coupler units. Intermediate stages are 6V6's—screen HT feed not shown — and the PA a pair of 807's.

In the same photograph may be seen the small cast box which houses all the VFO components except the EF50 valve, mounted externally on the top of the box.

Three plug assemblies connect the transmitter chassis to the power pack, which need not be withdrawn from the cabinet when work is being carried out on the transmitter proper.

Circuitry

The VFO consists of an EF50 in a Clapp oscillator circuit; this is directly coupled to the 6V6 buffer, the output of which (like that of the oscillator) is in the 3.5 mc band. By means of broad-band couplers and the usual switching scheme, this output may either be applied through one further stage to the PA, or, by means of doubling and trebling, is converted to 7, 14, 21 or 28 mc before arriving at the PA grids.

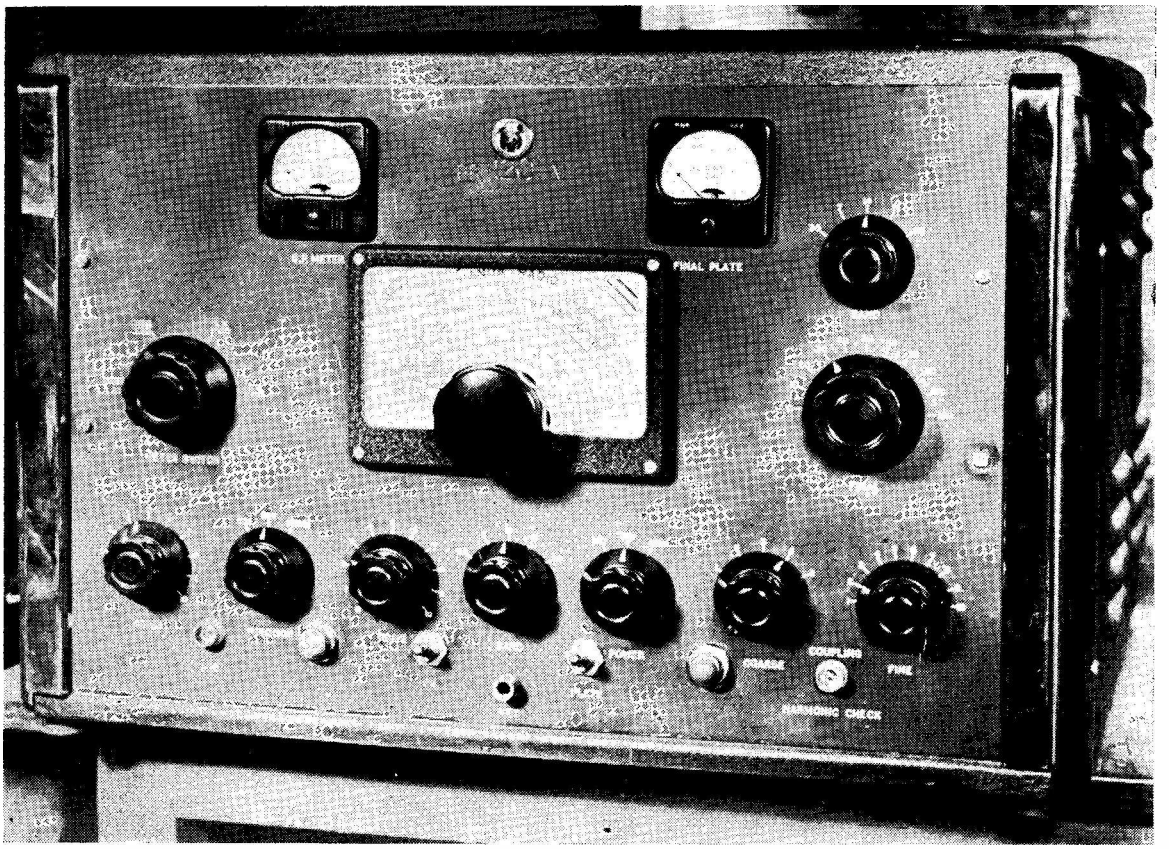
All four valves in the exciter, after the EF50 oscillator, are metal 6V6's. The third of these four valves is so arranged that it will double (to drive the PA on 14 mc), or treble (to drive on 21 mc), or, of course, it may finally be switched, as a doubler, to the fourth valve, which doubles again to 28 mc and then feeds the PA at that frequency.

These bands are selected on a switch immediately below the VFO tuning knob; the PA band-switch (top right) selects the necessary tap on the Pi-section tank circuit. Output coupling from the latter to the aerial tuning unit (external) is controlled by the two knobs at the lower right-hand end of the panel, one giving coarse and the other fine adjustment, by means of four fixed condensers and one variable.

Two meters are provided; one always reads PA anode current and the other is a multi-purpose meter, switched to read (*a*) PA grid drive; (*b*) Modulator anode current; (*c*) Low voltage HT; and (*d*) High voltage HT. A "QRP switch" is also provided, which reduces the screen volts on the PA and makes it possible to tune the latter without risk of overloading through excessively tight coupling or an off-resonance adjustment held too long.

A third position on the same switch, labelled "Net," allows the VFO and buffer-doublers to be tuned up, with no HT on the PA.

The modulator is perfectly conventional, using two double-triodes between the crystal microphone and the two 807's in Class-AB2. The first valve is a 6SL7GT, used as a two-



Front panel appearance of the Panda PR-120-V, which is self-contained for CW/Phone operation on all bands 28-3.5 mc, is fully TVI-proofed, and fitted with an exceptionally stable VFO. Most of the controls can be identified in this photograph.

stage voltage amplifier, and the second a 6SN7GT with its two sections in parallel as a low-impedance driver. Input and output transformers are fully screened, the latter being a UM2 type, the secondary of which is shorted out when the function switch is in the "CW" position. Adjustable grid-bias for the 807's is provided at the rear of the power pack.

The latter is also of conventional design, using two RG1-240 A's to provide a 750-volt supply for the PA and modulator, and a 5U4G to give the 400-volt supply for speech amplifier and exciter unit. The VFO anode and screen volts are stabilised from a VR-150. A metal rectifier supplies modulator bias, and a DLS-10 (thermal delay switch) safeguards the gas-filled rectifiers, giving a delay of about one minute before the HT can be switched on. The red indicator lamp on the front panel indicates the presence, or otherwise, of HT after the "Plate" switch has been made. A green lamp shows that the heater voltage is on.

Details and Refinements

The "Function" switch has three positions —CW, Receive, and Phone. In the "Receive" position the transmitter is dead, even with the key depressed, and a spare pair of contacts, brought out to the rear, are *open* in this position only. Thus relay switching for aerial change-over, receiver muting and so on can all be operated, giving a single-control change-over, from this one switch on the transmitter. In the Phone position of this switch, the high voltage is applied to the modulators and the transformer secondary "un-shorted," but the key must still be depressed, or the key-plug removed from its jack, as in the CW position, before drive is applied.

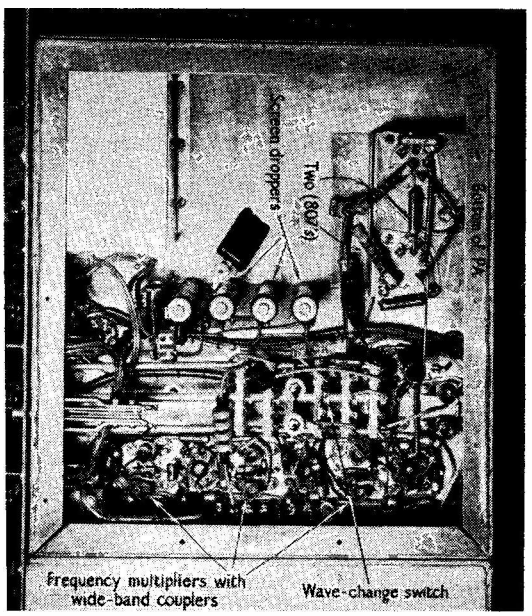
The "Net" position on the power switch makes it possible for the VFO to be tuned up even when the Function switch is in the Receive position. This is a useful feature making slight frequency - adjustment for

"netting" possible without interfering with reception while it is being done.

Keying is carried out in the cathodes of the buffer and the first buffer-doubler—*not* in the oscillator, as in previous models. This gives an extremely good note, but makes true break-in working impossible, at any rate on the 3.5 mc and 7 mc bands, where the oscillator beat remains strong enough to interfere with received signals on the same frequency. On the other bands it is there, but almost inaudible. Naturally, for full break-in some external modification to the station switching would be necessary, but the transmitter *can* be left in the CW position with the key up. This merely deprives the operator of the possibility of changing over the whole station on the Function switch but has no other disadvantage.

The VFO has a well-marked open scale, the calibration of which is reasonably accurate throughout the bands. Naturally, as the whole of the 3.5-3.8 mc band is included, the 14 and 21 mc bands do not cover much of the scale, but the slow-motion control is quite adequate and there is no difficulty about really accurate netting on any band.

The nominal input to the PA is about 150 watts (roughly 200 mA and 750 volts) and a fairly large amount of heat is generated in this stage; this is inevitable, bearing in mind the very thorough screening. At least it is important that nothing should be put on top of the case, to obscure the ventilating mesh in the lid.



Underneath the RF section of the Panda transmitter chassis, with certain main parts identified.

For good Phone quality and adequate modulation it is necessary to reduce the anode current of the PA (by varying the output coupling) to about 160 mA, giving an input of roughly 120 watts. One imagines, also, that this is desirable for the welfare of the 807's in the PA! Under these conditions full modulation is obtained with the audio gain control in about the half-way position, and there is no shortage whatever of available speech input.

RF output is taken from a co-ax socket at the rear of the PA screening-box, and is led out through a hole at the rear of the cabinet. An external aerial coupling unit is essential unless dipoles are used for all bands. A direct earth terminal is provided at the rear of the box.

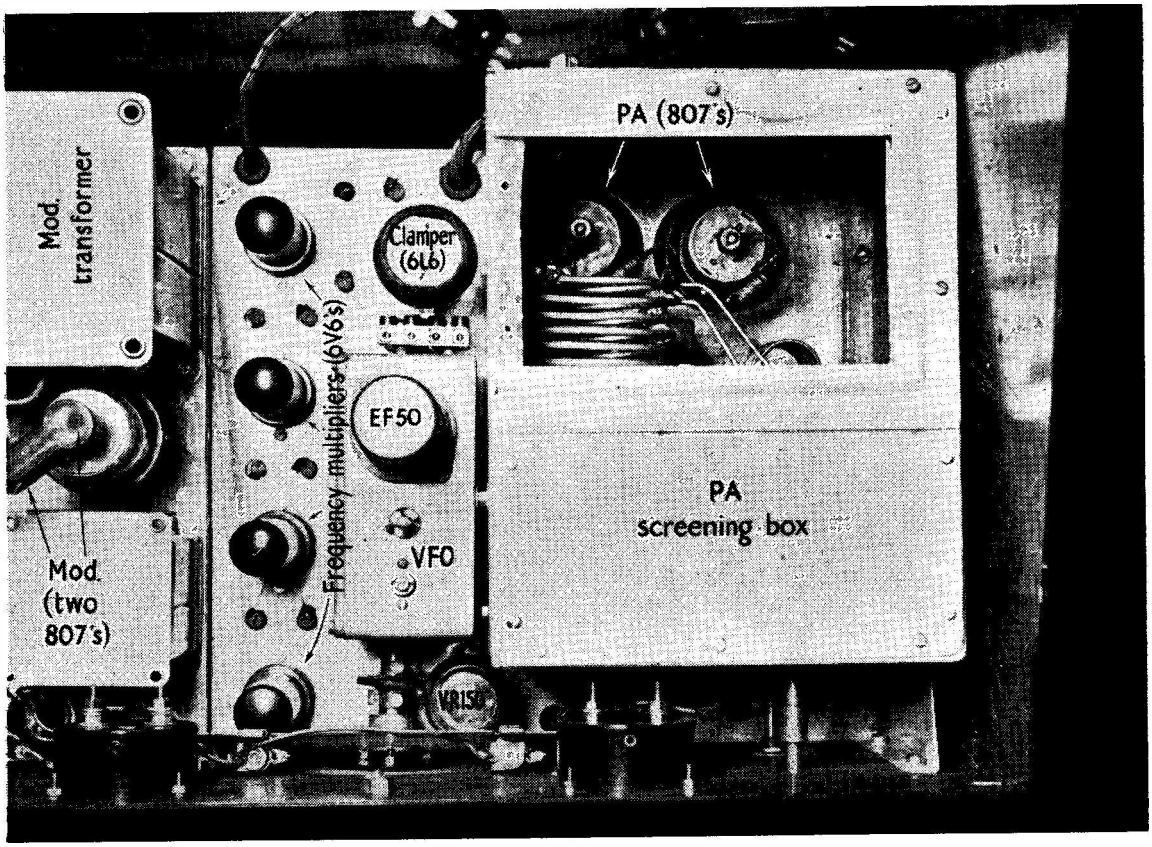
Performance

In brief, it may be said that this transmitter does all that one could expect any 150-watt rig to do, on any band. In detail, it is necessary to sub-divide this report under various headings.

Output: A measured output in excess of 100 watts was obtained on all five bands. It was remarkably even, not only from band to band, but throughout the full width of each one. The input used for this test was between 135 and 140 watts, in the CW position of the Function switch.

Stability: This was really an outstanding feature. After allowing a "warm-up" period of not more than ten minutes, the VFO was made to beat with a good crystal oscillator on 7035 kc, and the drift over a period of one hour was less than 50 cycles. This result was treated with some incredulity and therefore repeated three times—with similar results every time. Even the warming-up period resulted in a drift of less than 1 kc on the 7 mc band.

Band-Switching: It is necessary to jot down the readings for the output tank, and the coarse and fine coupling controls for each band, as the latter vary rather widely. For instance, using a 270-ft. long wire and a standard type of aerial coupler, it was found that the coupling controls were set on "1 and 1" for the 3.5 mc band, "5 and 4" for the 14 mc band, and "3 and 7" for the 21 mc band. It is impossible to memorise all these readings, together with the tank condenser setting, so it is obviously desirable to set them up correctly without the power on, making fine adjustments afterwards. The readings are, of course,



Looking into the RF section of the Panda PR-120-V, with the paralleled 807's PA stage on the right. The modulator, to the left, is also a pair of 807's. As might be expected, under working conditions these stages run very warm, since they are closely boxed-in for TVI-proofing. No ill effects need, however, be feared in operation.

constant once they have been determined for each band.

Drive : The optimum grid current for the pair of 807's appears to be about 6 mA, and this is readily obtained on every band. The setting of the drive potentiometer varies somewhat between bands, and this reading, too, is worth noting. On all bands except 21 mc it was possible to produce a drive in excess of 10 mA, this being the limit of the meter reading.

Keying : The keying is quite chirpless and a little on the "hard" side, without producing actual clicks. It was found an advantage to use an external filter, which consisted simply of a 5-henry choke in one lead, with a 0.25 μF condenser across the key. No interference was then audible on a broadcast receiver standing in actual physical contact with the transmitter, even on foreign stations in the medium-wave band.

TVI : As might be expected from the design, the transmitter is remarkably free from unwanted harmonics and outputs on undesirable frequencies. The test was carried out in a fringe area, where the field-strength of the TV signal normally varies between 40 and 180 μV/m. With the writer's standard set-up of a 150-watt 813 PA, (incorporating no TVI precautions at all) a picture is normally blotted out completely at a distance of some 500 ft. from the transmitting aerial. With the Panda the same TV set experienced no trace of interference, either during 14 or 21 mc operation. And the home set, distant from the transmitting aerial by some 25 ft., was not rendered useless, the only interference at these very close quarters being a slight "flashing" with the transmitter on 21 mc, and a weak "herringbone," accompanied by hum and clicks on the sound channel, with the transmitter on 14 mc. It was not expected for one moment that the Panda would be TVI-proof as far as the

home set was concerned, bearing in mind the very weak TV signal, and these results were regarded as highly satisfactory. On 28, 7 and 3.5 mc the home TV set was unaffected. Phone produced no more interference than CW.

Modulation : It is not possible to obtain full modulation with the full input without some distortion creeping in. But with the loading suitably adjusted to give a PA anode current of not more than about 160 mA, 100% modulation can be achieved with the audio gain control set less than half-way up the scale. There is then no objectionable distortion, although stations reported the quality as " slightly hard "—a loose term which need not be taken to mean anything very serious. With 80% modulation the speech quality was considered really good. Any normal type of crystal microphone, equipped with a TV-type coax plug, can be used ; this, by the way, is a much more satisfactory fitting for a microphone than the usual P.O.-type plug and jack, which can give rise to AC pick-up and to a bad rubbing contact very much amplified by the audio chain.

Results on the Air : The transmitter was first used during a spell of very mediocre conditions, but the following contacts were made during the initial session on 14-mc CW : JA5AB (579), W1TW (569), VS7MC (459), W2HAQ (469). The following morning slightly better conditions brought QSO's with VQ3BM (439), and AP2R (559), both before 0830.

The first spell on 21 mc resulted in contacts with OD5BA (59 phone), ZD9AA (559), SU1XZ (559), CE3AG (449), W8BHW (58 phone), VQ4RF (55 phone), 5A2CA (58 phone), MP4BBD (579).

No contacts have been made on 28 mc, in fact, none have been attempted, but the output is satisfactory and there is no reason to doubt the performance on that band. On 3.5 mc and 7 mc innumerable QSO's have been obtained, both on phone and CW, with good reports all round. Two W's on 3.5 mc were worked before midnight on an evening when conditions appeared to be very poor.

Since these initial spells of operation the transmitter has been in regular use on all bands, and the percentage of replies to calls (excluding CQ calls, which are very seldom made in any case) has been better than 80 per cent. Countries worked on 14 mc have included VU, ZS, VK, KZ5, ZL, KH6, KL7, FF, VR2, VS1, VS6, VE6, KP4 and FN8, in addition to those already mentioned. These contacts were equally divided between CW and Phone.

Summary

As will have been gathered from the foregoing details, this Panda transmitter is an eminently practical and well-designed piece of equipment which will give the kind of performance that the most exacting owner might expect. All components are of the highest quality and the wiring (subject of criticism in earlier models) is now said to be carried out to A.I.D. standards, and certainly appears to have been, in the model tested.

The qualities of TVI-proofing and oscillator stability are so excellent as to be almost spectacular ; in every other way the PR-120-V amply fulfils the makers' claims and does them full credit.

DO YOU GIVE THE " X "?

Almost without exception, CW reports given nowadays are T9 — though in many cases something far worse is merited. The natural tendency is not to hurt the other chap's feelings (besides, you might get a rusty one back!). Some operators skate round the difficulty by giving T9x where the signal really is good. But it should be remembered that the " X " is meant for xtal control, and it is a hark back to the old days, when it was quite permissible to give T8x or even T6x, where the signal was obviously CC but rough. What it comes to is that T9x should only be given for a superlative signal, and nowadays the " X " might be taken to stand for Excellent.

" COAX FEED FOR THE T2FD "

On p.212 of our June issue, in the Table of Values, the condensers C4, C5, should be shown as .003 μF, and not as stated. A recent test by G2NS with the aerial as described in his article gave contacts with 9S4 on Eighty, YI on Forty, KH6 on Twenty and W4 on Fifteen — unfortunately, Ten was not open at the time!

DAVID BROADFOOT

In their report on the loss of the *Princess Victoria* off the Irish Coast on January 31, the Court of Inquiry draws particular attention to the heroism and selfless conduct of David Broadfoot, radio officer, who remained on the air to the end, and went down with the ship.

True to the great traditions of his profession and like many another sea-going operator before him, he died with his hand on his key. A salute to his memory.

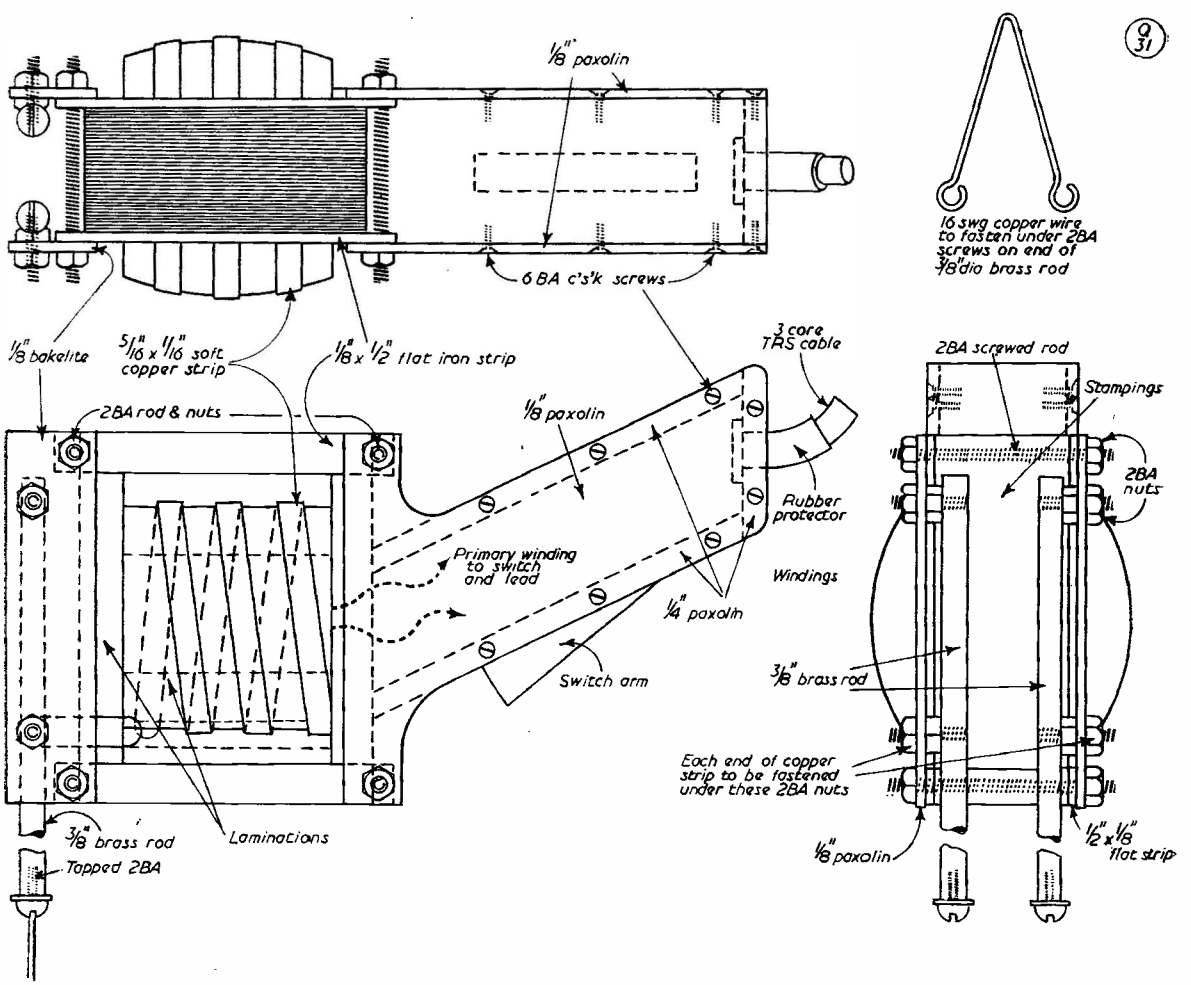
Quick Heat Solder Gun

USEFUL WORKSHOP TOOL

P. HARRAD (G8UN)

THIS article and the illustrations describe the construction of a cheap and highly efficient quick-heat soldering gun. Most of the parts can be obtained from the "junk box," but the main item is of course the heater transformer.

The first thing to do is obtain a transformer of approximately 50 watts rating, or in other words a cross sectional area of centre limb of one square inch. In the writer's case, use was made of a disused component, the primary winding of which was known to be sound, the secondary being burnt out. This was carefully removed down to the interleaving between the primary and secondary windings. A word here as regards the turns-per-volt of the transformer : In the case of a disused radio transformer having heater windings, on removing these note should be made of the number of turns, so that this can be taken into consideration when re-winding the fresh secondary. After removing the old secondary, work can commence on the rest of the con-



Detail drawings of the solder gun constructed by G8UN. The necessary low-voltage high-current heater supply is easily obtained by winding a few heavy turns over the primary of a stripped-down 50-watt mains transformer ; this is about the minimum rating acceptable for satisfactory working.

struction of the gun.

First obtain four ½ in. x ⅛ in. flat iron strips; in each end drill a hole to take a 2 BA screwed rod. These strips serve as clamping strips for the laminations, as in the diagram. No actual dimensions can be given as the physical size of transformers naturally vary somewhat.

The handle for the gun is made up of two pieces of ⅛ in. paxolin, side plates shaped as in the diagram. Two end pieces are formed of ¼ in. thick paxolin ; the two sides are fastened to the two thick pieces by 6 BA countersunk screws tapped into the ¼ in. paxolin. The ⅛ in. side pieces are clamped on the outside of the flat strip under the lower four clamping nuts. Reference to the diagrams will make this clear.

The primary winding leads are taken down inside the handle and connected to the switch and the 3 core input cable ; it is obvious that arrangements must be made such that the switch is always in the " off " position when the gun is put down. There are various combinations of micro switches which can be fitted into the handle to enable this result to be obtained. In the writer's case use was made of the inside of a flexible lead pair switch by the name of " Arcoelectric."

The bottom of the handle is a small piece of ¼ in. paxolin drilled to take the rubber tube from an electric iron connector ; through this passes the three-core mains cable, and one of these wires must earth the metal part of the transformer.

Next obtain two more pieces of ⅛ in. paxolin to form supports for the ⅜ in. brass rods, as in the diagram. These should also be clamped on the outside of the flat strip under the top four 2 BA nuts, as in the drawings. One end of each of the two ⅜ in. brass rods should be drilled and tapped for 2 BA screws. The brass rods are fastened to the paxolin strips by 2 BA screwed rods, into the ⅛ in. paxolin side plates.

The Secondary Winding

The solder gun " bit " can consist of a short length of 16 SWG copper wire bent in the form of a hairpin and clamped under the two 2 BA screws at the end of the brass rod. For the size of " bit " mentioned, approximately half-a-volt at 100 amps is required. To carry this current for a short while 5/15 in. x 1/16 in. soft copper strip will suffice. From this the number of turns required for the transformer secondary can be worked out ; in the writer's case 2½ turns as the secondary enabled the output to be obtained.

Before winding this strip on the transformer it must be wrapped with insulating material ; this can consist of Empire tape or plain white cotton tape shellaced after winding on the strip. It will be found quite easy to thread the copper strip round the existing interleaving over the primary winding, without dismantling all the laminations. Each end of the strip winding is clamped under the two forward 2 BA nuts securing the two ⅜ in. brass rods to the top side plates. The copper strip, if bought in the hard state, can be annealed by heating to redness and leaving to cool off gradually.

To clean up the appearance of the windings and body of the gun a piece of 1/16th fibre sheet can be stretched right round the transformer body and clamped on each side of the four rear 2 BA clamping nuts. This also will serve as protection for the secondary windings.

The writer has found that this gun is highly efficient for radio work and very small soldering jobs, and as previously mentioned, was constructed for " next to nothing," only the switch in the handle having to be purchased.

Close study of the diagrams will show the construction much more clearly than can be described.

ELECTRONICS EXHIBITION, MANCHESTER

We are informed that the Institution of Electronics is to hold its Eighth Annual Exhibition at the College of Technology, Manchester, during the period July 15-21. A number of interesting lectures, details of which are given in the catalogue (1s. 6d. post free) have been arranged for the week ; admission is by ticket only, application for which, with a stamped addressed envelope, should be made to: W. Birtwistle, Esq., 17 Blackwater Street, Rochdale, Lancs.

WEBB'S NEW CATALOGUE

This is a well-produced publication of 50 large pages, listing and illustrating a wide range of electronic gear. As all good catalogues should, it makes useful and instructive reading. Apart from " bits and pieces " covering the requirements of the professional and the amateur, there are sections on receivers, with full details ; amplifiers and audio equipment of every kind ; a wide range of recording gear ; test equipment in the well-known makes ; and details of the services offered by Webbs. Self-financed HP terms are available on all orders exceeding £15 in cash value. It is also important to note that, to go with the Catalogue, registered holders automatically receive a series of information folders to keep the Catalogue up to date — necessary in view of the frequent additions to the range, and changes in price. This new Webb's Catalogue is obtainable, price one shilling post free, direct from them at 14 Soho Street. Oxford Street, London, W.1 (Tel.: *GERrard 2089*).

DX COMMENTARY

L. H. THOMAS, M.B.E. (G6QB)

JA1AH

IT would be nice not to talk about conditions at all. They certainly don't make a pleasant subject at present, and even the English weather is a better topic of conversation. Suffice it to say, therefore, that we are still down in the depths; that we don't emerge from them very often; and that the date of our real turning-point is still the subject of much argument. Perhaps this coming winter will see a gleam of light; perhaps. on the other hand, it will be slightly worse than the last one. If the latter, then it must certainly be right at the bottom of the cycle and we can hardly fail to follow that up with an improvement.

Meanwhile those who don't mind taking their DX the hard way continue to pull out the occasional plum; and those who are philosopical (or something) have altered their standards so that they now class W1 and VE1 as DX, and are correspondingly pleased when they make a contact!

The Top Band

A very wary kind of "jockeying for position" seems to be in motion on the 160-metre band. No one can tell, just yet, how things are going to shake down, but one or two regular users have suggested that it would be much easier to avoid the commercials if they would only settle on one frequency and stay there. How can you avoid QRM if the other man keeps shifting around? So far, however, no trouble—which is all to the good.

Those who have departed from the band altogether have gone further than was necessary; it isn't dead, or even within sight of its own funeral yet. The judicious chasing of counties continues, and we are glad to note that two stations have now achieved what appears to be the highest practicable score at present. GM3OM (Larbert) and GI6YW (Belfast) both have the figures of 79 worked and 79 confirmed.

GI6YW would like to achieve the 80th before "resigning," but has not been able to use the band much owing to pressure of work. G3BRL (London, W.5) has worked his 60 but is three cards short. GI3HFT (Belfast) has worked 79 but is one card short —guess which! He finds that the band does not come to life now until after 2200, and both QRM and QRN are bothersome.

G3ABG (Cannock) also finds it pretty grim, but hopes to make his WABC later in the year and is also looking forward to the Daylight Tests. GC3EML (Jersey) says that signals up to 200 miles are often audible (in daylight) but that people just don't seem to listen to the weak ones.

G4FN (Westcliff) achieved a very rapid WABC (fifty days) and has also worked OH3NY, 7OH, OK1HI, HB9T and DL2PT on the band. All this on a 14-mc folded dipole! G8JC (Worcester) sends in his score. and adds "If only the commercials would keep to their allotted QRG's . . ." He also puts out a CQ for Cambridge, Cumberland, Monmouth, Shropshire, Westmorland and many GM's.

By now the Daylight Top Band Tests will, of course, be over, but the results could not reach us in time to catch this issue. They will be fully dealt with next month. Meanwhile may we repeat our suggestion that Top Band devotees should get busy with One-Watt outfits? If neces-

CALLS HEARD, WORKED AND QSL'd

sary we are prepared to support, or organise, a competition for a One-Watt WABC during the coming autumn and winter. We should, however, like to know how many interested clients we are likely to have. Please write by the next dead-line and say whether you are prepared to become a One-Watter for the winter months.

The future of the Trans-atlantic Tests is, at present, somewhat nebulous. It seems that we shall not only find it difficult to park *ourselves* in a convenient position on the band, but we are also liable to find the U.S.A. frequencies badly hashed up by other users. We are holding our fire at the moment, as the tests need not be announced for another three months or so.

Eighty Metres

There is only one report of DX this month — from G3ABG. After trying to work KP4KD on the band during good winter conditions (with no result) he raised him at 0100 on June 5, and VE1FR joined in to make a three-way. This confirmed KP4D's suspicions that midsummer DX is possible on Eighty. Apart from this no one else mentions it except G2NJ (Peterborough) who worked the Dutch Weather Ship on the Dogger Bank—PI1LC—at 0625 one morning.

Forty Metres

Also pretty deplorable! But G4QK (Croydon) raised OY3IGO, CR4AJ and EA6AF, and at the same time he heard YV5DE, CO5FL, HK1EE and 1EQ working each other, VP6AG and sundry PY's and LU's — all on CW. G3ABG worked HB9GX/MM aboard an oil tanker off the Portuguese coast, using QRP with 8 watts. 'ABG also managed KP4KD with a CQ at 2200.

Twenty Metres

Twenty, although in bad shape, has stirred up more correspondence than the other bands, and is well worth keeping a watch on. Once in a while we seem to get about three days of quite good conditions. G3TR (Southampton) has noted some good patches late at night and early in the morning, and has worked the usual run of Central Americans on phone, but the best bag of the month was SVØWP/P, on Crete.

G5OQ (Tunbridge Wells) has been doing exceptionally well with 50 watts to an 807 and a curly aerial, contacts including FI8AD, VP5SC, VS6CG, MP4HBK (Trucial Oman) and VQ9MR (Mahe Island, Seychelles). In addition KG4AF was worked several times, KV4AA almost nightly, and lots of South Americans and Asiatics were also raised. The aerial is actually a 132-ft. Windom which 'OQ remarks "could do double duty as a clothes line." His spells on the air were 1900-2000 and 2300-0030, but 'OQ says he thinks he could have done quite well if he could have worked the band at other times!

G4ZU (Croydon) raised NE1NMC (Nepal) and SVØWP (Crete) on phone, and ZC5VS and ZS8D on CW, for four new ones. He had a personal visit from VP6FO and is expecting PJ2AA to stay with him later in the summer.

G6VC (Northfleet) has forsaken the Top Band and has been chasing DX on Twenty. He caught up with HK6JH, PJ2AC and 2CC, KV4AA, FF8 and plenty of the more usual stuff. He uses a folded dipole made with 300-ohm ribbon.

G5BZ (Croydon) spent a little time on the band and was lucky enough to raise two new ones — SVØWP (Crete) and SVØWG (Rhodes), both on phone and on consecutive days.

G3CMH (Yeovil) found conditions good on June 8, with the short skip temporarily switched off. At 1700 the band was full of ZS1's and ZS6's, but by 1730 they had gone and were replaced by VS9, VU, HZ, YI, ZD4, and the like. He worked OD5LC, PJ2AA, VS2BS, VU2RC, YV5AB and a 4X on phone; Gotaways were ET2CG, HH2FL, HP1HO and VS9GV.

G4QK heard CP2BA, CR4AJ, several CE's, HH3DM, VS9AS, VP6GT, KR6's, ET2LK (ex-MI3LK), AP2N and other nice ones. G2WW (Penzance) was only on the band for one day, but HC1FG called him at 1600 and told him it was the first time he had ever heard a G at that time of day!

G8FC (RAF Locking), active as ever, collected CR4AJ, CR9AH, ET2LK, HC1GL, KH6ARA, MP4KAB, VS9AS, VQ9MR (2000), YK1AH and ZP9AY.

Fifteen Metres

There is no doubt that 21mc (or Fifteen Metres, as we are compelled to call it by sheer brute force!) has been the most popular band of all. The short skip which has made Twenty so undesirable has had the opposite effect on the new band, because lots of people have not yet worked many local countries, and they are all good for the collection. Hence the Marathon

21 MC MARATHON

(Starting July 1, 1952)

STATION	COUNTRIES
DL7AA	76
G3GUM	74
G5BZ	69
G6QB	66
G2BJY	64
G2WW	64
G2YS	56
G4ZU	55
G2BW	55
G3DO	50
G8KP	50
G5CP	56
G3TR	49
VK2AWU	45
G3CMH	44
ZE3JO	40
G3FXB	40
G6QX	39
G3ABG	32
G8OJ	32
G5FA	26
G3WP	24
G8VG	17
G2DHV	10

scores have been climbing rapidly. No one has got within shooting distance of the century for the band's first year, but we might well see one by the end of the coming winter.

G6QX (Hornchurch) added short-skippers to the tune of F, SP, 9S, Trieste and CN2; he also had a card in from HE9LAA for this band. .G2BW (Walton-on-Thames) spent the whole month on the one band and noticed a great increase in activity. Aided by a new final (a neutralised 4-65A) he collected fifteen new ones for the book, including ZC4, TF, KZ5, CP and OA.

G2WW has continued regular contacts with VQ4RF, without a single failure. New ones, numbering thirteen in all, have included CN2AP on CW and CN8, CT, DL, EA6, GD, HB, HE, OQØ, PA, PY, TI and YI—all on phone. Gotaways were KV4BD and CP5EK, while VQ3KIF couldn't count, as he is really a /MM moored at Dar-es-Salaam.

G3CMH also made use of the short skip, but managed to find some other nice ones as well. On phone they were CE3CZ, EA6AS and 9AR, KV4BD, PY's, VQ4's, YI3WH, ZD2S, 3V8AP and 5A2CA. Gotaways were YV1AP and ZD1SW, and a South American was heard calling VR2CG. VQ4RF was worked at 2130, about the latest time that he has made a G contact, and he said, at the time, that he had worked them as early as 0530.

G5BZ pulled in new ones with ZP5DC, OQØDZ, CX1AW, VQ5CB and EI2G (all phone), plus CP5EK, ZD2JDH, GD and EA9 on CW.

G4ZU did nicely on phone, with ZP5FI, CP5EK, ZD9AA, CE3CZ, VS7WA, AP2L and VQ5CB. CW brought in LU3DD and PY4RJ, and cards for the band have arrived from CE3 and ZP5.

G5JU (Birmingham) raised CS3AC in the Azores and was a bit puzzled about the call-sign. This seems to be an individual issue of the wrong prefix, and the same operator has been using it for a long time. Perhaps CT2 is reserved for nationals; this CS3 type is evidently an American Army occupant, who passes an APO number for QSL purposes.

The daughter of G6DL (Sutton Coldfield) was married recently in Southern Rhodesia. She was given away by ZE3JD (right) and the reception was at the home of ZE3JO (left). The bridegroom is out of the picture simply because he is the only principal who is not (yet) a member of the fraternity!

New ones for G2BJY (West Bromwich) were ZD2JDH and ZD4AE, both on CW. The latter said it was the first ZD4/G contact on the band. On phone the additions were VQ2HA, CP5EK, OD5BA, VQ5CB and CT, LX and SM. G4QK, on CW, added FA and Trieste to the list.

G2YS (Chester) brought his score up to 55 with OA4C (2330), KV4AA, KZ5IL, VQ3KIF and short-skippers, later adding ZP9AY as well. G3TR, on phone, found the best of the new ones to be CP, GD, ST, TI, ZS3, KZ5, IS and EA6. He also worked VQ4RF at 0530 GMT, when most people doubtless think the band is dead.

G5OQ thought Fifteen disappointing, but had 20 European contacts one Sunday morning. No DX, though, apart from VS9AP and VQ4AQ.

Ten Metres

Actually a few mentions of Ten this month, and one really good write-up from G3HCU (Chiddingfold). During the month he has had over 100 QSO's (excluding G's). DX was represented by seven LU's, VQ2DT, ZS6ZK and an /MM off South America. Short skip was used to work CT, DL, FKs, HB, I, OK, OZ and SM. 'HCU hoped to be hard at work for the Ten-Metre Activity Party on Sunday, June 28.

G3CMH remarks that the band has been "open," but he has only heard Europeans — mostly DL's and I's.

Several others go as far as mentioning that they have *heard* sundry European signals on the band, but very few have thought it worth their while to tune up and call them.

General Chat

From G4QK comes the news that he, with G3BZL and G6LX, will be setting up and operating 3A2AY between July 8 and 19. They will use phone and CW, all bands from 3.5 to 21 mc, but will concentrate on the latter. QSL's will be answered.

G2YS tells us that ZC4XP is shortly returning to G-land, but hopes that the 160-metre flag will be kept flying in Cyprus by ZC4GT and ZC4MH. The best time is January-February.

G3AKY (Sheffield) would like us to publish a blank map of Great Britain, with just the county boundaries shown, for use by WABC-chasers. We will see whether this is possible before the winter season — with its proposed One-Watt-WABC—starts.

G4FN and others tell us that

the MI prefix will not be heard any longer, since Eritrea is now regarded as part of Ethiopia. 'FN worked ET2LK, who appears to be old MI3LK.

G2BJY writes at some length on "conditions" and our recent various references to them. He suggests that the whole thing is a matter of guesswork and that no one really knows the answers as yet. 'BJY had the opportunity of listening on the amateur bands between 1939 and 1945, and says that in France, in 1940, they used to listen on 3700 phone and hear the Americans roaring in as late as 0800. (Incidentally, many of them were working the D's, whom the German Government apparently allowed to stay on the air.) Between 1939 and 1945 — the years which, if the 11-year cycle holds good—should have corresponded to the present time, 'BJY says that conditions were never bad.

Further, he suggests that the steady deterioration that has taken place, roughly from 1949 onwards, has affected all bands, the LF bands only slightly less than the HF. In his opinion there is no consistency about these cycles of good and bad conditions, which never repeat each other exactly. He follows this with the sinister suggestion that maybe, in our lifetime, we shall never again see such good conditions as in 1946-47, and may have to be content with an indefinite period of poor conditions on Ten Metres.

Personally we disagree with this, and think that conditions *do* follow the eleven-year sunspot pattern which, in itself, is pretty irregular. But time will show, and if we can all work KG6 on ten-metre phone again in 1957, we can write to G2BJY and invite further comments! It is perfectly possible that he is quite right; but we sincerely hope that he is not.

After having had a wonderful holiday signing /A from a moored house-boat at Horning on the Broads, G2AON is now in hospital at Eastbourne — Cavendish Ward, Princess Alice Hospital — where unfortunately he will have to be for some time. He can only listen round, on an RME-69 and phones. He has had so many messages and kind enquiries that it is impossible to answer them individually; so he asks that we offer his collective acknowledgement and his sincere thanks.

DX Flashes

The notorious Easter Island expedition should actually have occurred by now, after all the postponements. Latest buzz was that CEØAA should have been on from June 15 to June 20.

ZC3AA is another good one who *should* be on by now, although we believe his departure from VK was delayed.

KV4AA tells us that EA4BH is said to be on the air from Rio de Oro every week-end, on 14100 CW; also that W6NMC is supposed to be paying a visit and will doubtless sign EA9NMC . . . VK1HM and 1BJ are both on Cocos Is., and the *other* Cocos Is. (TI9) is due to be populated by W6UXX some time shortly.

Other shorts, by courtesy of KV4AA: KAØIJ is winding up operations on Iwojima during June; LB8YB is not on Jan Mayen, but Myggbukta Island, 100 miles off Greenland; a certain MP4 is reported by OK1MB as being in "the Sheikhdom of Bubai;" ZC5VS (British North Borneo) continues his activities on 14078 kc, most days between 1400 and 1700 GMT.

News from Overseas

AP2R (Karachi) is ex-G3GJQ and is looking for G's at the following times: 0200-0330 GMT, 14070 CW; 1030-1330, 14200 Phone; 1430-2000, both. He tells us that the active licensed stations there are AP2K, Quetta; AP5A, Lahore; and AP2L, 2N and 2R, Karachi. The United Nations stations using "4U" call-signs were unofficial and have been closed. AP2R has taken on the job of QSL Manager, and cards may be sent to him c/o Box 2002, Karachi.

Doug Taylor of ZC4DT, who was formerly VT1AC in Kuwait, has been home for some little time but is now off again, bound this time for Kenya, where his new call will be VQ4EI. He has hopes of a possible VQ9 expedition some time.

G3APX is radio officer of m.s. *Santhia*, on the Far East Service, and he has been meeting lots of people out there during his travels. He gets on the air from XZ2ST when in port there, and has also had a personal QSO with FN8AD. The latter's call is now VU2AX, but he still (naturally) prefers the FN8 prefix, although it has no special status any longer. Several of the VS6 boys worked Capt. Carlsen in *Flying Enterprise II*, on his recent trip from Colombo to Hong Kong, where he spent a few days. 'APX says that G's come in quite well around the South

FIVE BAND DX TABLE

POST WAR

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries	Station	Points	3.5 mc	7 mc	14 mc	12 mc	28 mc	Countries
DL7AA	622	83	145	214	76	104	220	G4ZU	373	11	9	178	55	120	192
G6QB	567	52	103	215	62	135	231	G3ABG	324	36	81	145	32	30	153
G5BZ	510	56	101	219	69	65	223	G2BW	323	24	57	144	55	43	155
G2VD	468	46	84	175	55	108	184	G2YS	315	42	52	125	56	40	147
G2WW	452	23	70	188	64	107	195	G3GUM	312	31	38	168	74	1	177
G2BJY	446	48	77	141	64	116	179	G8VG	277	35	76	123	17	26	140
G3DO	418	24	45	192	50	107	219	G3FPQ	254	47	40	120	35	12	127
G3FXB	403	54	102	168	40	39	174	G4QK	213	19	45	135	11	3	132
G5FA	398	33	116	150	26	73	165	G2DHV	173	20	21	107	10	15	111
G6QX	379	50	91	142	39	57	165	VS7XG	116	1	17	93	2	3	93

China Sea, best times being 1600-1800 GMT.

VS9AS (Aden) tells us that there are three operational stations there now—VS9AD, 9AP and 9AS. He himself is on 14060 and 7060 between 1200 and 2000 GMT, with breaks. He uses 30 watts to an 807 and gets out quite well. No news yet on the subject of activity in Oman.

VS7XG sends pictures of his small son "looking for his Granpop," who is G8VG. Said small son, ten months old, is wearing the phones and pounding brass in a highly professional manner, but unfortunately the photos cannot be reproduced here. 'XG tells us that Dominion Status means the VS7 prefix is being changed, and they have been offered "4S" as a substitute. So it looks as if they will keep their present calls and become 4S7's instead of VS7's. Peter suggests that the present lack of activity is connected with temperatures of 90 degrees coupled with very high humidity. Perspiration for 24 hours of the day is not the best stimulus to concentration in a hot shack! Researches into the local fauna revealed a four-foot "baby lizard" of a species that grows to twice that size . . .

VP8AJ (Antarctica) is on a small island off the coast of Graham Land, and counts as the latter. He uses 350 watts to two 813's in parallel, usually on CW, with a 200-ft. long wire. Work is mainly on 14 mc, although he can operate on 7 and 3.5 as well. Best times for G's on 14 mc are 2000-2200 GMT, and 'AJ appeals for some snappier operating, to give more stations a chance. As he says, things are a bit difficult —a rag-chew to find out what is going on would be *most* enjoyable, but others get impatient, and the station at the other end is considered a hog for monopolising the DX. Final note: Don't worry about QSL cards! They will arrive eventually, but they can't lay on special relief ships for the purpose . . .

GW3ALE has now turned up in Chile, of all places, and although he was welcomed by an earthquake he hopes to spend two happy years there. He finds that non-nationals can get CE tickets, and hopes to add another call-sign to his list, although equipment will be a serious problem owing to controlled imports. Call-sign details will follow as soon as possible.

The call-sign VQ2RCC will

Practically self-explanatory. W2RCN, Bayside, Long Island, is equipped for mobile operation, and is a member of his local group of the Amateur Emergency Corps.

TOP-BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
GI6YW	79	79
GM3OM	79	79
GI3HFT	78	79
GM3IGW	78	78
G6VC	76	78
GM3EFS	75	80
GM3JDR	74	77
G2NJ	74	74
G8KP	73	77
G3ELZ	73	76
G4XC	69	72
G5LH	69	72
G6ZN	68	72
G3ESY	68	68
G3HDQ	67	69
G3IAF	65	73
G3BJU	65	68
G4FN	64	68
GM3EHI	63	68
G3HIW	61	66
G3AKU	61	63
G3GZJ	61	63
G3FNK	60	69
G3HTI	60	64
G3IBL	60	60
GI3CVH	59	64
G3IQO	58	62
G3BRL	57	60
G2YS	55	70
G3IEF	55	61
G2BJN	52	55
G2AOL	42	66
G8JC	41	52
G3ABG	40	55
G3AKY	36	48
GW3CKB	35	55
G3DO	28	39
G3DVQ	24	30
G3ITY	23	45
G8VG	21	34
G3HWH	20	41
G3FZS	20	33
G5FA	20	38
G3NA	18	31

mark the Exhibition in connection with the Rhodes Centenary Celebrations in Northern Rhodesia, and special QSL cards will be forthcoming. The station will work on 14, 21 and 28 mc with a rotary beam for each band, and will come on the air at 1600 GMT on July 11, closing down at 1400 on July 14. We hope to publish an account of the station's activities, with pictures, in a later issue. From ZE3JO, we get it that there is another Rhodes Centenary Exhibition station, signing ZE1RCC, already in operation and manned by the Bulawayo ZE's, active on all DX bands, phone and CW, and likewise offering a special QSL card. So look out for these two calls, and let us know if you raise them.

The former VS9AW is now G3GUK again, and sends us a nice photograph of the VS9 rig. In five months of operation out there he worked 103 countries, and during November, 1952, some Top Band tests brought the following results: Two-way QSO with VQ4; Signals received in VS1, VS7, MP4 and YI (all at S9 or S9 plus); Reports since received from G and from PY.

This certainly put VS9 on the Top-Band map, and the aerial responsible for it was a twin "T," with 260-ft. top and 80-ft. open wire feeder. All this time, of course, VS9AW was situated in the Sultanate of Oman, with which country he gave hundreds of stations their first contact. G3GUK is not yet to be heard, owing to shortage of gear, but he will arrive sooner or later!

ZE3JO (Salisbury, S. Rhodesia) writes that "despite awful conditions" he has got to 40C on 21 mc, and to 114C in 36Z on Twenty. Of particular interest is the fact that the ZE's are now licensed for Top Band; ZE3JP is on, and '3JO himself will be there shortly.

With what looks like a circular letter, JA1AH (Tokyo), who is a Japanese, introduces himself as keen to forget the past and to make contact with his country's new allies. He is QSL manager for the J.A.R.L. QTH: Yukio Komiya, c/o Egota P.O., Nerima, Tokyo.

Short Wave Magazine DX CERTIFICATES

The following have been awarded since the publication of the last list, in the May issue:

WFE

No. 9 W8K1A (Defiance, Ohio)
10 VK4FJ (Brisbane)
11 DL7AA (Berlin)

WNACA

No. 45 OH2NB (Helsinki)
46 EI3R (Waterford)
47 OZ7PH (Aalborg)
48 DL7AB (Berlin)
49 DL1LD (Rodenkirchen)

WABC

No. 29 GM3EHI (Bellshill)
30 G3IBL (Derby)
31 G4FN (Westcliff)
32 G3BDS (Worcester)
33 G3IQO (Liverpool)
34 G3HIW (Ilford)

FBA

No. 15 EI3R (Waterford)
16 DL7AB (Berlin)
17 G3ABG (Cannock)
18 G3EZZ (Nottingham)

General conditions for the issue of MAGAZINE DX AWARDS were given on p. 673, January, 1953.

Tailpiece

Regarding those extremely rare cards from EA9DC (Ifni), G6YQ had one about eight months ago, and has been told by the ARRL that he is the only G who has received credit on the DXCC books for EA9DC. There is said to be only one W with a card from this same fellow.

G6YQ has made a certain offer to try and clear up the EA9DC situation, since his own card was delivered by hand (by the op's brother-in-law!). Negotiations are afoot, of which we might say more next month. Thanks also to G3GUM for details of this matter.

Next deadlines are **first post on July 15,** for the August issue, and first post on *August 12* for the following one. Address everything to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. Until next time, then, Good Hunting, 73 and BCNU.

THE NET

HOW IT OFTEN SOUNDS

Contact has been established. **The Net is in progress.**

G6RST—Roger roger George Six Roger Singapore Tokyo returning to G7XY and —er G3PQR—no, just a moment, I've got it here—G3QPR. 7XY, Albert old boy, you're your usual signal, 40 db over nine, right against the stop. I understand I'm the same with you. Fine business old boy. Very nice to see you again—long time since I was last over at your shack. 3QPR old boy, I don't know the handle. Handle here is Charlie Canada Honolulu America Roger London Ireland Easy. So over to you 3RQP from 6RST.

G3QRP—G6RST and G7XY, this is G3QRP returning. You're both five and nine plus here, but you're both overmodulating somewhat. I didn't get a report from you G6RST and I'd also like to have a report from you too at G7XY. I wonder if you two would like to co-operate with me in a quick test. So over to G7XY, with G3QRP and G6RST standing by.

G7XY—Roger roger roger roger old boy. Handle here is Claude—C for Sailors, L for Leather, A for Orses, U fer Mism, D fer Ential, E for Adam. I'll repeat that C for . . . . *etc.* Ha ha ha ha. Pushing about 150 up the spout here. Same old rig, Charlie boy. Getting a few cobwebs now, ha ha ha ha. How are you, you big cheese ? Still knocking back the wallop, eh. I've got Bert here. Remember Bert ? B for Mutton, E for Adam *etc.* He wants to speak to you. He's not used to the mike.

B'bert—H-hallo Charlie. This is Bert. Remember me ? I remember you . . . er . . . er . . . Long time since I last saw you . . . er . . . very nice weather here . . . nice to hear your voice . . .

G7XY—OK OK OK. Claude back, Charlie boy. That was Bert. I expect you remember him. He's not used to the mike. Turn it back to you Charlie now. Over.

G6RST—Roger, Claude and G3RQP—no that's not it . . . QRX. I've scribbled it down, but lost the paper . . . QRX . . . ah yes G3QPR. Well, it's nice to hear old Bert again—remember when we had a few that night eh Bert ? Glad to hear the Wx is OK there. It's raining bucketsful here—I said it's raining bucketsful here. Still using 150 watts old boy. 3QRP, you're a bit weak here—must be under-modulated. Turn up the wick, old man. And I haven't got your handle yet —handle here is Charlie C Canada *etc.* Over.

G3QRP & G7XY (*together*)—This is *mumble squeak judder whistle splurge splatter jumble* . . . . Silence.

PAUSE

G6RST—You two had better get yourselves sorted out hi hi. Bit of confusion there hi ! G3RQP, you take it . . . .

G3QRP—G6RST and G7XY, this is G3QRP returning. You're still badly over-modulated I'm afraid. What's more, we're on 7040 kilocycles, which puts us in the CW portion. Don't you think we'd better QSY, and then perhaps you'd help me with my test. How do you feel about this ? I can't modulate more fully, old man, as my oscilloscope shows I'm fully modulated already. So over to G7XY, with G3QRP and G6RST standing by.

G7XY—Roger roger old boy. OK about the CW business. Didn't know we were down there—my wavemeter's been u/s for some time. Must mend it some day ha ha ha ha. Must get a 'scope too. Very useful. I watch the colour of the PA anode. Very good test. Never mind about QSY old boy. The CW boys aren't causing any QRM. So we'll make do here, eh ? Old Bert's going off to lunch now, Charlie boy. So he says 73 and will see you soon . . . (*Dog barks*) . . . That's Fido my dog. Come here Fido—say 73 to Charlie . . . (*Barking*) . . . There you are Charlie—fine business eh ? Take it away Charlie.

G6RST—Roger dodger fine business whacko. Fine hound you got there Claude. Bags of output hi hi . . . (10 *minute monologue on dogs*) . . . OK on everything. 73 to Bert and see you again soon—don't get too sploshed hi ! Over to you now G— . . . where's that paper . . . G3QRP.

Who-o-o-o-sh . . Scrunch . . . . then

VOICE — Hello Charlie, Hello Charlie this is Bill. Hurry up you old rascal. I want to ragchew.

G6RST—Now now Bill, wait your turn, you old scallywag hi hi ! Wait till I see you down the club. Now go and work some DX.

VOICE—OK Charlie OK Charlie OK Charlie. See you there hi !

G3QRP (*patiently*) — This is G3QRP returning. Thanks for the QSO old man, but I think I'll leave it to you two old friends to have a natter. So I'll QRT now. Over to G7XY, with G6RST standing by. This is G3QRP ceasing transmission.

G7XY—OK old man, roger. Did I hear Bill sticking his nose in there ? Cheeky old so-and-so. Tell him that's a pint he owes me. Do you remember the time that Bill . . . (*launches into nostalgic half-hour*) . . . About time we turned it in isn't it ? Over.

G6RST—Roger roger. About time we found somebody else to annoy ha ha ha. So wot say G3Q . . . G . . . ah yes G3QRP. Over to you for your final.

G3QRP (in cold fury)—G6RST and G7XY, this is G3QRP returning. This is my final final. I am ceasing transmission. I am switching off my transmitter. I am switching off my receiver. I am switching off my wavemeter. AND oscilloscope. G3QRP is OFF. (*Switches off and starts to read a Good Book*).

G7XY—OK old man don't get shirty. Did you want to do a test or something ? Guess I'd like to work someone else now so won't be much use. Guess I'll have to close with you too now Charlie, so 73, and 73 to that smashing blonde I saw you with and 73 to the XYL and 73 to the junior ops. Best DX and good luck and 73 to the XYL. Cheerio, Charlie. G7XY over-off-and-clear.

G6RST—OK Claude OK Claude.

G6RST & G7XY (with split-second synchronisation)—Hello CQ, hello CQ, hello CQ, this is *mumble mumble judder scramble chatter . . . chaos* . . . .

SILENCE

More Selectivity for the BC-348

MODIFYING FOR DOUBLE CONVERSION

G. B. HORSFALL (G3GKG)

Over the years, much has been written about the BC-348, one of the earliest and cheapest of the war surplus receivers, originally designed for operation in Fortress aircraft of the U.S.A.F.; the very first BC-348 was landed in this country in the late autumn of 1940, on a grass airfield in East Anglia. Large numbers of these receivers are still in regular use at amateur stations in many countries of the world. Here is yet another practical offering in the sequence "Modifying the BC-348," which will be of great interest to all who run one for normal working on the communication bands.—Editor.

THE BC-348 receiver is probably familiar to most users of Government surplus equipment and there must be many of them in operation among the amateur fraternity. It possesses a number of features which make it especially suitable for amateur use, among which may be mentioned its high sensitivity, good bandspread, crystal filter, regulated HT on the local oscillator and, not the least important, comparatively low cost.

For the benefit of readers not conversant with the species a brief resumé of the line up is as follows: 2 RF, Mixer, Local Oscillator, 3 IF, BFO, 2nd Detector, AVC Rectifier and Audio Output. The valves used to perform these functions vary in different models, the main difference being that some models use single-ended type valves and others top cap grid types. The modifications to be described apply especially to the top cap grid types—*i.e.*, BC-348E, M and P, and others.

There is, however, one big draw-back to any mark of the BC-348 in an unmodified form, namely, that, largely due to the high IF of 915 kc, the selectivity is very poor. Fig. 1 shows the overall frequency response of the receiver RF and IF stages together with the response after the modifications described here. It will be seen that in its original state the band-width was of the order of 18 kc and is improved to something like 7 kc. Incidentally, these curves were obtained with the aid of a BC221 frequency meter and the receiver S-meter. The additional gain in the modified condition is apparent when actually using the receiver on the bands.

General Description

In order to obtain this band-width, which is more in keeping with the crowded conditions on the amateur bands, the receiver is converted to a double superhet using a second intermediate frequency of 85 kc.

The second frequency changer is a triode-hexode with the triode section functioning as a conventional Colpitts oscillator adjusted to a frequency of 500 kc. The second harmonic of the oscillator frequency is mixed with the signal which is applied to the grid of the hexode from the output transformer of the 6F7, second IF stage. The output of the mixer is fed *via* two IF transformers to the 6B8, which retains its old function as an IF amplifier but at the new frequency of 85 kc.

Using the second harmonic of the local oscillator ensures greater frequency stability and also obviates any tendency for the oscillator to "pull." It may be thought that a crystal oscillator on either 500 kc or 1 mc is desirable here, but this is impossible as the frequency has to be adjusted to suit the frequency of the crystal filter of the receiver.

Construction

The IF transformers used were removed

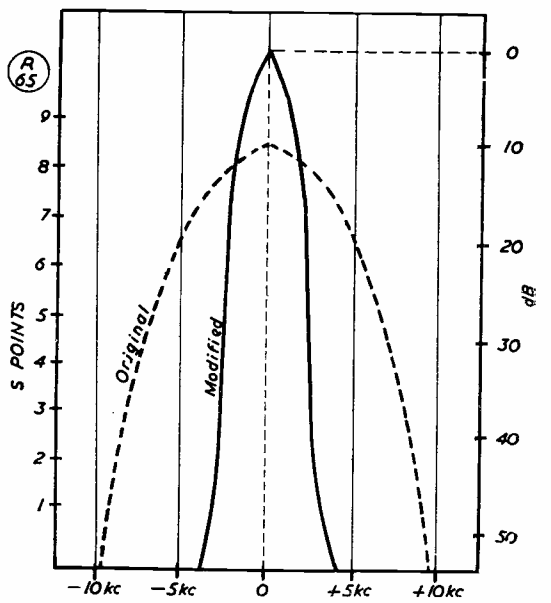


Fig. 1. Selectivity curves, taken before and after modification which considerably improves BC-348 performance.

from a Command receiver—BC-453 (190-550 kc)—and the mixer stage, together with the associated output transformers, mounted on a small sub-chassis constructed to fit into the dynamotor well of the receiver. In the writer's case a previously installed mains power pack had to be removed to do this, but the improvement is well worth the slight inconvenience of an external power pack.

Two modifications are necessary to the existing circuit and these will be dealt with first. The "cold" end of the secondary winding of the transformer following the 6F7—2nd IF— stage is disconnected from its position in the cathode bias network of the 6B8 and taken to earth point "X" in circuit diagram, Fig. 2.

The last IF transformer—anode of pentode section of 6B8—is removed altogether and an 85 kc transformer, No. 4698 is mounted and connected in its place. (The numbers referring to the 85 kc transformers are those stamped on the cans.) It is important in connecting these transformers to have the "hot" and "cold" ends correct as one of the trimmers is internally connected to earth *via* the screening can.

It is worthwhile to note that the most convenient way of mounting the IF's is to dispense with the plug-in base and bolt them to the chassis over a 1-in. diameter hole, connections then being soldered direct to the socket holes.

Of the remaining IF transformers number 4677 is removed from its can and a flexible fly-lead connected to the wire to pin 5 and brought out through a hole in the top of the can.

The disposition of the major components

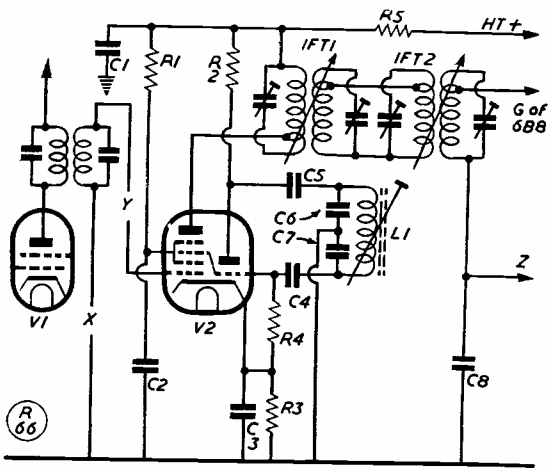
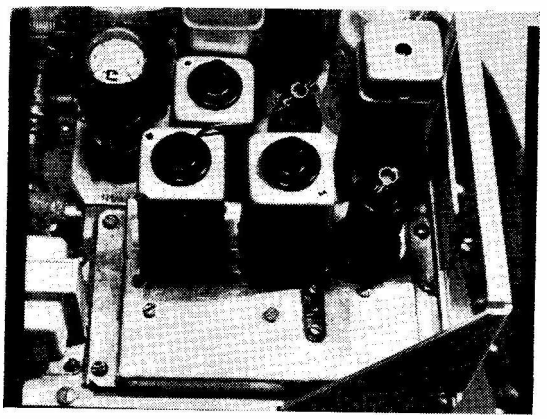


Fig. 2. Circuitry involved in the modification. Note that IFT3 is in the plate of the pentode section of the 6B8.



Interior view of the section of the BC-348 incorporating the modification suggested by G3GKG. The improvement is shown in the comparative selectivity curves.

on the sub-chassis is clearly seen from the photograph and the only remaining point worthy of note is the inductance L1. This is a permeability tuned, Litz wound coil which is very easily come by in 460 kc ex-Government IF transformers — as used in the receiver section of the TR 1196, Type 25 Unit, and also available very cheaply as separate items. Using the component values as specified for the oscillator section it will tune to the required frequency with the slug approximately in the midway position.

In order to gain adequate clearance underneath the sub-chassis and also to bring the top cap of the 6K8 to a convenient level, the platform is raised half-an-inch above the main receiver deck by bending the end flanges in the form of a step. To ensure rigidity of the platform flanges are formed on the longer sides. Long leads are left on for connecting up HT, heater and the cold end of IFT2—point "Z"—which goes to the previously mentioned point in the cathode bias circuit of the 6B8.

Before the unit is installed it is as well to check its operation and the frequency coverage of the oscillator. It is then placed in position and bolted in with four bolts in the existing threaded holes. The three leads are taken

Table of Values

Fig. 2. Modification circuit for double conversion.

C1, C2	= 0.1 μF paper, 350v. wkng.	R1, R4	= 33,000 ohms, ½-w.
		R2	= 47,000 ohms, ½-w.
C3, C8	= 0.1 μF paper, 150v. wkng.	R3	= 390 ohms, ½-w.
		R5	= 2,200 ohms, ½-w.
C4, C5	= 500 μμF, silver mica.	V1	= 6F7 (*original*).
C6, C7	= 200 μμF, 2%, silver mica.	V2	= 6K8, ECH35, or similar.

IFT1, 7267 ; IFT2, 4677 ; IFT3, 4698—*See text.*

through the cut-out in the main chassis and connected to the appropriate points.

Alignment

In the absence of a signal generator covering 85 kc the unit was aligned by rather "primitive means." The 915 kc IF channel was peaked up before the modifications were carried out. After allowing some time to warm up a 915 kc signal was injected into the grid of the original mixer stage and, with the 85 kc transformers in the broad position, the 500 kc oscillator was tuned for maximum signal on the S-meter. The coupling of the 85 kc IF transformers was then loosened by pulling up the ebonite rods at the top and all the trimmers adjusted for maximum signal. A refinement would be to stagger the tuning of IFT1 and IFT2, to give band-pass response, but this has not been attempted to date.

Conclusion

The graph in Fig. 1 was plotted with all the transformers in the loose-coupling position.

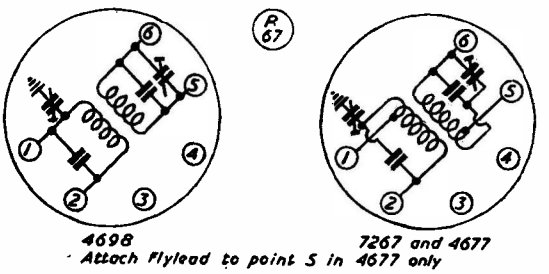


Fig. 3. Using the 85 kc IF transformers — see text for details.

The band-width can be increased in varying degrees by having either one, two or all the transformers tightly coupled.

On 'phone stations the present position gives maximum intelligibility in QRM and is about the narrowest band-width acceptable for telephony reception.

As a final comment on performance the considerable reduction in sharsh with the narrower bandwidth is a great asset in reading a weak signal in difficult conditions.

Clapp For VFO

SOME PERSONAL EXPERIENCES

G. MOORFIELD (GW3DIX)

There are many possible ways of arranging for VFO drive. The circuit which has come to be known from the States as the Clapp—but which was actually developed some 15 years ago by the BBC Engineering Division—is only one of them. The notes following discuss its practical application from the point of view of an operator trying the Clapp for the first time.—Editor.

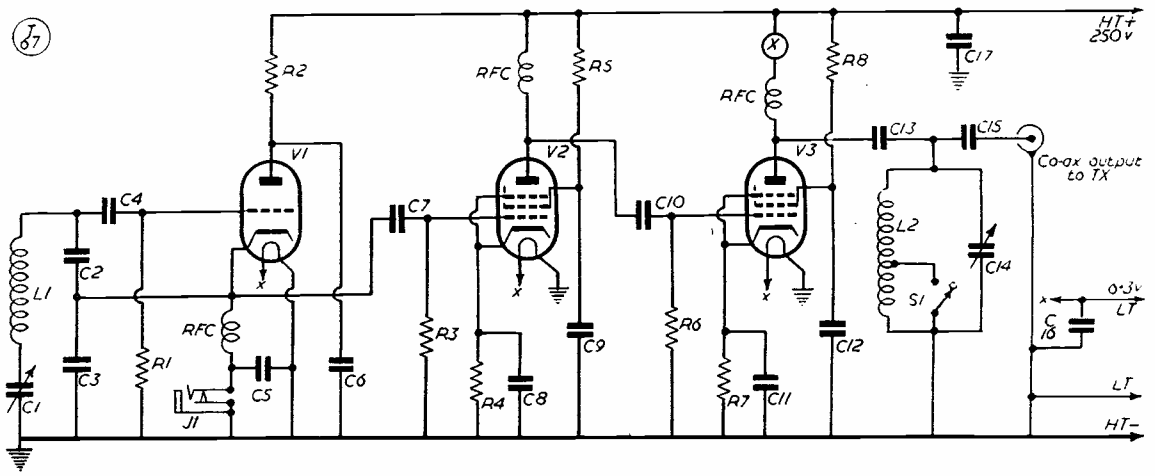
TECHNICAL experts in the field of Amateur Radio welcomed the arrival of the Clapp oscillator with unstinted enthusiasm. It is claimed that this circuit is one of the most stable and reliable of all currently used oscillators, chief among its many attractions being a ready ability to be keyed "straight" without any special difficulties, and an apparent indifference to fluctuations of anode voltage during operation.

It would appear, therefore, that the advent of the Clapp sounded the death knell for all those peculiar troubles which beset the would-be constructor of VFO circuits, when, like the writer, he is not blessed with anything more than very mediocre technical and practical ability.

However, information gleaned from careful listening to knowledgeable old timers on the bands—who did not, on the whole, seem to report the success one might expect from its application—tended to make the writer dubious as to whether the Clapp could actually be made to perform reliably when constructed under ordinary amateur conditions.

Nevertheless, it was decided to pursue development of the Clapp for amateur use and accordingly the original basic circuit was built up on a scrap chassis, using a 6C5 from the junk box and an old BC coil which, it was assumed, might be persuaded to tune to 1.7 mc. With no little trepidation, and the re-birth of many old fears, the little unit was connected to its supplies, and the key pressed.

To the amazement of all concerned the thing worked—better than anything experienced so far, and to cut a long story very short, a design was dreamed up of a complete VFO unit utilising the now material Clapp oscillator, which could be pressed into service to drive the station transmitter—the good old reliable "SWM 25-watt rig," as described in *Short Wave Magazine* for November and December,



Circuit of the VFO-driver unit, using a Clapp oscillator, as built up by GW3DIX. In his model V1 is a 6C5, while for V2, V3, such types as the 6SH7, 6AC7, 6SK7 or EF50 are suitable.

1949. Two isolating buffers, one untuned and one tuned, were added to the existing oscillator, which was itself cleaned up, the whole to be built into the transmitter rack on a separate panel and chassis. The completed circuit appears as Fig. 1 and the values of the components were found by the unorthodox cut-and-try method for maximum stable output with the valves used, which were the only types available.

Constructional Notes

The oscillator section proper was built at the extreme end of a standard chassis, screened both above and below the chassis deck from the remainder of the VFO. The "MO tuning" super-slow-motion drive from an old TU tuning unit was put to work to turn the tuning condenser C1, and with this in use, no band-spreading seems to be necessary.

The tuned buffer is likewise screened above and below the chassis deck, and its tank coil has, at 33 turns from the "hot" end, a tap, which can be earthed through S1, thus transferring the tuning of the circuit to 3.5 mc. The stage then operates as a doubler, when it is required to drive the main transmitter on the higher frequency bands. The switch employed for this operation is a high grade ceramic type —also ex-TU tuning unit. A milliameter may be inserted in the anode lead of the final buffer valve, if required, to give an indication of resonance, but this is not essential.

A neon bulb touched against the coax output socket nearly takes off when the final stage is tuned through resonance, but no "pulling" of the original frequency is experienced. An alternative method of coupling to the main transmitter would be by means of a two-or-three-turn link from the final buffer tank, but as the "SWM 25-watt rig" is capacity-coupled throughout, similar coupling was once more employed.

As always, the most rigid and direct methods possible of construction and wiring should be used and it is strongly recommended that the coil formers be firmly bolted to the chassis; however, no difficulties of any kind were encountered at any stage of the construction of the protoype, and layout or positioning of components does not appear to be critical.

Table of Values

Circuit of the Driver Unit

C1	= 250 $\mu\mu$F max.	C14	= 100 $\mu\mu$F max.
C2, C3, C13	= .001 μF, silver mica.	C16	= 0.1 μF paper, 500v wkg.
C4, C7, C10, C15	= 100 $\mu\mu$F, silver mica.	R1	= 100,000 ohms.
		R2	= 25,000 ohms, 10 watts.
C5, C6, C17	= .01 μF, mica.	R3, R6	= 47,000 ohms.
C8, C9, C11, C12	= .01 μF paper, 500v wkg.	R4, R7	= 150 ohms.
		R5, R8	= 25,000 ohms.

All resistors one watt rating except where otherwise specified.

L1 : 65 turns, 30 SWG enamelled, close wound on 1¼" diameter "Formo" ceramic former.
L2 : 50 turns, 22 SWG enamelled, close wound on 1½" former, tap 33 turns from "hot" end. *See text.*
S1 : *See text.*
RFC : Standard transmitting RF choke.
J1 : Closed circuit key jack.

(N.B. If an anode current milliammeter is inserted at "X," a .01μF condenser will be required at the junction of the RFC and the meter, as an RF by-pass to earth).

Conclusion

Results were, to say the least, most encouraging. On test, the VFO was allowed to warm up for five minutes, and then beat in with a Class-D wavemeter megacycle check note on 14 mc. After an hour, the beat note was so low as to be almost imperceptible—certainly less than 50 cycles.

Two-Metre Converter for the S.640

BUILT-IN 12AT7 CC UNIT

J. N. WALKER (G5JU)

This article will be of particular interest to the owners of S.640 receivers. By the incorporation of the CC converter described here—designed to fit inside the "640" cabinet and to draw its HT/LT feeds from the receiver's existing power supply — the coverage of the S.640 is in effect taken up into the two-metre band by tuning on the converter IF range; thus, the "640" can be made self-contained for all bands 1.7-144 mc. The converter itself is a well tried CC design using two only of the modern 12AT7 twin triodes in the RF-mixer-oscillator functions. Alternatively, the converter can be built up as a separate unit with its own power pack for external operation; or it could be adapted to fit inside the cabinet of several other makes of receiver, in the same manner as here described for the S.640.—Editor.

IN the April, 1953, issue of *Short Wave Magazine* there appeared brief technical details of the "ON4BZ" design of two metre converter—a design which has been attracting much attention of late among VHF enthusiasts, and which is actually based on some original work by G6VX. The present article deals with a particular physical version of this converter, and, for various reasons, it has been found desirable to make minor alterations to the circuit appearing on page 114 of the April issue. The main variation is the omission of the cathode follower IF stage, output being taken from the link winding.

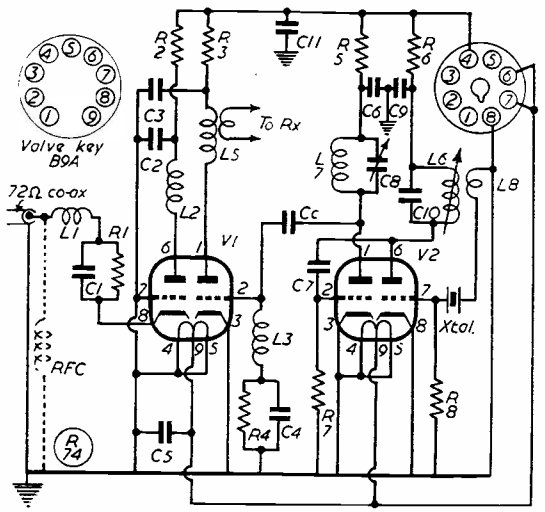
The original intention was to build the converter to fit on to the lid of a "640" receiver —that is, to the underside of the lid. However, it was obvious that it would be a rather tricky business arranging the components of the converter in a way which would not foul the two variable condensers and the valves, but another objection lay in not so much the difficulty so much as the awkwardness of fitting the leads for aerial, IF output and power, seeing that the lid would need to be lifted occasionally. It was therefore decided to construct the converter as a unit to bolt on to the available holes in the top of the mains transformer, utilising the space towards the rear of the cabinet. One snag also exists here—the original EF39 valve, if left in position, will undoubtedly foul parts of the converter, and it is necessary to change the valve (and valveholder) to a type 6BA6 or similar. In any case, this is a desirable modification as it results in improving the performance of the S.640.

Where it is not desired to carry out this modification, or if for any other reason the converter is required as an external unit, the

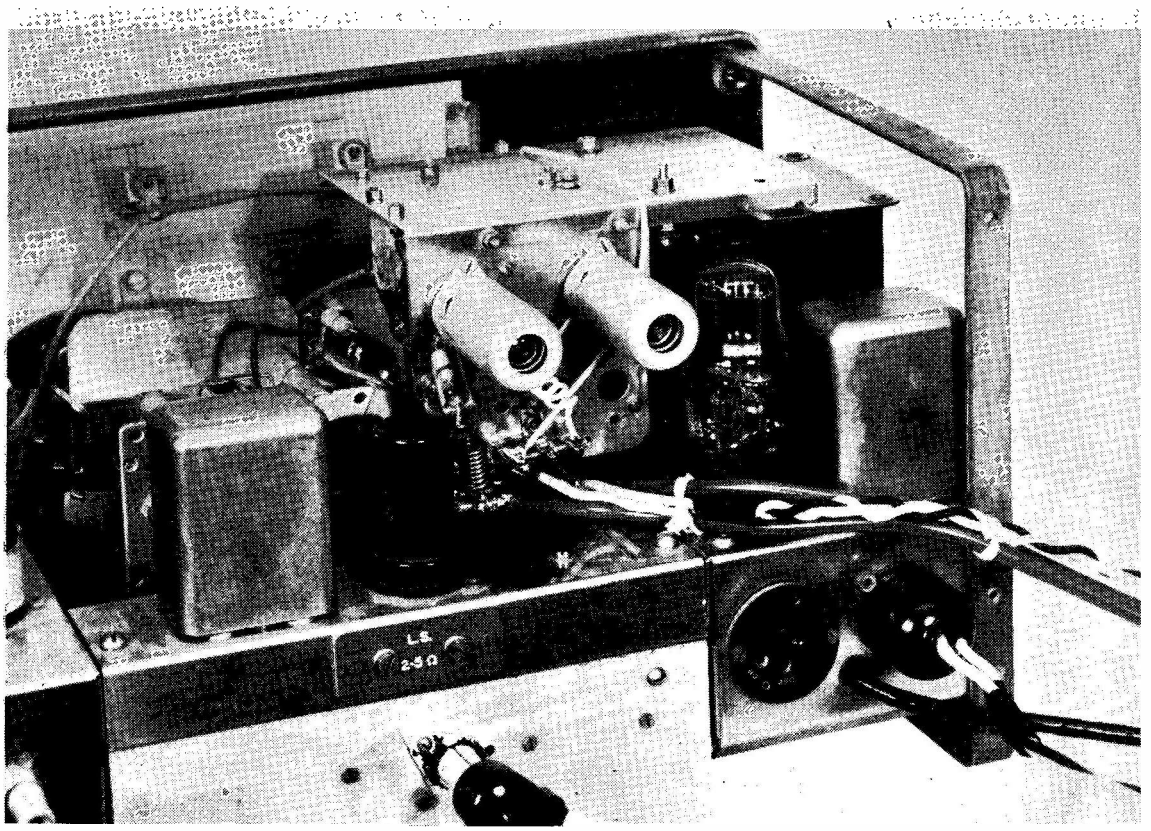
Table of Values

Circuit of the 12AT7 Two-Metre Converter.

C1, C2, C5, C6 = 750 $\mu\mu$F Moulded Mica (midget type).
C3, C9, C11 = .001 μF Moulded Mica.
C4, C7 = 50 $\mu\mu$F Ceramic.
C8 = 3/30 $\mu\mu$F Concentric Trimmer.
C10 = 20 $\mu\mu$F Ceramic.
Cc = Injection coupling — *see text.*
R1 = 220 ohms.
R2, R6 = 5,000 ohms (2 watt).
R3, R7 = 150,000 ohms.
R4 = 10 megohms.
R5 = 1,000 ohms.
R8 = 5,000 ohms.
(*All Resistors ½-watt unless otherwise stated*).
L1 = 7 turns 16g. enamelled, ¼" inside diam., ½" long, air-spaced.
L2 = 3 turns, 22g. enamelled, spaced two wire diameters at flange end of Eddystone Cat. No. 847 former.
L3 = 3 turns, 22g. enamelled, turns spaced one wire diameter, at other end of same former holding L2 coil.
L5 = 18 turns 30g. insulated wire towards flanged end of 847 former. (coupling winding two turns same wire at earthy end).
L6 = 7 turns 22g. enamelled, near flanged end of 847 former.
L8 = 1½ turns at other end of L6 former.
L7 = 4 turns, 16g. enamelled, air-spaced, ¼" inside diam., length ¾".
V1 and V2 = 12AT7, Tungsram.



Circuit of the 12AT7 Converter for the S.640. It is based on the design discussed in our April issue.



The 12AT7 Converter as fitted into an S.640 receiver, from which it derives its HT/LT supplies. Power is picked up from the plug on the right of the rear chassis apron, and the IF, 24-26 mc, is connected into the Ae/E terminals through coax cable. The only external connection is the aerial feeder.

design can easily be adapted to fit into a small metal box—the Eddystone Cat. No. 650 diecast box is ideal for the purpose. It would be a comparatively simple matter to bolt the box on to the rear of the cabinet.

Preliminary Comments

Presumably in the original circuit the crystal oscillates at its natural frequency and the second half of valve V2 acts as a high order multiplier. In the present circuit, the crystal is made to oscillate at its third overtone and the multiplier quadruples the fundamental frequency.

Some difficulty was experienced in preventing self-oscillation of the crystal circuit. With only one turn on the grid side of the coil, self-oscillation persisted, although a lock-in effect was observable near the crystal overtone frequency. This was not permissible, and, after some experiment, the circuit shown, in conjunction with the method of winding the coil, overcame the difficulty. With it, oscillation is positive at the proper frequency and *at no other*. It should be noted that the grid coupling winding is still very small and is comparatively widely separated from the main tuned winding. Evidently, in the writer's case, the crystal holder has a high self-capacitance, but in other instances, with different types of crystal mountings, some adjustment of the grid winding may be necessary to produce satisfactory results.

Because of the necessity of a wide IF bandwidth, it was decided to employ a fairly high intermediate frequency — somewhere in the region of 21 to 25 mc. There is also less likelihood of break-through in this region compared with the 10 to 15 mc often used. A lower IF could of course be employed, but a damping resistor would then be called for across the IF output coil. As it is, with the IF coil peaked to mid-band at 25 mc, there is a slight but noticeable falling off in response at the band edges and this effect would be greater at say 14 or 16 mc. At these latter frequencies, a certain amount of resistance

damping would be necessary to obtain a relatively even response over the whole bandwidth. Artificial damping means loss of gain, coupled with increased noise, and obviously both are most undesirable in a two-metre converter.

Choice of Crystal Frequency

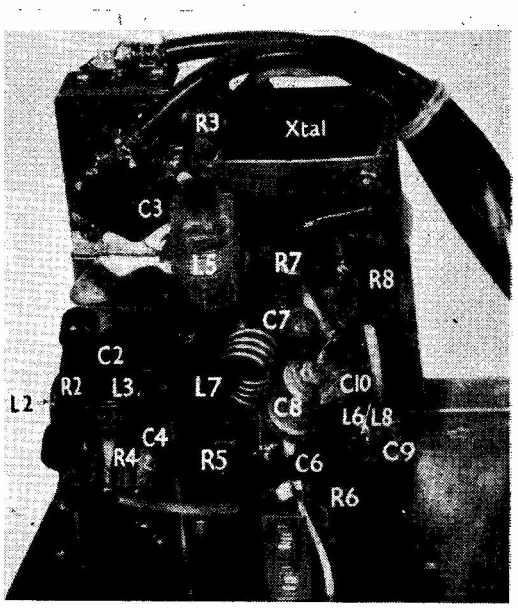
There is a very considerable advantage to be obtained by using a crystal as close as possible to 10,000 kc—it is that the tuning range of the receiver becomes 24 to 26 mc and obviously it is a simple matter mentally to relate the frequency of the received signal —or, conversely, one knows just where to look for a signal, the frequency of which is known. Admittedly, when a crystal is used in the overtone mode, the resulting frequency is not an exact multiple of the original calibration frequency, but for two-metre work at least, the difference will not be such as to cause any serious loss of accuracy.

A point which has to be watched is the avoidance of " birdies " and the most serious one will be due to the image signal falling within the tunable range of the receiver. For instance, in a " 640 " receiver, with its 1.6 mc intermediate frequency, the image will be found 3.2 mc *below* the fundamental frequency and, if the crystal is very close to 10 mc, the fundamental will occur at 30 mc, and the image at 26.8 mc. The crystal frequency therefore cannot be much below 10,000 kc without the image signal coming within the tuning range.

In the other direction, it is in order to go on up to say 10,400 kc at which extreme the lower tuning limit in the receiver, becomes 19.2 mc. It is useful to be able to check the fundamental crystal frequency on the receiver itself, to ensure that the crystal is actually taking control, and beyond 10,400 kc (which gives 31.2 mc), this is not possible.

In the case of a receiver which has a 465 kc IF channel, the image signal will of course appear much closer to the fundamental and further away from the tunable range. Then a lower frequency crystal can be employed, but it is still necessary to ensure adequate separation between the fundamental and the higher edge of the tunable range, since a fairly strong signal is injected into the receiver. For example, a 9,900 kc crystal will have a fundamental of 29,700 kc, an image at 28,800 kc (approx.), and the tunable range will cover 25.2 to 27.2 mc, which is acceptable.

The circuit constants shown are such as to require little or no alteration over the recommended oscillator range of 10,000 to 10,400 kc. One or two additional turns may be necessary on the IF coil L5 if the intermediate frequency falls around the 20-21 mc mark.



General arrangement underneath the little chassis of the 12AT7 VHF converter, showing layout of the main parts.

Suitable crystals, in small FT243 holders, are readily available from *Magazine* advertisers.

Construction

The chassis—if it can be called a chassis—is simply a piece of metal (brass for preference, but aluminium will serve) measuring $3\frac{1}{2}$ inches wide and $4\frac{1}{2}$ inches or more long. At right angles to this, and facing towards the rear as seen mounted inside the receiver, is another piece of metal $3\frac{1}{4}$ inches square. On this latter are mounted the two B9A Noval valveholders, with their centres $1\frac{3}{4}$ inches apart and $1\frac{1}{4}$ inches away from the base plate. These two pieces of metal hold all the components, the extended length being used for fixing to the mains transformer. Between the two valveholders is placed a small metal screen measuring $2\frac{1}{2}$ inches long by $1\frac{3}{4}$ inches deep.

Much information relative to the construction can be gained from the photographs and the following details may assist further.

Oscillator Stage

The coil is wound on one of the new Eddystone Cat. No. 847 polystyrene formers. The mounting flange is carefully sawn off and is used thereafter for mounting the coil L7 and its associated components. 6BA bolts and soldering tags are fitted to the existing holes

in the strip and another hole is made at the centre of the bar for mounting purposes. The bolt holding the anode end of the coil is $\frac{3}{4}$ inches long and is allowed to project through a hole made in the screen—from the other end of this bolt a wire (encased in sleeving) is made to lie near the grid wire from L3 to act as the coupling condenser marked "Cc" in the diagram. A single tag at the rear of the "chassis" forms the HT positive connection and holds R5 and R6. Two 6BA holes are made in the flange remaining on the L6 coil former to enable this to be mounted close to the valveholder.

Signal Frequency Stage (V1)

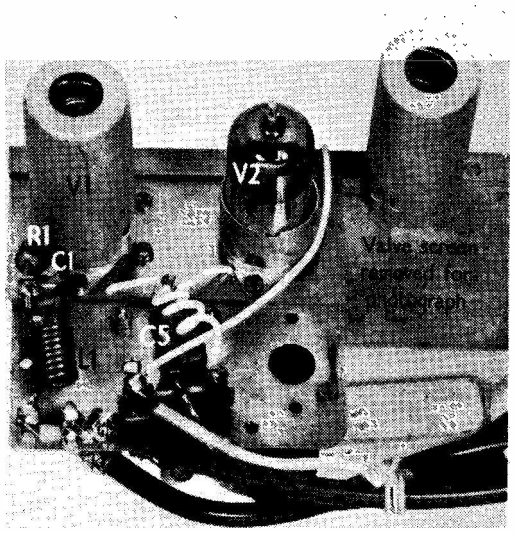
Instead of air spaced tuning coils and the special coupling link as in the original, it has been found preferable to "solidify" this part of the design by winding both L2 and L3 on a single polystyrene former which fits conveniently into the available space. The coils in the accompanying circuit bear the same numbers as in the original circuit (see p. 114 April issue *Short Wave Magazine*), hence L4 does not appear. The winding details should be carefully followed because the whole performance of the converter is dependent on proper resonance within the 145 mc band being obtained in this part of the circuit. R4/C4 have been moved to the earthy end of L3 for convenience, but the operation is not affected thereby. A single tag strip supports R2.

The input coil L1 is mounted on the valve side of the square piece of metal, where it is adequately screened. Tag strips are used to hold it and also to hold R1/C1—a sleeved lead from the latter passes through a small hole direct to the tag on the valveholder.

A tag strip supports the coaxial cable coming from the aerial—it is assumed the latter is of the folded dipole type, giving DC continuity to the cathode circuit. If the feeder is open circuit to DC, a small RF choke should be connected across the termination of the cable, as shown dotted in the diagram.

IF Output

The position occupied by the IF output transformer (L5) is clear from the photograph. The polystyrene former is lifted away from the metal base by $\frac{1}{4}$ in. pillars as it is then a little more out in the clear, but the pillars are not essential. A small additional screen, visible in the photograph, has been fitted, but it is a refinement which probably makes but little difference. Two tags of a three-way strip



Top view of the two-metre Converter for the S.640, using two 12AT7 valves in RF-mixer and oscillator-multiplier stages. Construction is for fitting inside an S.640. The same design could be adapted for other makes of receiver.

take the ends of the output link winding and support the coaxial cable which goes to the receiver input. The third tag is a holding point for R3.

Miscellaneous Points

The power leads are taken to an octal plug, the connections shown in the circuit being those necessary for the unit to be plugged directly into the socket at the rear of the "640" receiver. The wiring is of course likely to be different in other receivers.

When fixing the "chassis" to the mains transformer, 4BA bolts should first be secured in the existing holes, then the converter mounting plate bolted down with additional nuts. It may help to ensure proper clearance if small pillars are first placed over the the 4BA bolts, to bring the converter plate well up towards the lid of the receiver.

The metal screens, as purchased with the valveholders, are necessary around the valves. The consumption is 0.6 amps LT, and about 13 to 15 mA HT. This load does not appear to place any undue strain on the mains transformer as fitted in the "640."

Testing

A grid dip oscillator is invaluable in enabling a check to be made against the various tuned circuits before the converter itself is actually energised. The crystal circuit should be brought somewhere near 30 mc (or whatever

the frequency selected) and then C8 adjusted to bring the multiplier section to resonance at about 120 mc. If the GDO does not cover the latter frequency, L7/C8 can be adjusted subsequently by placing a meter to read the voltage at the junction of C3 and R3, and then rotating C8 (from minimum towards maximum capacitance) until the voltage is at maximum.

Next, the GDO should be held against L2 and the resonant frequency ascertained. Wound as described, resonance may occur at a frequency a little higher than 145 mc, and this should be the aim when winding the coil, as it is much easier to make corrections in a lower direction than towards a higher frequency. The frequency can be reduced if necessary by adjusting the length of lead in circuit to the by-pass condenser C2. Or a short length of wire—even ½ in. will make a surprising difference—can be inserted between the end of the wire coming from the coil and the bypass condenser. By the way, although the resonance will be fairly sharp with the converter unenergised, it becomes much broader, due to valve loading, when the valve heater is alight.

It has been found difficult to make any conclusive test in the case of the input coil L1. For one thing, the narrow diameter makes it difficult to secure adequate coupling, and, for another, the termination has a considerable effect on the reading obtained. So it has been taken for granted that the coil originally used is right for the frequency and results go to prove this is so.

The core in L5 should be rotated until the GDO gives a reading at the proper frequency —whatever it may be. Again, this operation can be left until later, when movement of the core will bring about a slightly increased noise level in the receiver when resonance is reached.

Practical Trial

The converter is now ready for an air test. If possible, a separate small power unit should be used, with the converter external to the receiver. The core in L6 should be rotated until the crystal oscillates steadily, as indicated by listening to the signal tuned in on the receiver.

The voltage at the junction of R3 and C3 should be measured and, as mentioned in the earlier article, the voltage with the crystal inactive should be near 40v. Allowing the crystal to oscillate will cause a rise in the reading and it should be brought up to around the 60 mark by final adjustment of C8 and by adjusting the spacing of the injection "condenser" Cc, pushing the wire closer to the grid lead of L3 if necessary.

With the IF cable attached to the receiver aerial input terminals (it is preferable to fit a coaxial socket at this point), the core in L5 should be set for maximum response, *i.e.*, increase in noise level, at the centre of the tunable band.

Finally, when satisfactory operation has been obtained, the unit can be "buttoned" into the receiver. A quick change-over of octal plug and aerial connection enables the converter to be brought into use at will.

As is to be expected from the all-triode line-up, the noise level is remarkably low, but it is evident the overall sensitivity is high and the converter is giving a good account of itself in comparison with an older type which uses 6J6 valves and has a tunable oscillator.

BRITISH AMATEUR TV TRANSMISSION

According to a list prepared for us by G3CVO, busy honorary secretary of the British Amateur Television Society, there is no G station actually able to transmit vision *and* sound on the 430 mc band. G3CTS/T in South London will be so equipped, but this is the station of the Television Society proper, and is not an amateur effort. One other station, GI3FWT/T of Belfast, transmits vision on 437.75 and 2350 mc, with sound on the Top Band. Five more stations — G2DUS/T, G2WJ/T, G3BLV/T, G3FNL/T and G5ZT/T — radiate vision only in the 70-centimetre band, apparently without any sound accompaniment, on frequencies ranging from 427 to 445 mc. Three different vision transmitting standards are at present in use, of which the 405-line interlace is the commonest in that it has been adopted by six of the stations operating or under construction. When G3ACK of Blyth, Northumberland, is in action, he will be the first amateur station able to radiate vision *and* sound in the same band, 430 mc. G3CVO (Gerrards Cross) will put out his sound on the Top Band. The total number of G stations listed is nine. Details are also given of PAØZX/T; he operates a system all his own, quite different from any of the others. If you hear a buzzing on 145.1 mc around 1500-1700 BST on a Sunday afternoon when the band is open for EDX, look for the sound in the 3.5 mc band!

"MODEL ENGINEER" EXHIBITION

The popular annual event organised by our well-known contemporary *The Model Engineer* takes place during August 19-29 at the New Royal Horticultural Hall, Westminster, London, S.W.1. As in recent years, a feature of the Exhibition will be the radio control of models, and in the demonstration area examples will be given of all branches of model engineering.

VHF BANDS

A. J. DEVON

No Decorations for DL3QA—
Says It was All in Fun—
Band Planning for 430 mc—
Station Reports and Activity—
Fair GDX but Little EDX Worked—

THE first thing to do this month is to print a retraction by DL3QA of his claim to have worked anybody by moon reflection. His "explanation," if such it can be called, is that it was a hoax perpetrated in the interests of focussing attention on the possibility of VHF DX *via* the moon. The astonishing thing is that he took *Das DL-QTC* with him in this, even to the extent of publishing a photograph, in their April issue (from which our quote was taken), of DL3QA sighting a tiltable 24-element array.

Now, all this can be looked upon either as a huge joke, or as a piece of irresponsible foolery on the part of those who manage *Das DL-QTC* which, believe it or not, is supposed to be the official organ of the German Amateur Radio Society. It might therefore expect itself to be regarded as a responsible technical publication. At that, some retraction or explanation should have been forthcoming in their May issue, but nothing appeared.

Naturally, the publication in the April *Das DL-QTC* of the claim credited to DL3QA aroused a tremendous, not to say an embarrassing, interest — so much so, that DL3QA himself has been compelled to circulate an explanation, in which he has the effrontery to abuse *Das DL-QTC* for not making it clear it was a hoax!

So there we leave this idiotic business, merely saying that anyone who thinks your old A.J.D. was had for a sucker would only be partly right, since it does not in any way affect the validity of the arguments for working VHF DX by moon-reflection, as discussed in some detail in May "VHF Bands." It may yet be that the whole episode will be justified by some real results. And in our next we shall be printing an article showing how moon positions can be worked out from nautical data.

Activity and Conditions

In spite of a short month and —as the "VHF Weather Report" elsewhere in this issue shows— very few EDX openings, we have a good batch of reports, and some 20 movements claimed for the Tables. GDX conditions have been quite good, with fair activity and more new stations showing up. As to conditions, the picture is much as it was this time last year, but activity is at a much higher level. More stations appear consistently, and we could list several regularly claimed for their counties by new entrants and those who move in the Tables.

Activity in the 70-centimetre band is increasing fast—we now list 42 stations as fully equipped (compared with 23 in April), with 34 known frequencies, all well distributed over the country. EI2W (Dublin) is a noteworthy addition and he is already on the DX trail on the 430 mc band; on May 31 he received G5YV (Leeds), the distance being something over 200 miles.

Our 430 mc listings are still not complete, and we would very much like to have full details from all operators who are "going" on this band, so that everyone can see where the active stations are and what the frequency distribution is. In connection with the latter point, it was put forward, and agreed, at the VHF meeting in London in April 1951 that the band 434-436 mc be adopted as the development area: some 20 of the stations we list conform. This 434-436 mc was suggested not only because it is in harmonic relation with the main area of the 144 mc band, but, more importantly, because it was considered easier to have a known two-megacycle band width to search, rather than the whole 420-460 mc, which would be the case if frequencies were chosen at random.

Actually, if everybody on 70 cm tripled from his two-metre Zone frequency, we would get automatic zoning and complete coverage of the central area of the 430 mc band. On the other hand, this arrangement does leave unused some 34 mc of a band no less than 40 mc wide! But if amateur TV and model control— TV being necessarily wideband and model control mainly SEO— would agree to take the areas 420-432 mc and 438-460 mc respectively, we should arrive at a tidy plan for 70 Centimetres which would use the whole band and give everyone room to play. Band allocations in this part of our spectrum must be governed by special considerations, on a live-and-let-live basis. The TV stations must have width, likewise the model controllers because their SEO transmitters drift, while what we (on the communications side) need is a specified frequency area within which we can find one another, and which can be developed for communication purposes.

If these arguments are accepted, then the logical approach to band planning on 430 mc seems to be as suggested above, with the slight additional amendment that we should have a guard band one megacycle wide at each end of the communications area.

However, this is for the future. In the meantime, some very good work is being done on 70 cm, in

the band 432-436 mc; the level of interest and activity is such that we are being urged to devote a separate section exclusively to Seventycems. That will, of course, be the natural outcome as the volume of reports for this band increases.

TVI on May 27

It may be remembered that the daily press referred to widespread TVI on the Alexandra Palace and Holme Moss channels during the evening of May 27. So far as we noticed on this occasion the usual press *canard* that "it was thought to be due to amateur wireless enthusiasts" was not offered as the explanation. On May 29 the BBC issued a cagey statement that the interference "was caused by stations on the Continent which are not receivable in this country except on occasions when natural conditions favour long-distance propagation at TV wavelengths . . . . such conditions are likely to occur at this time of year. . . . . There is nothing the BBC can do to overcome this trouble . . . . "

As our VHF weather chart gives a *nil* return for May 27, the conclusion must be that it was a sporadic-E effect—a patch of intense ionisation in the lower ionosphere—such as we used often to experience during the summer in the old five-metre (56 mc) days, when the Italians would suddenly roar in, workable at S9 + both ways for several hours. This used to happen on what is now, roughly, the TV band.

We mention this here because it is just as well that all VHF operators should be informed on these matters; the quick way out for many people is to try to pin any TVI, however improbable or unjustified, on local amateurs.

What we termed spor-E does not, curiously enough, appear to affect 144 mc at all—at least, we have never yet had a report which ties up with a sporadic-E manifestation. The reason would seem to be that these intensely ionised layers occur at levels to which waves of 50-60 mc can penetrate, but which are too high for the 144 mc band.

TWO-METRE ACTIVITY REPORT

(Lists of stations heard and worked are particularly requested for this section, set out in the form shown below.)

G6RH, Bexley, Kent.

WORKED: G2ANT/A, 2BMS, 2BMZ, 2BRR, 2CZS, 2DUV, 2HIF, 2UJ, 3AAN, 3CKX, 3CCH, 3DKZ, 3EOH, 3EVV, 3FD, 3FUH, 3FUM, 3FYY, 3GBO, 3GOP, 3HAZ, 3HSC, 3IEX, 3IIR, 3ISA, 3IWA, 3JKW, 3WW, 4RO, 5BM, 5DS, 5UM, 5YH, 5YK, 5YV, 6AG, 6XX, 8LN, 8MW, 8VR, GW2ADZ, 5MA/P.

HEARD: G2CNT, 2FJR, 2HCG, 3DO, 3FAN, 3GHO, 5BD, 5UD, 6NB, 6PG, 6YP, 8DV/A, GW8UH. (*May* 3 *to June* 11).

G2FJR, Sutton Bridge, Lincs.

WORKED: DL1LB, G2ATK, 2FCL, 2FKZ, 2FNW, 2FWW, 2HCJ/P, 2HIF, 2HOP, 2MV, 2WA, 2XV, 3AAN, 3AEP, 3ANB, 3BEX/P, 3BK/P, 3BLP, 3CCH, 3CGQ, 3EEL, 3EHY, 3FFV, 3GCX, 3GJZ, 3GMW, 3GNJ, 3GZM, 3HWF, 3IAI, 3JKW, 3WW, 3WW/P, 3YH, 4SA, 5BD, 5BM, 5HB, 5JO, 5JU, 5MA/P, 5ML, 5UD, 5UF, 5UM, 5YV, 6AG, 6NB, 6PG, 6WF, 6XX, 8AO/MM, 8DM, 8MW, 8VN, 8WV, GW5MA/P, PAØFB.

HEARD: G3EPW, 3FUM, 3FUW, 5JV, 5RW, 6RH, 6XY, GW2ADZ, PAØFP. (*May* 1 *to June* 9).

G6NB, Brill, Bucks.

WORKED: EI2W, G2FO, 3AGA, 3AGS, 3AOO, 3AUS, 3BW, 3CC, 3DA, 3DH, 3EPW, 3FFV, 3GCX, 3GNJ, 3HSD, 3IUD, 4GR, 4JJ, 5MA/P, 5ML/P, 5QU, 5UD, 5YV, 6QT, 6XX, 8AO/MM, 8GL, GC3EBK, GD3DA/P, GW3ENY, 3FYR, 8SU, PAØFB, ØFC, ØNL. (*All May* 11 *to June* 10).

G5MA/P, Near Oakham, Rutland.

WORKED: G2BMZ, 2DTO, 2FJR, 2FNW, 2HDZ, 2MR, 2NH, 2PU, 3AAN, 3BK/P, 3BKQ, 3DA, 3DVK, 3EHY, 3FMI, 3FR, 3GBO, 3GDR, 3GHO, 3GSE, 3HWJ, 3IOO, 3ISA, 3IWJ, 4AU, 4CI, 4RO, 4SA, 5DS, 5JU, 5ML, 5YK, 5YV, 6CI, 6LI, 6NB, 6PG, 6TA, 6WF, 6XX, 8MW, 8NM, 8OU, 8VN, GW2ADZ, 3ENY, PAØFC.

HEARD: G2UQ, 3FUM, GC3EBK. (*May* 23 *and* 24).

G3DLU, Weston-Super-Mare, Somerset.

WORKED: G2BMZ, 3FWW, 3FKO, 3HAZ, 3HWF, 8DA, GW3BNQ.

HEARD: G3FMO, 5DS, 5YV, 6NB, 8DL, GC3EBK, GW8UH. (*May* 16 *to June* 5).

G3IOE, Newcastle-on-Tyne, 3.

WORKED: G2BCY, 3GHO, 5BD, 5QU, 6LI, 8PX.

HEARD: DL3FM, G2DKH/P, 2DRA, 2FO, 2FTS, 3AOO, 3BLP, 3CC, 3DMK, 3DVK, 3FAN, 3WW, 4JJ/P, 5MA/P, 5YV, 6NB, 8ML, GM3EGW, 3IBV, PE1PL. (*March* 22 *to May* 31).

GM3DIQ, Stevenston, Ayr.

WORKED: EI2W, 3S, GI5AJ, GM2BUD, 3DDE, 3EGW, 3FOW, 3FVX, 3IBV, 4HX, 5VG, 6KH, 6WL.

HEARD: EI6A, GM3BDA.

G3GHO, Roade, Northants.

WORKED: G2ANT/A, 2CNT, 2FTS, 2FZU, 2HCG, 2WA, 3AAN, 3BK/P, 3BKQ, 3DIV, 3FAN, 3FQS, 3FUM, 3GHI, 3GVI, 3GWB, 3HWF, 3IUK, 3JKW, 3XC, 3YH, 4RO, 4SA, 5BC, 5MA/P, 5YK, 6NB, 6PG, 8VM, 8VZ, GD3DA/P, GW2ADZ, ON4BZ.

HEARD: EI2W, G2ASF, 2FCL, 2FJR, 2FKZ, 2FO, 2HQ, 2NM, 2WJ, 2XV, 2YB, 3ABA, 3ANB, 3AOO, 3AUS, 3BW, 3CJY, 3DJX, 3FD, 3FIY, 3FOU, 3FSD, 3FUW, 3GBO, 3HAZ, 3HXS, 3IIT, 3IOO, 3IPG, 3SM, 3WS, 4AP, 4AU, 4MW, 4RK, 5BD, 5DS, 5HB, 5JO, 5JU, 5QL, 5UM, 5YV, 6AG, 6CI, 6CW, 6RH, 6YU, 8DM, 8DL, 8OU, 8WV, 8MW, GW3FYR. (*May* 16 *to June* 10).

70-Centimetre Band Only

G4RO, St. Albans, Herts.

WORKED: G2FKZ, 2RD, 2WJ, 3GDR, 5DT, 6YP.

HEARD: G3BKQ, 3FAN, 3FP, 3IAI.

G3AOO, Denton, Manchester.

WORKED: G2JT, 3AYT, 3DA, GW2ADZ, 5MQ.

HEARD: G2OI, 3BKQ, 3BPJ, 3IOO, 5YV.

Contest Note

The first of our VHF Contest sessions—"Quick Contest No. 1"—takes place over the week-end July 25/26. The rules (*see* p.239, June) have been framed to make things as simple as possible, with a scoring system to encourage every sort of contact. There are no complications at all. Everybody can come in on a Contest of this sort, and we look forward to a good party, with new counties to gain and new stations to work. Indeed, it is those who have come on the band more recently who nowadays have most to gain from a contest, since they can always move up in the Tables. By contrast, the big men have done it all before, and have nothing to lose—but they can help to give the event pace and interest by taking part, as we hope they will.

Some Station Reports

G3IOE (Newcastle), on 144.3 mc, is still looking for GDX with his new 12-ele stack; the interesting thing is that he hears it all right—stations he lists are G2FTS (Hailsham), G3AOO (Denton), G3BLP (Selsdon), G3FAN (Ryde, I.o.W.), G5MA/P, G6NB (Nr. Aylesbury), and G8ML (Cheltenham), who have all been vigorously called. With G3IOE, the most consistent station now on the band is G6NB, always R5 on CW, and often on phone, too.

For new stations on 70 cm, G3BKQ (Blaby, Leics.) has worked G2HCG (Northampton), G3AOO (Denton), G3CWV (Birmingham), G3IAI (Northampton), G3IOO (Oswestry), and G4RO (St. Albans). Others frequently

QUICK CONTEST No. 1

Week-end July 25-26. Rules on p. 239, June issue. Make it a Party!

SEVENTY-CENTIMETRE STATIONS— Fourth List

CALL	LOCATION	FREQ. (mc)	EQUIPMENT
DL3FM	Mulheim-Ruhr	434.2	Tripler, 32-ele stack, SEO Rx
EI2W	Dublin	432.54	Tripler, 16-ele stack, (? Rx)
G2BFT	Solihull	433.17	Tripler, 16-ele stack, (? Rx)
G2BVW	Leicester	432.60	Straight PA, 5-ele Yagi, Special Rx
G2CNT	Cambridge Airport	435.2	Tripler, CC Rx, 12-ele stack
G2DDD	Littlehampton	435.6	Tripler, 16-ele stack, CC Rx
G2FKZ	London	435.95	*no details*
G2FNW	Melton Mowbray	?	Tripler, 5 ele-Yagi (? Rx)
G2WJ	Great Canfield, Essex	436.00	Straight PA, CC Rx, 16-ele stack
G2XV	Cambridge	435.10	Tripler, CC Rx, 12-ele stack
G3ABA	Coventry	?	Tripler, 16-ele stack (? Rx)
G3AOO	Denton, M'cr.	433.13	Tripler, 4/4/4, CC Rx
G3AYT	Hyde, Ches.	433.13	Tripler, City Slicker, CC Rx
G3BKQ	Blaby, Leics.	434.05	Tripler, 16-ele stack, CC Rx
G3DA	Liverpool	432.6	Tripler, 6-ele Yagi, CC Rx
G3EOH	Enfield, Middx.	436.03	Tripler, G2DD C'vtr., 12-ele stack
G3EUP	Swindon, Wilts.	433.9	Tripler, 3 stk'd dipoles, CC Rx
G3FFC	Leicester	?	Tripler, 16-ele stack (? Rx)
G3FIJ	Colchester	435.18	Tripler, SEO Rx, 5-ele Yagi
G3FZL	Dulwich, S.E.22	435.24	Doubler, CC Rx, 12-ele stack
G3GZM	Tenbury Wells, Worcs.	?	Tripler, 16-ele stack (? Rx)
G3HAZ	Northfield, Birmingham	435.00	Tripler, SEO Rx, 4/4 Yagi
G3HBW	Wembley, Middx.	434.61	Tripler, 12-ele stack, CC Rx
G3HTY	Kidderminster, Worcs.	?	Tripler (? beam array and Rx)
G3ILI	London, S.E.22	434.97	Tripler, 6-turn Helix, R.1294 mod.
G3IOO	Oswestry, Salop.	432.54	Tripler, 16-ele stack, SEO Rx
G3IRA	Swindon, Wilts.	436.50	Tripler, SEO Rx, 8 d'ples stk'd
G4AP	Swindon, Wilts.	436.50	Tripler, CC Rx, 3 stk'd D'ples
G4RO	St. Albans, Herts.	434.16	Tripler, 16-ele stack, CC Rx
G5DT	Purley, Surrey	?	*no details*
G5YV	Leeds	432.72	Tripler, 8-ele stack, G2DD C'vtr.
G6CW	Nottingham	?	*no details*
G6NF	Shirley, Surrey	435.47	Straight PA, 5-ele Yagi, SEO Rx, ASB8 cavities
G6RH	Bexley, Kent	434.7	Tripler, 16-ele stack, ASB8 C'vtr.
G6YP	London, S.E.5	435.75	*no details*
G6YU	Coventry	434.10	Tripler, CC Rx, 16-ele stack
G8QY	Birmingham	?	Tripler, 24-ele stack (? Rx)
G8SK	Enfield, Middx.	433.15	Tripler, G2DD C'vtr., 8¼-waves stk'd
G8VR	London, S.E.22	435.0	Tripler, SEO Rx, 12-ele stack
GW2ADZ	Llanymynech, Mont.	432.90	Doubler, 32-ele stack (? Rx)
GW5MQ	Mold, Flints.	432.58	Tripler, 3-ele Yagi (? Rx)
ON4UV	Fayt-lez-Mange, Nr. Charleroi	434.7	Straight PA, CC Rx, 32-ele beam

This list is incomplete as regards many stations known to be equipped for the 70-centimetre band. All 430 mc operators are asked to forward details for inclusion in this Table, under the headings given.

worked, still on 430 mc, are G2FNW, G3GZM, G3HAZ, G6YU and GW2ADZ. And just to keep his hand in on Two, G3BKQ goes up four in All-Time Counties with Cardigan, Durham, Rutland and Suffolk.

GD3DA/P was on Snaefell during mid-June, as mentioned here last time, and gave a number of stations a brand-new contact. We are without full details from G3DA himself, as his activity up there was right on the dead-line for this issue. Among his many two-metre contacts on June 10 was G3GHO (Roade, Northants.), who gives May 25—*see* VHF Wx Chart—as being exceptionally good, when ON4BZ was worked at 1040 BST. G3GHO can hear G5YV working EI's and GI's, and asks that the latter aim south-east occasionally; a new station worked for Huntingdonshire was G3JKW, from whom we have not yet heard.

G5DS (Surbiton) goes up in both Tables, with the goodly total of 467 different stations now worked. Harold of G5YV has been tussling with a G2DD 70 cm converter, finding that he had to shorten the mixer line to get resonance at 430 mc; with two more counties worked (I.o.Man and Co. Antrim) he keeps comfortably out in front in the Annual Table. By the way, will all interested please remember that we wind up this Table for the year at the end of next month, so that new scores should be claimed as soon as possible.

G3IWJ (Liverpool, 8) is exclusively VHF and active on both bands, 144.315/432.945 mc, and some locals have been worked on 70 cm. G2FJR (Sutton Bridge), right on the edge of The Wash, asks that more people look his way about 1930 clock time any evening; he can not only give points in a contest, but also a county to many operators who say they are in need of Lincs. And though his effective aerial height is only about 10 feet, G2FJR had 328 contacts in the five months ending May 31.

G3HWJ (Surbiton) has not been very active, but two out of his three new counties were gained from G5MA's /P expeditions—like many others, he pays tribute to Bob's extraordinary enthusiasm. G3GHI (Purley) goes up two in Countries, with OZ2FR and SM7BE, worked during the earlier openings. G6RH (Bexley, Kent) shows a nice list of stations heard and worked—*see* "Activity Report" herewith—and G3HCU (Chiddingfold) writes to bring his scores up to date. He it was who, in a QSO on Ten, got the news from I1HC that he was watching the Coronation on his home-built TV receiver, as reported in the *Daily Telegraph* for June 3.

After an absence for aerial reconstruction, G4RO (St. Albans) is back again on both bands, and in just about a month had 135 contacts on two metres, with

TWO-METRE PROGRESS

British Records

		Miles
Sept. 1, 1948	G2BMZ-G6LK	140
Sept. 5, 1948	G2AJ-G5MQ	164
Sept. 14, 1948	G5BY-G5MQ	220
Sept. 14, 1948	G3APY-G5BY	227
Sept. 17, 1948	G5BY-G6OS	287
Nov. 12, 1948	G5BY-PAØZQ	380
Jan. 1, 1949	G2BMZ-PAØEO	384
May 13, 1950	GW2ADZ-PAØHA	417
June 28, 1950	G5BY-DL3FM	470
Sept. 13, 1950	G2BMZ-DL4XS/3KE	520
June 1, 1951	G5YV-SM7BE	602
Oct. 9, 1951	G5YV-F9MG	620
March 2, 1953	GC3EBK-OZ2FR	647
March 22, 1953	G5UF-SM6ANR	750

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14
From Fixed QTH Only

Worked	Station
61	G3BW
60	G3BLP (629)
58	G3EHY
57	G2OI (349), G6NB
56	G5YV (439), G8SB
55	GW5MQ
54	G2HIF (200)
53	G2AJ (519) G4CI,
52	G2NH, G3WW
51	G2HDZ (368), G4SA
50	G3ABA, G5DS (467)
48	G5BM, G5MA
47	EI2W (140), G3FAN, G5WP
46	G3GHO, G4HT (476), G5BY, G6YU (205)
45	G2XC, G6XM (356)
44	G3BK, G5ML (250), G3HAZ (194)
43	G3COJ, G5DF
42	G5BD
41	G2FQP, G3BA, G3DMU, G6CI (162)
40	G3CGQ, G4RO (256), G5JU, G8KL, G8OU
39	G2FJR, G2IQ, G3VM, G8IL (325)
38	G3APY, G3HBW, G8DA
37	G2AHP (350), G2FNW, G2FZU (180), G3GSE (383), G3HBW
36	G3CXD, G6CB (312), G6TA (259), G8IP
35	G3FZL, G3HCU (224), G3HWJ
34	G2FCL (182), G3BKQ
33	G3BNC
32	G2FVD, G8IC, G8VR, G8QY
31	G3GBO (364), G3HXO, G5RP
30	G2HOP, G5NF
29	G3AGS, G3AKU, G3BJQ' G5MR (153)
28	G3FIJ (163), GM3BDA
27	G3DAH, G3FIH, G6GR, GW8UH
26	G3AEP, G3CFR (125), G4MR (189)
25	G5SK
24	G3DO, G3FD, G3FXG, GM3EGW
23	G3CWW (260), G4LX, G5PY, G6PJ
22	G3ASG (150), G3BPM, G3FRY, G3GOP (122), G3HIL, G3ISA
21	G3SM (180), G6XY
20	G3EYV
19	G2AOL, G3DLU, G3FEX (118), G3GCX, G3WS, G3YH, G5LQ (176)
18	GM3DIQ
16	G3FRE, G3HSD, GC2CNC
15	G2DVD, G3IWA
14	G2DHV, G3GYY

Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties are worked.

GD3DA/P as best GDX. Over May 8-10, conditions were found to be good to the North, on May 25 to the East and West, with PA's heard weakly for a short time around 1900, and then on June 6-7 G3FAN was an excellent signal. On each day June 5-7, G4RO was testing with G2HCG, G3BKQ, G3FAN, G3GOP and G3IAI on 430 mc—the best result was his reception of G3FAN at RST-448 for a minute or so around 0830 BST, the distance being about 85 miles; two-way QSO was effected with G3BKQ, over 68 miles. The G4RO receiver for 70 cm is a CC job using the mixer arrangement first suggested in *Short Wave Magazine* by G3EJL—*see* June 1950.

Another VHF Receiver

G2BVW (Rearsby, Leics.) has an entirely home-built receiver designed for operation on both VHF bands exclusively. Using, of course, separate "fronts" for 144 and 430 mc, the IF tunes 24-34 mc in an IF section which is virtually a copy of the AR88, but using miniature valves throughout—thus, the RF side incorporates two 6AK5's, and the performance on 10 metres is noticeably better than on a standard AR88. On 430 mc, the RF stage is a 2C40, and the frequency changer another 2C40 in a coaxially-tuned circuit. The two-metre transmitter is 6 mc xtal—EF55 18 mc—EF55 36 mc—EF55 72 mc—CV6/144 mc—829 144 mc—Eimac 327A 150w. PA. For 70 cm, this same transmitter is used as far as the 829, which drives a QQE-03/20 tripler to 432.6 mc, followed by a QQE-06/40 PA in Class-C capable of giving about 30 watts RF *output*. Aerials are, for 70 cm, a 6-over-6 at 60 feet, and for two metres, a 4-over-4 at 50 feet. Stations heard or worked by G2BVW on the 430 mc band include G2FNW, G2HCG, G3ABA, G3APY, G3BKQ, G3FFC, G3HAZ, G5RW, G6CW, and G6YU. All this represents much good and interesting work, and we shall hope to hear more of G2BVW as time goes on.

As many people will know, G5MA was /P in Rutland (again) for the week-end May 23/24, when a total of 47 different stations was worked, with G2BMZ as best DX; GC3EBK was heard at RST-549 on the Sunday morning, but called without joy—which was bad luck, as it would have been a good 235-mile QSO and useful to both of them.

Soon after achieving his very first QSO on Two, G3CUZ (Leek, Staffs.) writes in to report himself. Though at about 500 ft. a.s.l., he is surrounded by higher ground, with the wall of the Pennines to the North. The G3CUZ transmitter is 9 mc xtal-12A6-12A6-TT11-RK34-832 PA, all the driver stages doubling so as to avoid the Holme Moss and Sutton Coldfield channels; operating this transmitter either on CW or on phone with constant modulation controlled carrier (as advocated by G3ENI in *Short Wave Magazine* for August and December 1951) produces no TVI on the domestic receiver; his converter is the G6VX CC design (also as described in the *Magazine*) into a BC-455; the aerial is a 12-element stack, to the design by G5RZ in our issue for November 1952, at a height of 37 ft., which seems to be working "as per book." Frequency is 144.608 mc, and G3CUZ expects to be among those present most evenings about 1930 BST, looking for QSO's with all comers.

G3HBW (Wembley, Middlesex) sends data for the Seventy Centimetre Station List, and hopes to keep "very active on both bands." G2DDD (Littlehampton), whom we well remember from pre-war days, also reports for the 70 cm

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

13	G3BLP (DL, EI, F, G, GC, GD, GI, GM, GW, ON, OZ, PA, SM). G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, ON, OZ, PA, SM).
12	G2HIF, G3WW.
11	G2AJ, G3ABA, G6NB.
10	G2FQP, G2HDZ, G3BK, G3EHY, G3GHI, G5DS, G6LI, GW5MQ, ON4BZ, (DL, EI, F, G, GC, GW, ON, OZ, PA, SM).
9	EI2W, G3GHO, G4SA, G5BD, G5MA, G6RH, G6XM, G8IC.
8	G2AHP, G2XC, G3BNC, G3FAN, G3HCU, G3VM, G5BM, G5BY, G5ML, G5UD, G8SB.

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1952

Starting Figure, 14

Worked	Station
50	G5YV
46	G3GHO
45	G3BLP*
44	G3WW*
41	G5DS
40	G2XV
39	G2HDZ, G4SA, G5ML
38	G3IOO
37	G2AHP, G2FJR
35	G3HWJ
34	G3FAN
32	G4RO, G6TA, G8IL
30	G5BM
28	G2HOP, G3HBW
27	G6YU
26	G3GVL, GC3EBK
25	G3HCU, G3HXO, G8DA
24	G5MR, G6CI
23	G2FCL, G3DO
21	G3FIJ, G3GJZ, G8VR
20	G3ISA
18	G3EOH, G3IRA
17	G3YH
16	G3IWJ
14	G2BRR, G3DMK

Note: This Annual Counties Worked Table opened on September 1st, 1952, and will run until August 31st, 1953. All operators who work 14 or more Counties during this period are eligible for entry in the Table. The first list sent should give stations worked for the counties claimed; thereafter, additions claimed need show only stations worked in each county as they accrue. A certificate is given for all VHF operators who work 40C or more in the year, for which QSL cards must be shown. Cards are not, however, required for entry into the Table.

* Cards held for Annual 40 Counties Worked Certificate.

List—glad to hear from you for "VHF Bands" for the first time since 1939, Eric! At G6CI (Kenilworth) Brian continues to make steady progress, reporting plenty of 100-150 mile QSO's but no EDX. G3GVL (Derby) claims his latest scores, with 59S now worked, and G6TA (Balham, S.W.12) climbs in both Counties Tables, with 259 different stations in the log.

Another welcome first-time correspondent is G3AOO (Denton, Manchester), who is also operational on both bands; his two-metre assembly is a modified S440B driving 832-829, with an 832A tripled for 70 cm. The receiver on Two is a 3-stage 6J6 job into an R.1132, and on the same chassis he has a 70 cm. converter to the design by G5BY, as originally published in the *Magazine*; thus, the two converters are switchable into the same IF/AF strip, with a one-second change over from band to band. A second converter for 430 mc utilises a modified ASB8 RF stage with CV102 crystal mixer having a coaxial ¼-wave input line, with CC injection obtained from 6J6's worked xtal 15 mc - 45 mc - 135 mc - 405 mc, giving an IF of 27 mc. Aerials at G3AOO are a "City Slicker" for Two, and a 4-over-4 at 40 ft. for 70 cm. Stations heard or worked on that band are given in the Activity Report. G3AOO is an advocate for the idea of a one-megacycle calling area in the 70 centimetre band, to be tried out on Sunday mornings during the summer. Our earlier comments on 70 centimetre band planning have some bearing on this, and to us it seems that zoning may be the answer—we then know where to look, and where our neighbours are. But your A.J.D. is quite prepared to lay on whatever enough people want, so let us hear from the 430 mc operators what they think; in particular, whether they would be prepared to put in another crystal and retune for a second frequency.

At G6NB (Brill, Bucks.) Bill has been using the time while conditions have been off to build a converter to end all converters; he thinks he may just have done it! Between times, a station heard for interesting DX was EI6A (Wicklow), received on several occasions; G6NB goes to 57C in the All-Time and has been working EI2W again. G3DLU (Weston-s-Mare) is ready with his 80-watt PA, and on May 25, the good day, had a near-QSO with GC3EBK.

GM3DIQ (Stevenston, Ayr) would very much like to take G4SA up on his suggestion that the GM's look South from about 1900 clock time; '3DIQ says that he is probably the only GM who is on every evening, except Saturday, from 2000 onwards, with a schedule with GI5AJ every Thursday and Friday (as well as at 1430 on Sundays). From about 2030 onwards, GM3DIQ undertakes to beam South, and to call and listen at 10-minute intervals — though the best time is really much later in the evening, say around midnight or after; a new station worked by '3DIQ is EI3S of Dublin, and EI6A has been heard and called.

Some Overseas Reports

According to a news bulletin from EI2W, the EI/GI activity is steadily on the increase, stations he mentions being EI2A, EI2G and EI3Y, with GI3GGY and GI3HXH for Northern Ireland. The EI2W/P expedition will be on site at Kilkee during July 4-12, using as much power as they can up to 300 watts and keeping a 24-hour watch. The weather survey for the last two years does not hold out much prospect of success over the full distance to eastern U.S.A., though a path

THE TWO-METRE ZONE PLAN

(This is reproduced here for the benefit of newcomers to the band).

***Zone A & B:* 144.0 to 144.2 mc.**	All Scotland.
***Zone C:* 144.2 to 144.4 mc.**	All England from Lancs. Yorks. northward.
***Zone D:* 145.8 to 146 mc.**	All Ireland.
***Zone E:* 144.4 to 144.65 mc.**	Cheshire, Derby, Notts., Lincs., Rutland, Leics., Warwick and Staffs.
***Zone F:* 145.65 to 145.8 mc.**	Flint, Denbigh, Shrops., Worcs., Hereford, Monmouth and West.
***Zone G:* 144.65 to 144.85 mc.**	Northants, Bucks., Herts., Beds., Hants., Cambs., Norfolk, Suffolk.
***Zone H:* 145.25 to 145.5 mc.**	Dorset, Wilts., Glos., Oxon., Berks., and Hants
***Zone I:* 145.5 to 145.65 mc.**	Cornwall, Devon, Somerset.
***Zone J:* 144.85 to 145.25 mc.**	London, Essex, Middlesex, Surrey, Kent, Sussex.

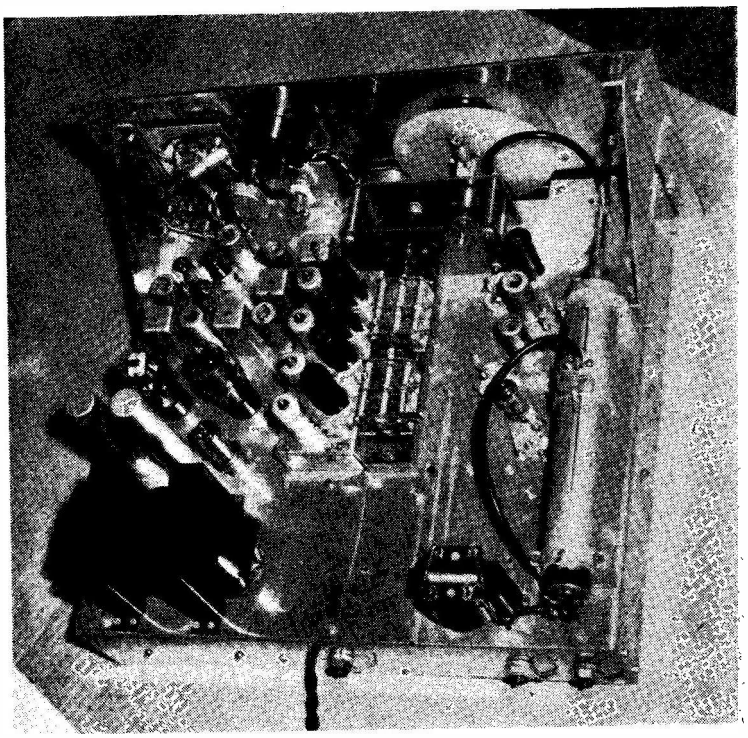
might open as far as VO. The possibilities, and the factors which affect them, are discussed in the "VHF Weather Report" in this issue, and readers will be particularly interested in the surveys for long-distance paths in directions other than across the Atlantic.

The ZB1's will no doubt be pleased to know that CN2AP (Tangier) is equipped for Two Metres, with a Cascode using 12AT7's and a stacked aerial array; the transmitter frequency is at present 145.7 mc. It may be that CN2AP will be home on leave by the time this reaches the ZB1's—but he will be back, with better gear and a frequency nearer the LF end.

During the month to June 8, ZB1BZ and ZB1KQ were regularly active on Two, on every evening and practically all day on Sundays—but no joy, except for weak modulated carriers at ZB1BZ on four occasions, too thin to resolve into anything intelligible. Well, we know all about that sort of thing over here. If only half the stations regularly working phone were to sign on CW on half their overs . . . how often have we said it! The receiving gear at these two ZB1 stations is all right, because by tuning into the neighbouring channels they can hear aircraft at up to 300 miles, and have also received TV sound from all BBC stations except Kirk O' Shotts. Schedules are being arranged with 3V8BB and with F's and I's following our recent notes in this space, so results are confidently expected before long—and it is evident that the ZB1's are trying hard, so good luck to them.

Crax Out Of Context

"My chief moan is that the present system of cross-banding is a bit of a dead loss. I wonder how many QSO's have been made from a CQ call on 70 cm? Could you arrange for test periods on this band, say every Sunday morning 10.0 a.m. to 12 noon?" (G3AOO) . . . . "We realise we must be on the band as much as possible, so you can rest assured ZB1BZ and ZB1KQ will be there almost every evening from 1900 BST, calling on CW" (ZB1BZ) . . . . "G3FKY, who lives about 200 yards away as the beam looks, and I have been close followers of your feature for nearly three years, and we have finally succumbed to temptation" (G3CUZ) . . . . "My early-evening sessions have been sadly curtailed, as my XYL sees to it that I really do hold the baby" (G3GHO) . . . . "My interest in Amateur Radio lies mainly in the design and construction of equipment, with operating the necessary proof of the pudding" (G2BVW).



The very fine combined 144-430 mc receiver designed and built by G2BVW, Rearsby, Leics. The 70-centimetre RF section is lower right, and all coaxial circuits are home-made from copper piping or brass tube. A 2C40 (446A) valve is used as mixer on 430 mc; this is found to give a certain amount of gain, whereas the crystal mixers always show a loss at this position. The 70-centimetre section also has a tuned RF stage incorporating a second 446A. The two-metre section is 6J6-9002, and the common IF 24-34 mc.

Finally—

And for this month, that's it. Don't forget the Contest in three weeks' time, and for next month's "VHF Bands" please let us have all your news, views, claims and comments by **July 17** certain, addressed A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Use the *full* address, as letters directed simply to "VHF Bands, Victoria Street, S.W.1" (we actually had one such this month!) are likely to be delayed by anything up to five days! CUAGN August 7.

QUICK CONTEST No. 1

Week-end July 25-26. Rules on p. 239, June issue. Make it a Party!

VHF WEATHER REPORT

PERIOD MAY 14 TO JUNE 10

A. H. HOOPER (G3EGB)

This month's summary not only covers the propagation conditions obtaining for the period of the current "VHF Bands" report, but also includes an extremely interesting survey of the conditions which developed over several long-distance paths during the years 1951-'52. This shows that on the weather record and in terms of VHF DX working the chances of communication over the 2,100-mile path SM/CT2 are six times better than over the 1,900-mile path EI/VO, and that the month of July should give many good openings over the 1,300-mile path Cornwall to the Azores. This is the first time that such an analysis, authoritative and based upon firm data, has been published; it shows once again that the immediate need for the full development of the VHF bands is much more Continental activity. If all European countries together could produce only half as many stations active on two metres as we have in this country, EDX working on VHF would begin to compare with European coverage on the LF bands.—EDITOR.

A CHANGEABLE month, with neither persistent anticyclones nor much strongly marked subsidence. Depressions alternated with brief, transitory ridges of high pressure until May 23, when a warm, damp, airstream from the tropics reached us. This soon gave way, to the accompaniment of widespread thunderstorms on May 25 to an anticyclone which remained for three days. The series of depressions which then dominated us from the north-east gave way during June 4 and 5 to a weak ridge from the south-west. This was not replaced until the approach of a shallow depression from the east on June 10.

Interpretation

For long range working we look to reflection effects from discontinuities aloft. Fig. 1 shows the presence of modified refractive index (MRI) discontinuities over East Anglia, as deduced from the results of radio-soundings reported in *The Daily Aerological Record* of the Meteorological Office, London. We see that for this period reflecting layers made only brief appearances. Over other regions of the British Isles their appearance was equally erratic. They were mainly weak and at high levels.

Confining attention to layers below 5000 feet as being of greatest significance for VHF communication, it was found that a discontinuity developed at varying heights between 2000 and 5000 feet in the early hours of May 26. It extended over most of Great Britain and Northern Ireland at first, but by the same evening had disappeared from over our southern counties. On the evening of May 28 another layer appeared, this time mainly at 4000 feet. The GM/GI path was open on May 27 with a layer at about 3000 feet, and again on June 4 and 5 at 5000 feet—with little overhead elsewhere in the country. On June 6 a further layer appeared over East Anglia and extended over the southern counties for the two evenings following, but on June 9 again it was only East Anglia that was involved.

At the foot of Fig. 1 is shown a graph of the mean sea level (MSL) barometric pressure at Cranfield, Bedfordshire, for the period covered by this survey. It has been included for those who are interested in its relation with VHF propagation. In the graph the high points correspond with *maximum* pressure points.

Table 1 is largely a summary of the charts in the *Daily Weather Report* of the Meteorological Office. The information listed is for the evenings of the dates quoted. The first line indicates the type of pressure system over Southern England. The classification is into anticyclones (A), depressions (D) and cols (C). The last are areas of slack pressure gradient occurring between the main types of pressure distribution and often result in radiation cooling.

The second line is given to showing the evenings when radiation cooling occurred. This is a process leading to enhanced *inland* propagation by means of super-refraction at *very low levels*. The figures indicate, as far as can be ascertained, the times of onset of saturation in the lowest layers of the atmosphere and, as discussed later, give a guide as to the time when enhanced propagation by means of super-refraction in these layers faded away. Where the time is after midnight, the figures are still placed under the pre-midnight date. No entry is made for poorly defined or *Nil* cases.

The remaining lines of Table 1 show the occasions when anticyclone or ridge conditions existed over paths in certain directions from southern England. Their presence should indicate in a general sense the extent of any discontinuities of MRI which may have existed aloft.

Certain entries are in heavy type. These mark an extension of the analysis. First, *dates* in heavy type correspond with the presence of low-level MRI discontinuities over East Anglia. They are provided to facilitate cross reference with Fig. 1. Certain country *prefixes* are in heavy type. These indicate the occasions when analysis has shown the presence of low-level discontinuities out over the path at least as far as the country designated. They are, therefore, the DX paths probably available, and even with the results for only four weeks, it is immediately apparent that discontinuities are not to be associated with all anticyclones and ridges. It can be seen, too, that on several occasions (May 22, for example) a layer extended over the path eastwards to Germany, although not covering East Anglia. In that the layer must end somewhere between East Anglia and Holland, it seems possible in such circumstances that East Coast stations could beam eastwards under the layer and so exploit the situation. This would be a very critical business! Despite a fair proportion of anticyclonic conditions, the south and south-east routes appear to have had a very poor month indeed.

Did your results fit these and the several other facts conveyed in the Table?

In Retrospect

As foreshadowed by A.J.D., it has been interesting to compare last month's weather report with the results reported in "VHF Bands." April 19-23 and May 3 are summarised as peak periods, and it is encouraging to note that these periods fit two of the three low-level MRI discontinuities shown in Fig. 1 on p.241 of the June issue. This leaves the period May 8-11 unaccounted for. A re-scrutiny of the vertical MRI graph shows that on May 8 and 9 the discontinuities were very silght as compared with the earlier occasions. This knowledge will help future assessments of significant discontinuities, and with this point in mind the writer adds his plea to that made by A.J.D. for dates and times to be supplied with each instance of anomalous propagation.

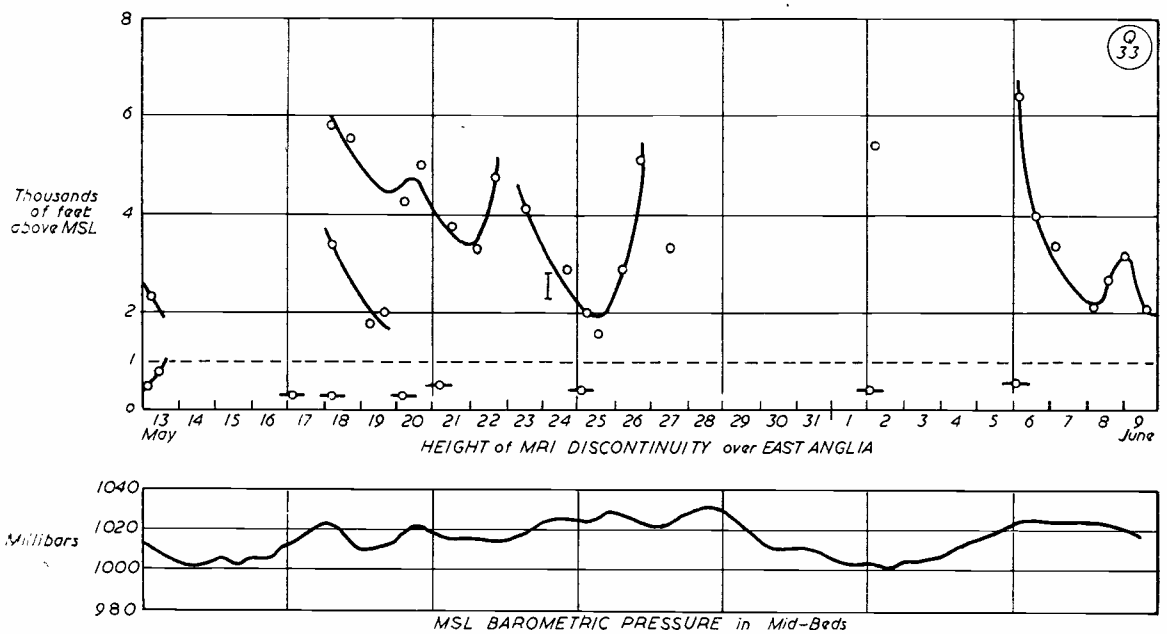
Noting the GM/PA QSO of May 3, the writer finds that it occurred at the same time as the north-eastwards extension over the path of a belt of high pressure referred to last month. The high pressure belt had already resulted in a discontinuity over our southern regions, and radio-soundings over Fifeshire show that the evening of May 3 resulted in the first low-leved discontinuity there for over a week.

Further to the blanking-off effect of high ground which accounts so well for the effects observed in early March, and which may well influence G/GM contacts, it seems worthwhile to go a stage further. For enhanced propagation we have, for overland paths, the beneficial effect of radiation inversions which develop by means of cooling from the earth's surface at night-time. They become established over low-lying ground and do not offer help in the task of VHF transmission over mountain ranges. Moreover, prolonged cooling results in saturation setting in, first at the surface and then through a progressively deeper layer of the atmosphere. With this layer extending beyond aeral height, the enhanced refraction of radio waves ceases. Whether or not the saturation level can become intense enough at, say, 100 feet to act as a weakly reflecting surface is not established. Certainly the path limits then remain confined to the same area of low ground and shallow slopes. For great distances, both over land and sea, partial reflection from MRI discontinuities aloft is the most frequent mechanism. These develop in air sinking earthwards (subsidence) from high levels. When such a surface of discontinuity is sufficiently low, then a reflection process begins. Should the discontinuity sink below aerial height, then the reflection effect ceases, the less effective refraction process is substituted, and, depending upon wavelength, transmission may be within a duct. With the discontinuity right down at the general ground level, diurnal temperature and water vapour changes modify it drastically, and for us the effect is comparable with the radiation process described earlier. In the special case of a discontinuity still above ground level, but with an isolated range of mountains protruding up through it, a different effect can occur. It is conceivable that when shallow mountain slopes are involved modification of the discontinuity could be such that it "follows" the slopes. It could then be possible for stations in certain critical positions to transmit over the range. With the steeper and more usual mountain slopes, however, it seems that the range must act as an interruption in the reflecting layer and, also, in the propagation paths. It is this last theory which explains the effects of early March. A reflecting layer at very low levels can be expected to experience fluctuations in height from day to night. These are superimposed, however, upon any general changes in height, and for this reason no particular time can be assigned for the best results.

Possibilities

One aspect of two-metre interest is in communication over great distances. The writer has examined the chances of tropospheric propagation over certain paths from the British Isles. What is needed is a low-level discontinuity of refractive index lying without interruption along the whole of the path excepting, possibly, a few tens of miles at each end. For identification this requires analysis of radio-soundings of the atmosphere at frequent intervals along each path. The publications mentioned earlier do not give the results of soundings along the final stages of the paths considered. However, we know that wide-spread low-lying discontinuities are associated with anticyclones and their ridge extensions from time to time. Occasions when such a pressure system extends over the selected path and are associated with discontinuities at the starting point can be identified. This is a necessary condition. In that the discontinuity observed does not necessarily extend over the whole of the pressure system, the number of occasions may be optimistic, when regarded as suitable for VHF propagation over the path. For propagation by this mechanism they will not be pessimistic.

With the forthcoming EI2W tests in mind, records have been examined for the whole of 1951 and 1952, 731 days in all. Attention was confined to the 1200 GMT surface weather analysis and to the 1400 GMT radio soundings. Spells of extended propagation are of more interest than single occasions, and the suitable cases were divided into spells of various durations. The first examination was of the 1900-mile path from Valentia, Eire, to St. John, Newfoundland. The number of occasions when an anticyclone and its ridge extensions lay along this path have been combined with discontinuities over the starting point and over the British weather ship 400 miles out along the path. These discontinuities were found to exist at both stations on all the relevant occasions. The result is shown in the first column of Table 2. For this path little more than isolated cases were found, and it was of interest to note than on three of these "possible" occasions a *depression* with associated fronts lay between Newfoundland and Nova Scotia, *thus barring further progress.* On the other occasion the possible path was "clear" as far as Nantucket. This was, however, for a very limited time, as by the following day a vigorous depression had developed and moved along the coastline to Newfoundland. (*See page 308*).



Showing the all-too-brief reflecting layers which formed over East Anglia during the period May 13 to June 9. The occasions when they coincided with reflecting layers out over various paths from the British Isles, building up conditions suitable for EDX working, can be ascertained from Table 1. With the exception of the layer first appearing on June 6, all were weak and poorly defined.

TABLE 1

Date	MAY 14	15	16	17	18	19	20	21	22	23	24	25	26	27	JUNE 28	29	30	31	1	2	3	4	5	6	7	8	9	10
Pressure System over Southern England	D	D	D	A	D	A	A	D	D	A	A	C	A	A	A	D	D	D	D	D	D	C	A	A	C	C	C	D
Radiation over Bedfordshire, GMT	—	—	02	21	—	01	04	22	—	21	21	23	24	24	05	—	23	—	—	—	—	22	24	24	03	22	01	01
NE	—	—	—	SM	—	—	SM LA	—	—	—	SM LA	—	—	—	LA	—	—	—	—	—	—	—	—	—	—	SM	—	—
E	—	—	—	DL	—	—	SP	—	DL	DL	SP	—	DL	—	SP	—	—	—	—	—	—	—	DL	—	—	—	—	—
SE	—	—	—	OE	—	ON	OE	—	OE	OE	OE	—	HB	—	F	—	ON	—	—	—	—	—	—	—	—	—	ON	—
S	—	—	—	49°	—	**45°**	43°	45°	43°	43°	43°	—	**45°**	—	47°	—	—	—	—	—	—	—	—	—	—	45°	45°	—

Ridge and "A" conditions from Southern England

Notes—(1) *Conditions listed are for the evenings of the dates shown.*
(2) *D = Depression. A = Anticyclone. C = Col, slack pressure gradient.*
(3) *Times in the second line mark the end of super-refraction inland.*
(4) *Country prefixes indicate the approximate extent of conditions. When in heavy type they indicate a good path.*
(5) *For the Southern Path, which is wholly over France, it has been necessary to quote latitudes in two-degree steps. The latitude of Paris is approximately 49°N, and that of Marseilles 43°N.*
(6) *Heavy type dates correlate with the graph.*

Showing the broad features of VHF weather during the period May 14 to June 10. Dates in bold type are those when a reflecting surface formed over East Anglia (see Fig. 1), a desirable condition for the start of an EDX path. Country prefixes are in bold type when a reflecting surface extended out over the route to the country indicated. For example, though A-conditions lay over the path G/SP on May 19 and 20, it was only on May 19 that EDX conditions existed, and then only for part of the route.

TABLE 2

Duration of SPELLS in DAYS	PATHS				Months of year Cornwall to Azores											
	Valentia to St. John 1900 miles	Cornwall to Azores 1300 miles	E. Anglia to Sweden 600 miles	Azores to Sweden 2100 miles	J	F	M	A	M	J	J	A	S	O	N	D
1	2	17	22	12	2	2	1	2	2	1	3	—	1	—	2	1
2	1	10	7	4	—	—	—	—	1	3	2	1	2	1	—	—
3	—	3	5	1	—	—	1	—	—	1	1	—	—	—	—	—
4	—	1	1	—	—	—	—	—	—	—	1	—	—	—	—	—
5	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—
6	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Days	4	55	61	23	2	7	4	2	4	10	14	2	5	2	2	1

This interesting Table will repay careful study. It shows the maximum possible number of days, during 1951 and 1952, suitable for VHF DX working over several paths from the U.K.; the period examined totalled 731 days. The number of spells of good conditions for various durations is shown, and it is quite clear that the chances of DX contact over some paths are considerably better than for others. For the Cornwall-Azores path the figures have been broken down into months of the year, and in this particular case show that July and to a lesser extent June were the favoured months during the years 1951-52. It would be a fair assumption that somewhat similar conditions should develop during this coming July, so that a QSO G/CT2 could be regarded almost as a certainty — if we had an active and properly equipped VHF station in the Azores.

Hence, it can be concluded that for one brief occasion only during 1951 and 1952 did a *possible* chance exist for propagation at noon over the 2,800-mile path from Eire to the New England States. In general, an alternative mechanism appears necessary for this path.

G3JU has long held the view that the path to the Azores is well worth attention. An analysis on similar lines was accordingly made for the path Cornwall to Azores. Occasions when a suitable surface chart coincided with a discontinuity over the starting point were found to be quite frequent. The result is shown in the second column of Table 2, and it can be seen that not only were there many more occasions than for the Atlantic path but, additionally, many of them were grouped in spells of several days. So that if we had an active two-metre station in CT2 a contact from Cornwall would have been possible.

A third analysis, this time for the path East Anglia to Sweden, was also carried out. The result, given in the third column of Table 2, was very similar to that for the Azores.

The Maximum EDX Path

Finally, the second and third analyses were combined in an attempt to assess the possibilities for one of the longest paths in Europe, from the Azores to Sweden. From the fourth column of the Table we see that the number of occasions has been reduced to about one-third of the others. However, it would appear that this 2,100-mile path is actually a very much better proposition than the 1,900-mile path from Eire to the nearest point of the American Continent. But, of course, there is always a chance, however slight, that a path *might* develop for the EI2W test over July 4-12. Next month we shall be able to see what happened.

In case the EDX prospect should inspire a sunny holiday complete with portable operation, the remaining section of Table 2 shows the Azores/Cornwall result broken down under months, as a guide in selecting dates. With the exception of one entry for February, it is very noticeable that June, and especially July, then produced the greatest number of occasions and also spells of the longest duration. In case this result arose from a particular sequence in only one of the two years examined, a further division was carried out. It was found that in both years June and July were the favoured months. So, on the face of it, then is the time for a G/CT2 attempt.

Views

The possible effect of high ground upon propagation by means of reflection from low-lying discontinuities has already been discussed. This factor enters into any consideration of VHF propagation from the Mediterranean Basin to the British Isles. With so much ground over 10,000 feet, one would expect the Alps and the Pyrenees, and the somewhat lower Massife Centrale of France, to form effective barriers. Their very size undoubtedly leads to local modification of air masses, and within their vicinity strange effects can be expected from this cause. With very great power, greater perhaps than has yet been used, it should be possible to communicate over irregular paths by means of multiple scattering—sheer brute force, in fact. Height, too, can be very helpful, although the writer has not here in mind the minute differences in UK station heights which caused controversy some months ago. For our low-powered stations, confined virtually to ground level, it seems only too likely that the path is unattainable —all controversial correspondence welcomed!

The writer is grateful for the permission of the Director, Meteorological Office, London, to quote information obtained from the official publications mentioned.

Random Jottings by the Old Timer

WE all realise, subconsciously, that Amateur Radio has got to "sell itself" to the authorities and the public if it is to continue to enjoy even its present privileges. The public have, perhaps, been brought more into contact with us during the last five years than ever before, through the pleasing custom of including Amateur Radio in the popular Hobbies Exhibitions which are held up and down the country. As for selling ourselves to the authorities (whoever they may be!) this is best achieved by causing no trouble while presenting evidence of plenty of healthy activity. The amateurs' restrained behaviour since the changes enforced on the Top Band has been a credit to them; very little trouble is caused by wilful interference with either BC or TV (practically all the cases investigated can be settled sensibly). Pirates are *not* amateurs, although they pretend that they are. So, on the whole, we don't cause much trouble. Do we give the impression that we are all working at something worth while? Or do we strike outsiders as a rather frivolous crowd? It is worth thinking about, quite seriously.

MIXING IT UP

Our crazy "amateur slang" is well-enough established to have become traditional, but some people overdo it to such an extent that they merely make themselves ridiculous. One example is the use of CW abbreviations on telephony, especially when the "abbreviations" are blown up by phonetic spelling until they are far more clumsy than the plain language (for example, the futile "Q R Morocco"). In particular it hurts to hear two stations in contact, after having given each other "FB S9+" reports, bandying phonetics about to such an extent that one appears to have the name of January India Morocco and the other Baltimore Item London London (yes, we actually heard this one, quite recently). If anything could convince the listening public that amateurs are a crowd of cretins, this sort of thing could. If you are S9 and your name is Jim, why even bother to spell it? If the other fellow can't hear you say "Jim," he won't hear you burbling something about Morocco!

TELEVISION'S IMPACT

It is common knowledge now that the coming of television has put many U.S. amateurs off the air altogether; with the TV on for 24 hours a day, the man in a block of apartment-houses has very little chance of operating without hitting somebody, on *some* channel or other. Also the forest of TV aerials on the roof has just about killed his chances of putting up any kind of a radiator for himself. Fortunately for us, we have a far smaller percentage of our amateur population in apartment blocks (flats to you). Even so, the amount of complete rebuilding necessitated by absolute TVI-proofing procedure has been fantastic. After all this, there are many who cannot transmit on the band that they fancy, and have to bow their heads to the greater might of the new phenomenon. Fortunate, but somewhat rare, is the man who can boldly come up in the evening with 14 or 21 mc CW or phone, in the knowledge that he isn't spoiling anyone's TV programme or bringing down wrath of some kind on his own head. So the search for the completely TVI-proof job goes on, and naturally it varies in individual cases, with the strength of the TV signal and the channel in use. The amazing growth and development of TV has been one of those things that keep us up to scratch!

OLD TIMERS' QUIZ

For the second of these light-hearted puzzles we pose the following questions: (1) Which of these five very well-known pioneers of the early Twenties are still active on the bands?—2NM, 2KF, 2OD, 2FQ, 2OM. (2) What was a "Schnell-and-one-step"? (3) A well-known ARRL official went round the world with the US Navy and was allowed to work on the amateur bands. Who was it, and what was his call? (4) Did amateurs ever operate on CW without using the "de" between call-signs? And what took its place? (5) How did one distinguish between the various European countries before prefixes were thought of?

CONSTRUCTIONAL

In the dark days of the Twenties every amateur had to be a bit of a carpenter, but metal-work hardly entered into the proceedings at all. In fact, the idea of mounting any components near a metal panel engendered a sensation of horror (*think of the eddy-current losses*!) only comparable with that occasioned nowadays by the idea of leaving anything *unscreened*. This change-over from wood to metal has had several repercussions. For one thing, it means that amateur-built gear, when properly carried out, looks much more like the commercial article than it ever did before. For another, it means that few amateurs have the capability or resources to build a really well-finished job, so the average station consists of converted surplus and looks a junk-pile. Finally, I think it has vastly increased the sale of sticking plaster and finger-stalls!

The Other Man's Station

G6QB

IT was in October, 1923, that a strange-looking collection of hay-wire gear took the air with the call-sign "6QB." It was powered by some 300 volts of torch batteries and a six-volt accumulator, and occupied a lot of space without covering much in the way of distance.

The various rigs signing G6QB have been hay-wire ever since, changes having been too frequent for the station ever to have settled down to a tidy existence in rack-and-panel or any other form. The present layout, as shown in the photograph, has lasted for nearly a year (a record!) but is quite likely to have been demolished by the time this appears in print.

The AR88 receiver is mounted at 45 degrees to the table—well worth the trouble for the sake of operating comfort—and is flanked by the Q5'er on one side and the VFO, operating in the 3.5 mc band, on the other. The VFO consists of a Clapp oscillator (6J5) and buffer (6F6) and is used to drive two further stages in the small unit to its right. These run either as buffer-doubler, buffer-trebler or doubler-doubler to cover the bands down to 21 mc. At present if 28 mc operation is desired, the 813 PA has to run as a doubler.

The PA unit has band-switching from 3.5 to 21 mc in the anode circuit (on the right) and plug-in coils for the grid circuit. Meters show grid, screen and anode currents.

Underneath the PA is the modulator, consisting of a pair of pre-war T.55's with output applied to anode and screen of the 813 PA.

Below the bench, on the right, are a power-pack,

the Top-Band transmitter (with its own VFO at the left-hand end of the panel) and, standing on top of this, the three-stage speech amplifier which follows the crystal microphone and is quite a separate unit from the modulator.

Two aerial tuners are visible, the upper one being for the HF bands and the lower for Top Band only. On its left is the R. 1155 relay used for change-over purposes, and in the flat box to the left of that are two relays selecting different aerial combinations.

The "aerial farm" consists of three 136-ft. wires fed by a three-way open-wire line, and one of the switches in front of the VFO (operating the relays) will select any one of the three pairs of wires available. The selection is applied to the receiver as well as the transmitter, so that a rapid check on the best aerial system can be made while listening.

Sometimes an El-Bug is used, but the key shown in the photograph is a Vibroplex which was bought in 1928 from a French amateur (outlay 8s. 6d.!) It has been in more or less continuous use ever since. The untidy wires seen drooping all round the underside of the bench are mostly operating relays for receiver muting and breaking of all transmitter circuits. Change-over is by a single switch near the key.

The Top-Band transmitter can also be used for QRP on 3.5 mc, or its co-ax output lead can be fed into the 813 PA for that band, keying being changed over from one exciter to the other by shifting a jack-plug.

G6QB hopes to celebrate his 30 years on the air by building a really tidy station some time during the *next* 30 years!

(*He wrote this himself, so on his own head be it!* —EDITOR.)

WRAPPING THE MYSTERY

The "Keep It Dark" system (now being practised by certain stations), in which the prefix is not sent when operating from a juicy DX location, is catching on. The other day a station was heard calling "CQ de *GUESS WHO*," and an interesting QSO was established with someone answering *ME TOO*. The theme could be developed, and would make even Forty an attractive proposition — after all, as the Chinese say, "Life begins on Forty." Call-signs could consist of question marks followed by a personal serial number registered with the IARU and the Region 1 Bureau. G stations would benefit considerably. A call of "CQ de *WHERE AM I*?" would line up the ZM6's in no uncertain fashion; if the G concerned were then to say "No card from me, Buster, till I get yours," a card without the obligation to QSL would be almost a certainty. It would make the writing of "DX Commentary" a bit tricky, of course, but we could find a way round that. And introduce two new awards at the same time: The WAGG ("Worked All Golders Green") and the C.A.L.P. ("Collected All London Postmarks") Certificates. Well, it's not so funny when you look at some of the diplomas you *can* claim.

XTAL XCHANGE

Readers who wish to exchange crystals are invited to make use of this space, which is free for such exchanges *only*. Notices should be set out in the form shown below, headed "Xtal Xchange — Free Insertion," and all negotiations conducted direct.

G2NS, 7 Foxholes Road, Southbourne, Bournemouth, Hants.
Has QCC Type P5 7140 kc crystal, and 8080 kc certificated. Wants band-edge marker crystal 1750 or 3500 kc.

G3HSW, 134 Saltwell Road, Gateshead 8, Co. Durham.
Has QCC Type P5 14040 kc crystal, ½in. mounting, certificated. Wants 1000 kc bar, any mounting.

G4RS, 17 Tudor Avenue, Bebington, Cheshire.
Has ex-WD 3.5 mc crystal, no certificate. Wants 1.75 mc frequency, any spacing.

RADIO QUARTERLY

The first issue of our new quarterly is now available, as announced elsewhere is this issue. It will be found of considerable interest to the beginner and the SWL, so that if you have friends in this category who are always asking questions, buy them the *Radio Quarterly* — this first issue will be found to contain most of the answers! The size is 96-page, pocket format, and the price is 4s. post free, of The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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TO CLUB SECRETARIES

The hard-working honorary secretaries of all local radio clubs and societies are reminded that they should, periodically, add to their labours by sending us a report for appearance in our "Month with the Clubs" feature. Insertions are, of course, free—though it is surprising how often we are asked if there is a charge — and the Club section is space we are glad to give in the interests of the movement. Secretaries often report that they have gained many new members through the notices appearing in *Short Wave Magazine* — which is one of the reasons why we have always carried Club Notes.

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NEW QTH SECTION

We much regret that it has been found necessary to hold over our pageful of "New QTH's" until the August issue, when they will appear as usual. A month missed in the *Magazine* does not delay appearance in the *Radio Amateur Call Book*, the well-known American directory to the amateur stations of the whole world, for which publication we are sole European agents. All amateurs are invited to send us their call-signs as issued, for publication in "New QTH's" and in the *Call Book*, also changes of address. There is, of course, no charge for this service.

The Month With the Clubs

We have now reached the time of year when many Clubs embark on a long vacation, owing to rival interests and activities outdoors. Some of the more flourishing organisations have shown this closure to be unnecessary, but a Club with a small membership usually finds itself somewhat handicapped if more than half the members are keener on outdoor pursuits than radio, and it is well advised to go into recess for the summer.

Field Days, D-F events, visits to places of interest and so on . . . . all these help to keep members together, and should be utilised to the full by those Clubs whose aim it is to maintain an all-the-year-round existence. We often wonder why so few inter-Club events take place, as this form of activity is surely ideal for the summer months; inter-Club D-F Contests, or Field Days with the accent on DX working, are often very popular and successful undertakings.

This month we acknowledge news sheets and similar publications from the following Clubs: CLIFTON *Newsletter (Special Coronation Issue);* CHESTER *News Letter;* PURLEY *News-Letter;* QRP RESEARCH SOCIETY *Journal; and* SURREY *Radio Contact Club Monthly News.*

Next month's deadline is **first post on July 15.** *Please address letters to Club Secretary,* SHORT WAVE MAGAZINE, *55 Victoria Street, London, S.W.1.*

Bristol & District Amateur Radio Society

The Club paid a visit to Wenvoe TV station and had a most enjoyable day out. The Annual Outing proper, to Weymouth, is due on June 28. Three members have taken on the job of building the Club Transmitter, which should be active by the end of the year. Visitors please note that the Clubroom will be closed during August for the annual clean-up.

Lancaster & District Amateur Radio Society

This Club has recently started off with a membership of 14, but it is hoped that local publicity will increase its numbers before long. The Chairman is G3HHR and the Secretary G3FJO. A recent Rotary Club Hobbies Exhibition was extremely successful and was, in fact, responsible for the formation of the Club.

Torbay Amateur Radio Society

Judging for the Constructor's Cup Competition was due to take place on June 20, and some interesting entries were expected. Otherwise NFD was the main centre of activity during the month. Meetings are held on the third Saturday at the YMCA, Torquay.

Clifton Amateur Radio Society

The first Club Field Day was organised for June 21, in the form of an inter-Club D-F Test, with eight members of the Willesden Club competing. Other items during June were a Junk Sale, a Novelty Quiz and a talk on Tape Recording.

Southend & District Radio Society

Recent events have included a talk on Crystals by Dr. C. P. Fagan, and a Hamfest at which more than a hundred members and friends were present. The latter event was apparently a huge success, at which "heaps of prizes" were awarded, including a transmitting valve as big as a breakfast cup! A talk on Frequency Measurement was given by Mr. S. W. F. Asquith on June 12.

Worthing & District Amateur Radio Club

The Annual "Bucket and Spade Party," now practically a tradition, will be held on July 26 at the usual venue—The Kiosk, Beach House Grounds. Further particulars of this event may be obtained from G2DHG or G3HVH at their addresses as given in the *Call Book*.

QRP Research Society

The organisation of the Club QRP Contest is being worked out, and any Clubs desiring to enter are asked to get in touch with the Hon. Sec. without delay, when full details will be sent. New membership-data leaflets have also been prepared, and are available, on application, to prospective new members.

Cannock Chase Amateur Radio Society

As several local amateurs are active on the Top Band, a recent meeting was devoted to an informal discussion about the new frequency allocation. The next meeting, on July 2, will take the form of a survey of the Club's activities, and new officers will be elected.

Slade Radio Society

At the end of May many members visited the Dunlop Research Dept.—an item of outstanding interest. On July 10 Mr. J. R. Reed, B.Sc., of the GEC, will talk on Insulation in Radio Construction, and on July 24 miniature lectures will be given by members. All meetings, as usual, at Church House, Erdington, beginning at 7.45 p.m. The Club now holds the call G3JBN, which will be used for future D-F Contests.

Enfield Radio Society

This Club has now moved into new quarters, and it is hoped to stage a Two-metre Field Day for the near future, gear for which is now being built. Present meetings

The Solihull Amateur Radio Society was recently re-formed, and this photograph shows some of the members at the first meeting. Standing on the extreme right are G5TU and G2ATK.

are informal, but a definite programme is being arranged for the future. Old and new members will be welcomed, and are asked to contact the Hon. Sec. (*See* panel for QTH).

Surrey Radio Contact Club (Croydon)

Meetings continue throughout the summer at the Blacksmiths' Arms, South End, Croydon, on the second Tuesday of each month. The July meeting will discuss the results of NFD, and the lessons learnt from experience. A station was operated at a local Coronation celebration Exhibition, and was the high-spot of that event.

British Amateur Television Club

Membership is now well over 200, and the Club hopes to have eight amateur TV stations on the air by the end of the year. Public demonstrations are in full swing—at Wisbech on June 13 and Dagenham on August 29-30. Visitors will be welcomed. (*See* panel for QTH of Hon. Sec.).

Cambridge University Wireless Society

Before the Society closed down for the Long Vacation, the workshop and the transmitter, G6UW, were thoroughly overhauled. The noise level in the Cavendish Laboratory is extremely high, and this prevents DX contacts except on the VHF bands. (*See* panel for name and address of Secretary).

Purley & District Radio Club

On June 6 the Club ran a 20- and 80-metre phone station, and a display stand of Members' Equipment, at a Coronation Fete. At the AGM at the end of May the officers for the year were elected, and a full programme is being arranged for the coming season, including talks, visits, constructional contests and practically everything of interest to members. Next meeting is on July 23 at the Railway Hotel, Purley.

NAMES AND ADDRESSES OF SECRETARIES REPORTING IN THIS ISSUE

BRISTOL : N. G. Foord, 71 Brynland Avenue, Bristol 7.
BRITISH AMATEUR TELEVISION CLUB : M. Barlow, G3CVO, Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks.
CAMBRIDGE UNIVERSITY : R. C. Marshall, St. John's College, Cambridge.
CANNOCK CHASE : C. J. Morris, G3ABG, 58 Union Street, Bridgtown, Cannock.
CLIFTON : W. Wooller, G3GYZ, 7 Neptune House, Neptune Street, London, S.E.16.
ENFIELD : F. Tickell, G3ICV, 10 Cowdrey Close, Enfield.
LANCASTER : A. O. Ellefsen, 10 Seymour Avenue, Heysham.
PURLEY : A. Frost, G3FTQ, 18 Beechwood Avenue, Thornton Heath.
QRP RESEARCH SOCIETY : J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHEND : G. Chapman, B.E.M., 20 Leigh Hill, Leigh-on-Sea.
SURREY (Croydon) : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
TORBAY : L. D. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot.
WORTHING : R. Chidzey, 33 Bruce Avenue, Worthing.

RADIO IN THE ANTARCTIC

Short-wave radio can present a few unaccustomed difficulties in a region where the sea freezes solid to a depth of ten feet! Such are the conditions in Graham Land, where some of our VP8 friends run Ionospheric and Meteorological stations. The central plateau of Graham Land is about 10,000 feet high, with glaciers sweeping right down to the sea, ending in 400ft. sheer ice cliffs.

There are only one or two places where landings are possible, and then comes the long climb up the glaciers, all travel being done on skis and with a sledge and dog team.

Two seasons — summer and winter — occupy the whole of the year. In winter the sun disappears for about two months and temperatures fall to 45 or 50 below Zero. In summer there are twenty-four hours of daylight, with temperatures "up to" 15 to 35 degrees.

Main troubles with the radio gear are due to icing, and three or four inches of ice on the aerials is not unusual. Replacing breakages is not easy when temperatures are low and a blizzard is blowing. And their mails are once a year — if the ship can get through!

BBC HOME SERVICE COVERAGE ON THE SOUTH COAST

The BBC announces that a three-acre site has been acquired at Pages Lane, Bexhill, approximately one mile west of the centre of the town, for the permanent low-power (2 kW) transmitting station that is being provided to improve reception of the Home Service in the area.

Construction will start immediately, and, when completed, the station will take over the service on 206m. (1457 kc) at present given by the temporary transmitter of lower power near Hastings. The latter covers little more than the town itself, but it is expected that the permanent station, with its higher power and better site, will extend the area of satisfactory reception to include also St. Leonards, Bexhill and Eastbourne. The permanent station is expected to be in service before the end of the year.

G. F. STEVEN, GM5BA

The death is announced of Old Timer GM5BA, Berwick-on-Tweed, suddenly on June 17, aged 56. Gibson Ferrier Steven was a colourful personality, a newspaper proprietor well-known in the North, and he had held an amateur call for many years; the *Times* of June 19 described him as a pioneer in the manufacture of wireless sets. He served in the Royal Engineers Wireless Section (forerunner of the Royal Corps of Signals) in the 1914-18 War, and during 1939-45 was on special radio interception duties, using his own station, for which he received the special thanks of the War Office.

SMALL ADVERTISEMENTS

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, S.W.1.

OFFICIAL APPOINTMENTS

TECHNICIAN (M2C/30023/SQ) and MAINTENANCE ENGINEER (M2C/30022/SQ) required by the NORTHERN RHODESIA GOVERNMENT Information Department for one tour of 36 months in first instance. Free passages; family can accompany. Liberal leave on full salary. **TECHNICIAN** salary, etc., in scale £617, rising to £1,041 a year; gratuity at the rate of £80 or £100 a year. Candidates should have a good technical background with a general knowledge of broadcast engineering and a special aptitude for recording. **MAINTENANCE ENGINEER** salary, etc., in scale £830, rising to £1,116 a year; gratuity at the rate of £100 a year. Candidates should possess technical qualifications in electrical and/or telecoms, engineering of a standard not less than the Grade C examination of the B.B.C. —Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote reference number against the post for which application in made.

TECHNICIANS, GRADE I (RADIO), required by EAST AFRICAN POSTS AND TELECOMS ADMINISTRATION, on probation for pensionable employment. Salary, etc., in scale £687, rising to £1,050 a year. Outfit allowance, £30. Free passages. Liberal leave on full salary. Normal tour 4 years. Candidates should possess a thorough practical knowledge of the working and maintenance of radio transmitting and receiving equipment. G.P.O. staff should apply through departmental channels.—Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/32424/SQ.

TRADE

QSL's and LOGS by MINERVA. The best there are.—Samples from Minerva Press, 46 Queen's Road, Brentwood, Essex.

WANTED: RCA 4331 Transmitters. — P.C.A. Radio, Cambridge Grove, Hammersmith, W.6. (*Telephone Riverside 3279*).

WANTED: R.C.A. Speech Amplifiers, type MI-11220 J or K, and aerial tuning units BC939a coils and tuning units for BC610 transmitters. —Offers, stating quantity and price, to P.C.A. Radio, The Arches, Cambridge Grove, W.6.

SMALL ADVERTISEMENTS, TRADE—*continued*

WANTED: Power Supply Units for No. 33 transmitters (Z.A.10729).—Call or ring, P.C.A. Radio, The Arches, Cambridge Grove, W.6. (*Riv. 3279*).

VALVES (over 3,000 in stock): 12AT7, 6BW6, 6CH6, 6SN7, 807, 6V6, 9/-; EF91, 6AM6, EC91, EL91, 6J6, 6SJ7, 12AX7, 7/6; 6C4, 6J5, 6J7, 6N7, EF92, EAC91, 6/-.—Skillman, Franchise Street, Weymouth.

QSL CARDS AND LOG BOOKS. APPROVED G.P.O. SAMPLES FREE. — ATKINSON BROS., PRINTERS, ELLAND, YORKS.

WANTED: BC610 Hallicrafters, ET4336 Transmitters SX28's, AR88's; receivers and spare parts for above. Best prices.—P.C.A. Radio, The Arches, Cambridge Grove, W.6.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

NATIONAL 1/10, £7; 625A mod. Two Metres, all valves, £3 15s. 0d.; 829, £2; 12SK7, 6K8, 6SJ7, 6V6, 6J7, 6C6, 6D6, VR91, 5/- each; Thordarson 700-0-700v. trans., 35/-; B.T.H. talkie speaker, mains energised, 10in. cone, £2 10s. 0d.; BC348 AC 230v., £17; U.T.C. mod. trans. VM2, £2.—G5CP, 33 Manley Road, Sale, Manchester (*Sale 3816*).

TAYLOR Valve Tester Model 45A, £15 0s. 0d.; Taylor Signal Generator Model 65B, £8 10s. 0d.; G.E.C. Miniscope, £8 10s. 0d. The above instruments are as new.—Beckett, Manor Farm, Brimington, Chesterfield.

ASB8 (Cavity Tuning Type) complete, or cavity tuning section. Wanted: Details.—77 Dunkirk Street, Droylsden, Lancs.

BC221-AA Philco; absolutely brand-new and in mint condition, complete with spare xtal, £28; SX16, S27, I-130-A Handbooks wanted. SX43, S40A Receivers, and U.S.A. test equipment required. Good, reasonable prices paid.—Box 1279, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

TRANSFORMER 0-2000-2500-3000-3500-4000v. 200 mA, input 0-230-250v. 50c., 75/-; 2-100TH boxed, 2-813, £2 each. Soiled but guaranteed the following: 2-EF50, ECH35, CCH35, EBC33, EL33, CY31, EF39, 3/- each; 3-SP61, 2-ARP12, 2/- each. New: 6K8GT, DK91, DAF91, 5/- each. Three new IF Transformers, 465 kc, 2/6 each. Vibrator-type 534C, 4/-. Set of coils for broadcast Rx. SW-MU-LW Superhet, 6/-. All items carriage extra.—G3HHD, 41 Shortheath Road, Erdington, Birmingham.

BC221 FOR SALE, brand-new condition; also Wilcox Gay Master Oscillator. What offers, please?—G3GDQ, 119 Lakenheath, Southgate, N.14.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Collins installation, comprising TCS 12 Tx, 12v, rotary P/Pack; aerial coupling unit, 16-way cable; £17. R.C.A. ACR111, 16-valve communications Rx, all refinements, £30. Buyer arranges transport. 1155 output stage P/P PX4's, power/pack, £8. All carriage extra.—Details: L. Grout, 68 The Drive, West Worthing.

SALE: 807's, 7/6 (4); 1 doz. 24v, 2.8w, MES, bulbs, 10/-; TU9B, rough, 7/6; T1154 PA section, 5/-; RF Unit 27, 15/-; RF Unit 24, 15/-; 2 μF 600 v.w. oil blocks, 1/- (10). BC453 Command Rx, mains, p/unit, cabinet 20in. x 10in. x 12in., £3. HRO Junior, chrome dial, 180-430 kc, coil, rack mounting, £8 10s. 0d. Bakelite BC cabinet, 17in. x 12in. x 8in., complete chassis, dial, knobs, etc., new, 25/- *Wireless Worlds* 1946 (Jan. missing), 5/-; 1947, 10/-; 1948, 10/-; 1949, 10/-; 1950, 10/-; 1951 (March missing), 7/6; 1952, 10/-; s.a.e. details.—Duke, 19 Hollands Avenue, Folkestone, Kent.

GOING QRT. Bargain, Eddystone 640, hardly used, mint condition; buyer collects; £15.—G3ESI, 13 Denford Avenue, Church Road, Leyland, Lancs.

BULLETINS Wanted: August 1926, February 1928, October 1934, February 1941; also *QST*: December 1915 to September 1917, June 1919 to August 1923, October 1923, April and June 1924, April 1945. *CQ*: 1945 and 1946. 153 old copies *Practical Wireless*, 1932 to 1938, and Nos. 441, 457, 459, 511 and 512. *QRP*: November 1949. Most copies of *Radio, R/9, Amateur Radio, Break-In* and *Popular Wireless* from No. 27. *B.S.W.L. Review*: February 1936 to July 1941, November 1941, March 1942, September 1948 to February 1949.—G3IDG, 95 Ramsden Road, London, S.W.12.

SALE (surplus to requirements): Quantity of Tx and Rx equipment by first-class U.S. and British Manufacturers. Valves, transformers, chokes, condensers, meters, CRT's, precision dials, etc., etc. Much of the above new and unused, at low prices. B.36 Rx 1-20 mc, mint condition, with valves, £18; s.a.e. lists.—Box 1273, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Table-top Transmitter, 50-150 watts; preferably bandswitched and TVI-proof; power/pack immaterial. Also compact 2-metre Tx. —Box 1272, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

WANTED: AR88 Receiver and empty case, BC221 and spare case. Any Ham gear or test equipment purchased. Will exchange HRO band-spread coils for any of above, with adjustment. Will collect.—Box 1274, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

HAM requires quantity boxed valves, U.S.A. and British; also 813's and ET4336 Tx or similar. Would consider complete Ham station. Will collect. —Box 1275, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

FOR SALE: 200-watt, 14 mc, phone transmitter; p/pull TZ40's in PA and modulator; five power/packs; fully metered; professionally made, in 6ft. rack. 21 valves, £50; 13-valve receiver, 27-83 mc, in 3 bands, £25; AR77E, £25.—Dixon, 18 Silverbirch Road, Erdington, Birmingham 24.

SMALL ADVERTISEMENTS, READERS—*continued*

HALLICRAFTERS HT11A Power Unit; input 12v.; outputs 250v.; 70 mA vibrator pack, and 350v. 165 mA dynamotor; £4 10s. 0d. National HRO battery pack, £2 15s. 0d. Carriage extra.—G2AC, Sleepy Hollow, Headley, Bordon, Hants.

R1116 Double Superhet, modified with 8in. speaker and eliminator in cabinet; excellent condition; £15. Would exchange for National, Hallicrafters, Eddystone, etc., Receiver.—Albans, 17 Fern Road, Cropwell-Bishop, Notts.

NO ROOM TO SLEEP: YL wants wardrobe fitted out HRO Senior, coils, P/Pack; superb condition; £30. Two-metre gear, transmitter with 832, £4; 829B, tuned lines PA, £3 10s. 0d.; de-luxe crystal converter, 2RF, £6; professionally-built table-top rig, 829B PA, 832A, seventy centimetres, less 832A, £10; rack mounting gear, 120-watt modulator TZ40's, £10; P/Pack for same, £6; 75-watt modulator, 807's, £7 10s. 0d.; G5RV TV-proof exciter, P/Pack, etc., £30; 813 bandswitched grid PA, plate coils Twenty and Forty metres, clamper tube on screen, £6; 1250-volt pack, Gardners transformers, chokes, 866's, £10; Lionel bug key, £3; D105 microphone, 45/-; Xtal table mike, £3; Labgear xtal calibrator, £7 10s. 0d. All good gear, no hook-ups; please arrange carriage; all s.a.e.'s answered.—G3HVO, Highwood Road, Parkstone, Dorset. Racks, TV Aerials, callers only, please.

SALE: Eddystone 740, £30; Class-D Wavemeter, £5; Power/packs; Tx rack; quantity components.—G3FWX, 19 Endeavour Place, Solihull, Warwickshire.

SALE: Multi-range Taylor Meter, £6; all-wave Sig. Gen., £7; Hallicrafters Sky-Buddy, £5. WANTED: MCR1.—G2DFH, Pendennis, St. Erth, Cornwall.

HRO Mx, with coils 7-30 mc, £12; R1132, unmodified, £3 10s. 0d.; Valves, 811's unused, 15/-; TZ40's, PX25's, tested, 7/6. — 6 Elizabeth Road, Wilton, Salisbury. (*Wilton 2253*).

150 WATT engineer-built bandswitched Tx, 10, 15, 20, 40 metre CW with input for cathode mod., 12 valves, xtal switching, separate 4-valve VFO, with stabilised power supply, relay controlled, 10-watt 160, 80-mtr. CW Tx with internal VFO, 20-watt 2-mtr. CW Tx. High gain 15-watt modulator, speech clipping and filtering, 3 switched outputs to any of above Tx's. All above in enclosed racks or table cabinets. Xtal mike. Two-metre 15 dB square-corner beam on 27ft. cigar mast. *Buyers collect.*—Offers and enquiries for this and other items, etc., to Parvin, 19 Fellbrook Avenue, Acomb, York. (*Tel.: 78283*).

FOR SALE: Hambander Communication Receiver, £12; or will exchange for 1155 or similar communication receiver. Must be in good order.—Box 1277, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SELLING UP: BC348's, R1155A's, R1132A's, National's, Receivers, Television; amplifiers, valves, speakers, car radio, oscilloscope, etc.; s.a.e. for list.—Wright, 47 Grosvenor Street, Pendlebury, Manchester.

SMALL ADVERTISEMENTS, READERS—*continued*

VRL 1.4 mc, 28 mc, complete with rack, £20, or exchange for BC348 ; BC455, £2 ; TV5 trans. with circuit and rack, £5 ; Type 3 Power Unit, £3 10s. 0d.; Type 3 case with chassis, £1 ; G219 oscillator, 500m, 22 mc, £4 ; Test Set, 276x3, AC mains, £4 10s. 0d.; A.T.U. Marconi, £1 10s. 0d. All plus carriage. WANTED: HRO Tuning Condenser, urgently, please, someone.—Box 1270, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

BC348 FOR SALE ; good condition and working order. Internal 230v. AC p/pack, £15.—Young, 118 Church Road, Murston, Sittingbourne, Kent.

HALLICRAFTERS Super Skyrider, 11-valve, xtal; 545 kc to 38.10 mc ; £18 10s. 0d. or offer.—G2BFQ, 13 The Dell, Wembley.

FOR SALE: RCA, AR88D, mint condition, £55. WANTED: SX28 in good condition.—80 Ellesmere Street, Moss Side, Manchester 16.

BC SPEECH AMPLIFIER-MODULATOR, as new, on standard rack chassis ; 100-120 watts audio, complete valves : 6J5, p/p, 6J5, p/p, 6F6, pair 811's. Heater supplies and Mod. Transformer 0-200 mA included ; beautiful equipment ; £15.—Hudson, 35 Ewden Road, Wombwell, Nr. Barnsley.

1131 TRANSMITTER, all valves and many spares. £20 ; CR100/2, really FB, £20 ; BC221/AK, as new, but no case, £15 ; TU5B VFO, £2. Delivery reasonable distance.—Lambert, 3 Broadway East, Carlton, Nottingham.

WANTED: Valves, HK257B, 4E27. Class-D Wavemeter.—Ben Jobson, Tofts Farm, Seaton Carew, Co. Durham.

EDDYSTONE 640 Communications Receiver with matching speaker ; very little used ; £18.—G6BS, 96 Hinton Way, Gt. Shelford, Cambridge.

TAYLORMETER 70B, 50 ranges, new, £8 ; cabinet, 19in. x 10¾in. x 10in., fitted chassis, handles and HRO-type dial, unused, £5 ; 5CPI at 15/- ; R10, UD41, 6SN7, 6SL7 at 7/6 ; 6J7, 6SG7, 6N7, 2050, at 5/- ; SP61, EA50 at 2/- ; 6H6, EB34 at 1/6.—Whitby, 5 Menai View Terrace, Bangor, Caerns.

SALE (surplus to requirements): Valves 829B, QQVO6-40, QQVO7-40, EC91, EF91, 6C4, etc. Receivers: S640, National 1-10, 7v, all-dry superhet, 2-21 mc, FB mobiles ; handbooks for HRO, CR100, SCR522, AR88, CR300 ; Germanium rectifiers, meters, 3.5/7.0 mc xtals.; s.a.e. complete lists.—Box 1271, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

TELEFUNKEN, 7-valve, short-wave portable, 24 volts DC and 110-250 AC ; outside rather rough, inside OK ; good working order ; £6 (carriage paid).—Box 1278, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SALE: Cossor 'scope ; Class-D Wavemeter ; Amplion Testmeter ; Radiogram all-wave chassis ; 150-watt transmitter ; Woden, Gardners transformers and chokes ; UM3 mod. transformer ; valves, crystals, coils, meters, etc. All at low prices. —G3SN, 1 Station View, North Tawton, Devon.

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