The SHORT WAVE Magazine

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VOL. XIII OCTOBER, 1955 NUMBER 8

WORLD WIDE COMMUNICATION

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Managing Editor : AUSTIN FORSYTH, O.B.E., (G6FO)

Advertisement Manager : P. H. FALKNER

Assistant Editor : L. H. THOMAS, M.B.E. (G6QB)

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FOR THE EXPERIMENTER AND THE RADIO ENGINEER

The SHORT WAVE Magazine

EDITORIAL

Automation *This is a word that is being heard more and more these days, and it will not be long before it becomes one of the familiars in the radionics* vocabulary. In this field, it is taken to mean the control of factory processes by automatic methods : most of these involve the large-scale application of extremely complex and expensive electronic equipment. The theoretical objective of Automation is the elimination of production-line labour to the greatest practicable extent, for the purpose of increasing output, reducing costs and controlling quality.*

It is true to say that it is now possible to plan, on paper, a factory in which the human element is reduced to a few quiet men whose sole function is to control, maintain and service the equipment which in turns operates the machinery doing the work — and to keep the factory going 24 hours a day, six days a week.

This concept, which is much nearer than might be supposed, taken with the coming use of atomic energy for large-scale power generation, means that in the lifetime of many of us another industrial revolution will be witnessed. What this will lead to in the social scene and in terms of human relationships is not a matter for discussion in this space.

But what is obvious is that the opportunities in the radionics field will be greater and will expand more rapidly than ever before. Though Automation, applied successfully, may well displace 75% of factory labour — indeed, it will not be much use if it does not succeed to that extent — it will create an urgent demand for large numbers of skilled technicians and engineers highly trained in radionics*.*

So it is in this new direction that the radionics industry is looking, and young people entering it now — many through having their interest quickened by Amateur Radio, which teaches the fundamentals of all practical work in radionics*— have an inspiring future before them, with great opportunities.*

*Radionics—compounded of the words "radio" and "electronics," which we now offer as an addition to the vocabulary!

Austin Forbes G6FO.

A Single-Sideband Exciter

PHASING TYPE SSB DRIVER

C. F. COLE (G3GEN)

There is much to be said for, as well as something against, the SSB mode of transmission, in which a number of operators have become very interested. Several SSB stations can regularly be heard at the HF end of the 80-metre phone band. Here we have a tested design for an SSB modulator unit, of standard pattern, which is easy to build from the details given. But the secret of successful SSB transmission lies in the adjustment of the exciter and it is here that some operators have failed, with the result that SSB has been condemned out of hand as an unpractical system for amateur working. Our contributor shows how the adjustments should be carried out, and, as he suggests, much valuable advice can be obtained over the air from stations already operating SSB transmitters successfully.
—Editor.

THE principal advantages of SSB transmission, as opposed to the A3 type, are narrower bandwidth and a substantial increase in the effectiveness of the signal, for a given input power. To users of adjacent frequencies the absence of a heterodyning carrier is also a Good Thing.

Against SSB, the disadvantages are difficulty in receiver tuning, lack of speech quality and the need for linear amplifiers. Tuning becomes easier with practice, reasonably good communication quality is easily obtainable, and even the linear amplifier has an advantage, for it helps materially in reducing TVI.

Being persuaded by such arguments, and also being impressed by the results to be heard on the amateur bands, it was decided to build a simple SSB rig as quickly as possible. Unfortunately, the published SSB circuits did not look very simple. The most promising circuit was that of a phasing-type exciter in the *Radio Handbook* (12th Edition). The exciter to be described here is based on the phase-shifters and balanced-modulators of that design. Audio may then be taken from an existing speech amplifier, and RF, at the operating frequency, from a good VFO/BA (or CO) of about two watts output. For single-band operation the exciter is connected to a linear amplifier, but by interposing a suitable multiplier stage, operation on other bands becomes possible.

At G3GEN, operation around 3·8 mc was chosen as a start for it is a good place to meet other SSB people and exchange ideas.

The Circuit

The block diagram, Fig. 1, shows the exciter in relation to a typical complete transmitter. V1 and V2 are used to obtain four-phase audio for the balanced-modulators, V3 and V4.

An RC network provides RF voltage at V3, with 90° phase difference from the RF at V4.

The balanced-modulators each produce a double-sideband-suppressed-carrier signal in the output circuit, but as the two channels are

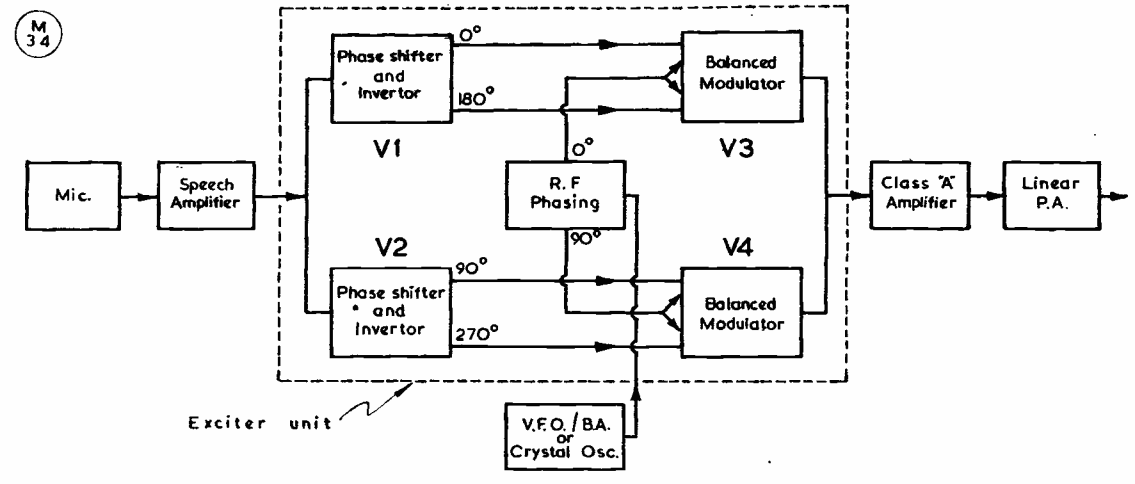


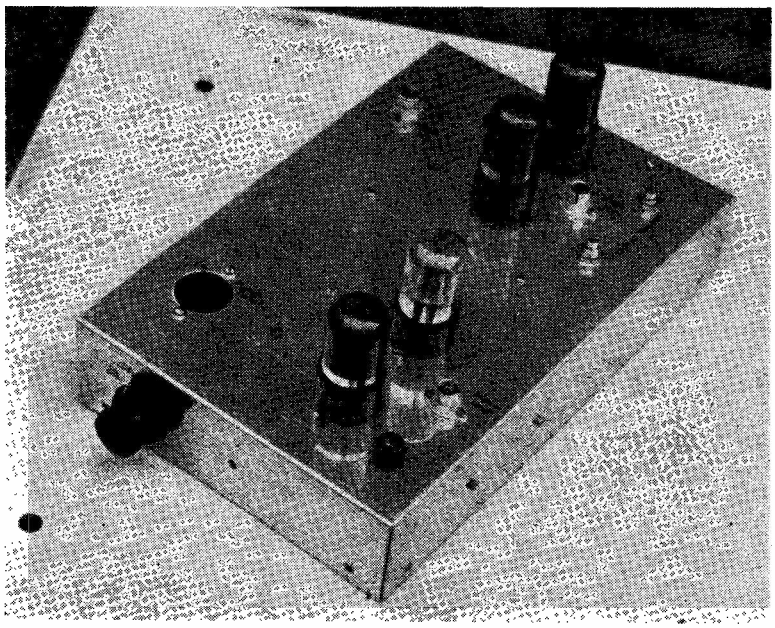
Fig. 1. Block schematic, showing the SSB Exciter in a typical transmitter chain.

phased by 90° one of the sidebands is eliminated, leaving the desired SSB signal.

Since balanced-modulators are not particularly efficient, the exciter is followed by a Class-A amplifier, the 6AG7 being very useful in this position. This is capable of driving a pair of 807's to the licensed input power.

Fig. 2 shows the actual circuit diagram. The valves used are four 6SN7 double-triodes. The important components are the resistors and condensers in the phasing networks.

In the audio phasing network these are : C4, C5, C6, C17, C18 and C19, with R6, R8, R9, R20, R22 and R23. Each of these should be within a few per cent. of the specified values.



Upper-chassis view of the SSB Exciter. At the front is the sideband switch, the octal socket just behind being for power supply connection. The RF output coax connector is at the left rear. RF input and carrier balance controls are at right rear. Another photograph shows the construction below the chassis.

In the RF phasing network are R17, R18, C14 and C15. These, also, should be close-tolerance types. The values specified for C14 and C15 are for 3·75 mc ; for other bands the capacity is inversely proportional to frequency, *e.g.*, at 14·25 mc a value of 112 $\mu\mu$F should be used. The network presents a 70-ohm load to the RF source.

The audio valves, V1 and V2 in Fig. 2, are operated with a positive grid voltage set by potential-divider, R2-R3, *via* the gain control, R4. In each case, the first triode section feeds through a phase-shift network to the second triode section, which is a phase-inverter. The phase-shift is such that if the outputs of V1B are represented as 0° and 180°, those of V2B will be at relative phases of 90° and 270°. This relationship can be maintained fairly accurately, with the networks shown, over a range of frequencies from about 150 to 2700 cycles. In order to get good sideband suppression, the four audio outputs must be equal in magnitude. Therefore, it is suggested that resistors R10, R11, R24 and R25 be adjusted, by trial and error, to obtain this condition.

The outputs of V1B are taken to the grids of V3A and V3B, the anodes of which are push-pull connected. The grids are also fed with RF, but this time, effectively, in parallel. Balance in the two sections is obtained by the adjustment of the slider of R16.

The connections between V2B and V4 are very similar, except that the audio leads are reversible by means of switch wafers S1B and S1C. The reversal effects a change from upper to lower sideband, or *vice versa*.

It will be noticed that the switch has two other positions. In the first, *i.e.*, anti-clockwise, position, V4 is not supplied with audio and, as the carrier is balanced out, the valve is ineffective. However, V3 is still supplied with audio, and by means of S1A, which increases the output of V3A over that of V3B, the output is double-sideband, with carrier, *i.e.*, A3. When passed through a linear power amplifier, this is useful for working a station unused to tuning SSB signals.

Alternatively, S1A can be used to unbalance V4, when phase-modulated signals result. However, on-the-air tests with this connection were not very satisfactory, so it was changed to the A3 version shown in Fig. 2.

With the switch in its fourth position the output is double-sideband with carrier suppressed. Whilst this is useless for communication purposes, it can be useful for testing linear amplifiers.

Power requirements for this exciter are 250 volts DC at 30mA, and 6·3 volts at 2·5 amps.

As shown in Fig. 3 and the photographs, the exciter is built on to an aluminium chassis, size 12 ins. x 8 ins. x 2½ ins. An aluminium screen across the chassis separates the audio circuits from the balanced-modulators. The twelve audio phasing components are all assembled on to a group board, prior to mounting alongside the two audio valveholders. The Yaxley-type switch, S1, is mounted at the front end of the chassis. The audio gain control can also be mounted here, or, as shown, at the chassis top surface when the existing speech amplifier has its own gain control.

On the other side of the screen are the two valveholders for the balanced-modulators. To one side of them are the carrier-balancing potentiometers, and to the other, the push-pull anode tuned circuit. As this does not seem to require critical adjustment, the control is taken to the rear of the chassis. If front-panel control is required, no doubt an extension-spindle can be arranged.

Screened wires (of the thin type used for

Table of Values

Fig. 2. Circuit of the SSB Exciter Unit.

C1 = 25 μF, 25v.
C2 = .01 μF
C3 = 2 μF, 350v. (TCC CE17L)
C4 = .02 μF (*see text*)
C5 = .003 μF ,, ,,
C6 = .0066 μF ,, ,,
C7, C8, C20, C21 = .05 μF, 500v.
C9, C10, C22, C23 = 80 μμF, silver mica
C11, C12, C24, C25, C28 = .002 μF
C13 = .0005 μF
C14, C15 = 425 μμF (*see text*)
C17 = .005 μF ,, ,,
C18 = 730 μμF ,, ,,
C19 = .0016 μF ,, ,,
C26, C27 = 75 μμF 2-gang (*ex*-RF27)
R1, R31 = 2,200 ohms, ½-w.
R2 = 100,000 ohms, 2-w
R3 = 10,000 ohms, 1-w.
R4 = 500,000 ohms pot. (AF gain)
R5, R7, R19, R21 = 27,000 ohms, 10%, ½-w.
R6, R20 = 22,000 ohms, 2%, ½-w.
R8, R22 = 150,000 ohms, 2%, ½-w.
R9, R23 = 100,000 ohms, 2%, ½-w.
R10, R24 = 56,000 ohms, ½-w. (*see text*)
R11, R25 = 47,000 ohms, ½-w. (*see text*)
R12, R13, R26, R27 = 220,000 ohms, ½-w
R14, R15, R28, R29 = 470 ohms, ½-w.
R16, R30 = 1,000 ohms, 3-w. pot. (Colvern wire-wound). (Carrier Balance)
R17, R18 = 100 ohms, 2%, 1-w.
RFC = 2.5mH RF choke
L1 = 45 turns, centre-tapped, 24 SWG enamel close-wound on 1in. dia. former
L2 = 10 turns, 22 SWG PVC-covered, wound over centre of L1.
S1A, B, C = Yaxley type switch, 3-pole, 4-way
V1, V2, V3, V4 = 6SN7

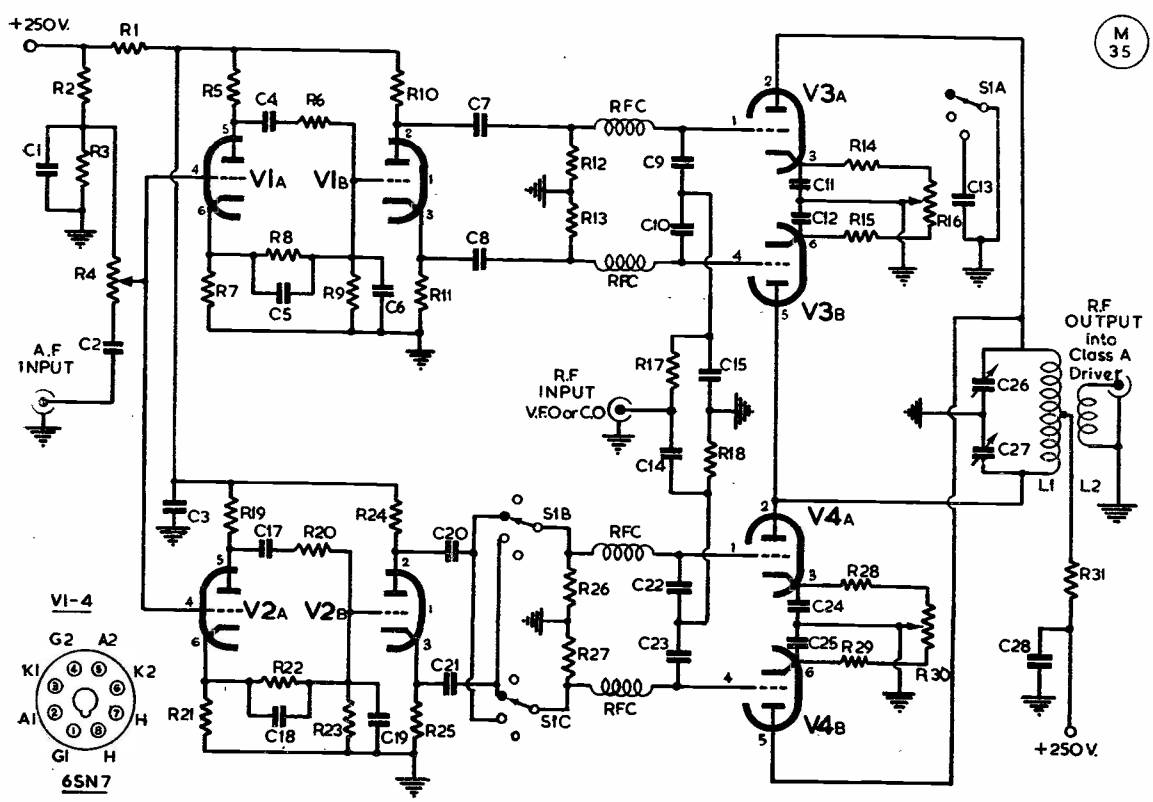
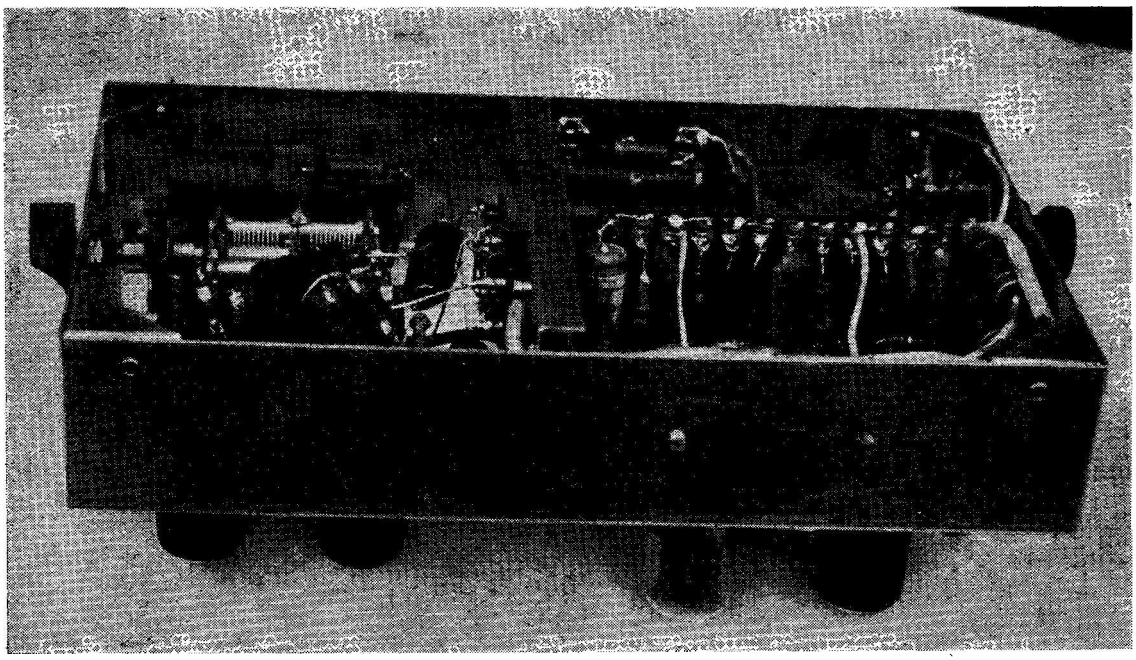


Fig. 2. Circuit complete of the Single-Sideband Exciter described by G3GEN and based upon a standard design. It is of the phasing type, with low-level balanced modulators. The switching provides for A3 (AM phone) carrier when required. Note that the top end of C13 should go to the junction of R14, R16, and that the switching is shown in Posn. 3 of the 4-way switch S1A-S1C.



Under-chassis view of the G3GEN SSB modulator. On the left of the central screen are the balanced modulators, V3 and V4 in Fig. 2, with the tuned circuit of L1 at the rear. In the centre of the right-hand section can be seen the group board carrying the twelve audio phase-shift networks.

pick-ups) is used for the audio connections between phase-shifters and balanced modulators. Insulating sleeves over the screening prevent accidental short-circuits. Power connections are taken to an octal socket on top of the chassis.

Setting Up

When construction is completed, and the HT line has been tested through, power is applied. Switch S1 is set on position 2 or 3 (one of the SSB positions), and a steady audio tone is fed into the AF input, with carrier-balance controls in approximate mid-position. The gain should be adjusted to give an output of the order of 5 volts to the balanced-modulator grids. Now the four outputs should be measured, preferably with a valve-voltmeter, if available. Due to component tolerances, the four readings will probably differ somewhat. The easiest way to get over this is to alter the anode and cathode resistors (R10, R11, R24 and R25) accordingly. For instance, the resistor corresponding to the highest output should be reduced in value, and the one corresponding to the lowest output increased. By successively altering and rechecking in this way the voltages should be made as equal as possible.

Now apply RF at the operating frequency and set S1 to position 1 (A3). Using the receiver, coupled to the output, adjust the tuned circuit for maximum output. Leaving this control set, disconnect the audio input signal and turn S1 to position 2 (SSB). The carrier balance potentiometers can now be alternately adjusted for minimum carrier signal. As the actual *null* may be masked to some extent by direct radiation from the oscillator, the exact settings may be left until a linear amplifier is available.

Re-connecting the speech-amplifier, the exciter should now be generating a single-sideband suppressed-carrier signal. Set the receiver for SSB by turning AF gain up, RF gain down to a suitable level, AVC " off " and BFO "on." Speaking into the microphone, and tuning the receiver, a point will be found where the " scribble " sound is resolved into clear speech. It may be found that reducing the grid-leak at the front end of the speech-amplifier to 150,000 ohms improves the SSB signal, by cutting off the low-frequency response. Using the receiver, it can also be determined which of the switch positions gives the upper, and which the lower sideband. The lower is the one usually employed, on 80 metres.

By suitably coupling an aerial at L1 in Fig. 2, local contacts should now be possible.

To complete the picture, Fig. 4 illustrates

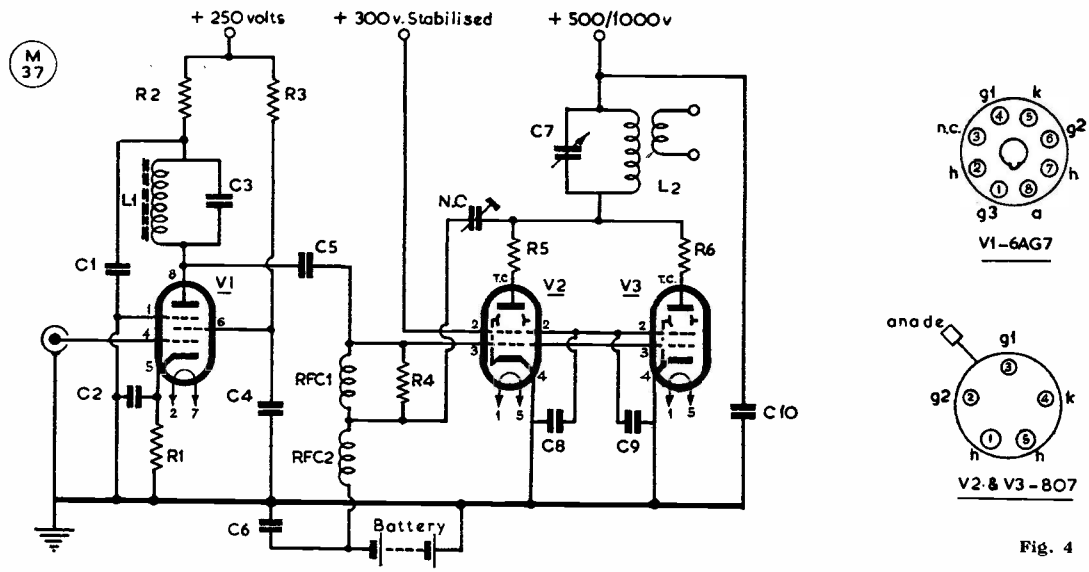


Fig. 4

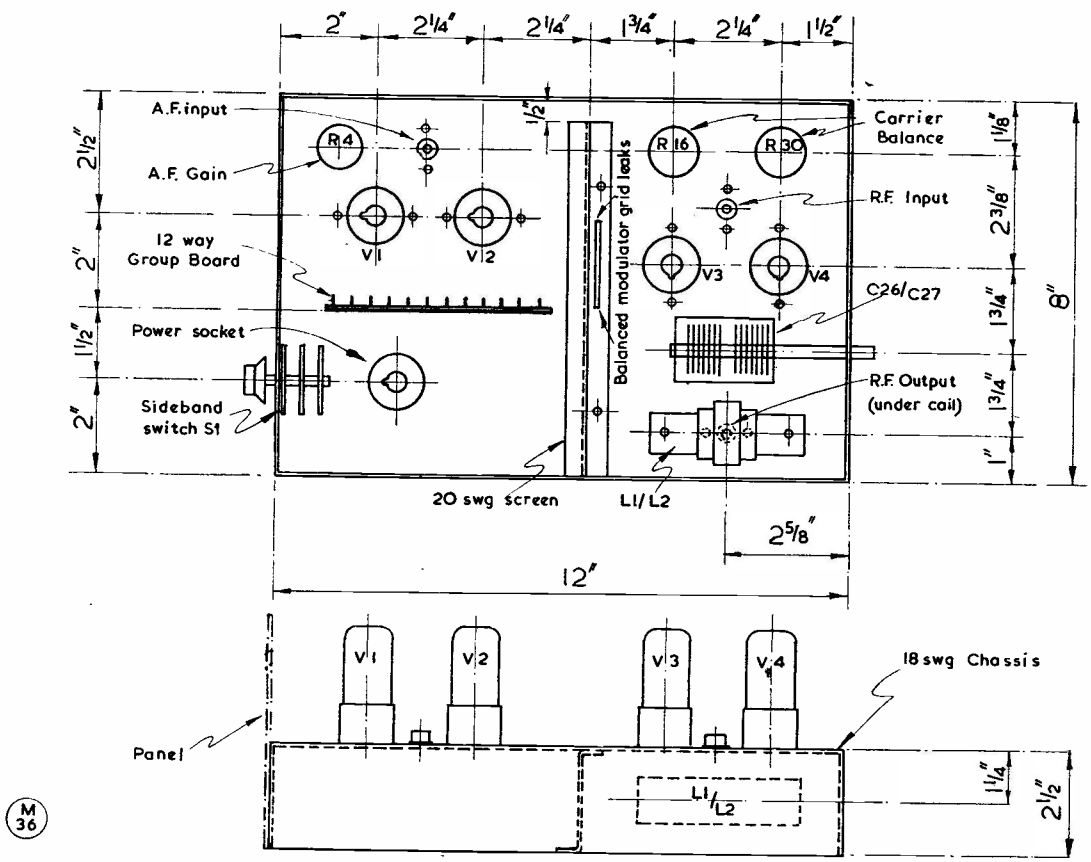


Fig. 3. Chassis layout adopted by G3GEN for the construction of the SSB Exciter described in his article.

Fig. 4. A linear RF power amplifier, with driver, to complete an SSB transmitter capable of operation at the full input of 150 watts. The 807's must be neutralised as they run "free" with only a small holding bias. The 6AG7 gives ample drive and in this case the transmitter is operated on 80 metres. *(Circuit opposite).*

Table of Values

Fig. 4. Linear PA stage for SSB Transmitter.

C1, C2, C4, C6,		R5, R6	= 47 ohms, 1-w.
C8, C9	= .002 μF, ceramic	L1	= 60 turns, 30 SWG enamel close-wound on ½in. dia. former with dust iron core
C3	= 5 μμF		
C5	= 100 μμF		
C7	= 300 μμF (PA tuning)	L2	= 16 turns, 16 SWG 1¾in. i/d. 2in. long
C10	= .001 μF, mica		
NC	= Neutralising condenser	RFC1, 2	= 2.5mH. RF choke
		V1	= 6AG7
R1	= 100 ohms, ½-w.	V2, V3	= 807
R2	= 1,000 ohms, 1 w.		
R3	= 15,000 ohms, 2-w.	Batt	= 36 volts bias; standard bias batteries in series
R4	= 10,000 ohms, 2-w., carbon		

a typical linear amplifier as used with this exciter. It consists of a 6AG7 voltage-amplifier operating in Class-A, and a pair of 807's, in parallel, as a Class AB2 PA. Construction follows normal practice, except that the PA is more likely to need neutralising than would a Class-C PA. The usual precautions against TVI should be taken.

The circuit is, of course, only typical, and most of the usual variations can be tried, such as a pi-network tank circuit, for example. However, the screen voltage of the PA should be stabilised, 300 volts being recommended for anode voltages above about 550. At G3GEN, grid bias is by battery, and is adjusted to give a standing anode current, for the pair of 807s, of 30mA. The peak power output will, of course, depend on the HT voltage available for the PA.

Conclusion

The results obtained with the exciter, in conjunction with a linear amplifier of the type briefly described above, have been very gratifying. The writer has been converted to the belief that there is a future for SSB in Amateur Radio, and it is hoped that this article will persuade others to give the system a trial, judging for themselves whether the claims made for SSB are justified.

On the air, the "old hands" at SSB will be found very ready to help the newcomer to the system, and in this connection G3GEN would like to thank, in particular, G2HX, G3AOO, G3EPL and G6ZQ for their assistance and suggestions.

BBC TELEVISION STATION AT LES PLATONS, JERSEY

The BBC announces that it is intended to start the television service to the Channel Islands on an experimental basis from the new station at Les Platons, Jersey, on October 3. Regular test transmissions started on September 19. The station will operate on Channel 4 (vision 61.75 mc, sound 58.25 mc) and will have an effective radiated power of 1 kW. The transmissions will be horizontally polarised.

For the first few months the service from Les Platons will be experimental, because the station will obtain the television programmes by radio reception from the temporary television transmitter at North Hessary Tor in South Devon, or alternatively from the more distant station at Wenvoe in Wales. This arrangement will enable the BBC to provide transmissions in the Channel Islands earlier than would otherwise have been possible, but it means that until North Hessary Tor is working on full power, early in 1956, there may be times when propagation conditions make reception from the mainland unsatisfactory. The signals are picked up at a receiving station which has been established at Torteval on the south-west coast of Guernsey, and piped from there to Les Platons in Jersey by a microwave radio link. If during this experimental period reception of the picture becomes so poor that it cannot be re-broadcast, it will be faded out completely and replaced by a local test signal.

CLUB CONTEST ON TOP BAND — "MCC"

The Tenth MCC—the SHORT WAVE MAGAZINE 1.8 mc Club Transmitting Contest, to give its full title—takes place during the week-ends November 19-20 and November 26-27, 1500-1900 GMT each day. This means that the 160-metre band will be very busy with CW stations during those periods; while Clubs will be seeking to work one another for the full three points, they will also want to make single-point once-only contacts with non-Club stations. Therefore, all Top Band CW operators interested in fast contest working are invited to be on for the event. Club stations can be identified by the fact that they will call "CQ MCC" and will give their Club name for a complete contest QSO. It is particularly requested that non-Club operators should *not* use "CQ MCC," even if they are looking for MCC stations. If they do, it will not only confuse the issue but, in accordance with the rules (*see* p.441), they will be embarrassed by being asked to identify the Club they represent.

✶

"MINIATURE ALL-BAND CW/PHONE TRANSMITTER"

The author of this article in our September issue wishes to apologise for the fact that he named the modulator valve V4 incorrectly on p.346 and in the circuit on p.347; G2XX says it should be, and is in fact, a 12AX7.

Modern Top Bander

PART II

MODULATOR SECTION— POWER SUPPLY —ADJUSTMENT

R. G. B. VAUGHAN (G3FRV)

The first part of this article appeared on pp. 350-353 of our September issue and described the RF section in detail. The text below should be read in conjunction with Part I, to which there are various cross-references.—Editor.

The modulator circuit, Fig. 4, is fairly conventional, the only unusual point being the two separate high and low level inputs. V6 is a voltage amplifier with high impedance input suitable for a crystal microphone. Some care is taken in the grid circuit to prevent RF entering into the modulator; the 50 $\mu\mu$F condenser (C28) should be mounted right on the valve base and the rest of the input circuit should be wired with very short leads and as far away from heater connections as possible. To prevent hum *one* earthing point only should be used for the stage. All earthy leads should be commoned at this point only and not elsewhere, otherwise hum loops and common impedance coupling will almost certainly give trouble. The output from V6 feeds the gain control R28 in the grid of V7a. V7a/b is used as a mixer stage; the grid circuit of V7b is separately brought out to the front panel, and may be used for high level input from pickups, etc. G3FRV has also made use of this for relaying a station on another band, an electrical link being much preferred to holding the microphone in front of the speaker !

V8 is the modulator valve, a 6V6. A 6BW6 would probably be better here, and the author intends to test one as soon as possible. The modulation transformer used is surplus from the SCR522 transmitter. Whilst not providing an exact match, the approximation is not worth worrying about. If one of these cannot be obtained a Woden type UM1 would probably be even better, although considerably larger. Connections for both are shown in Fig. 3. It will be noticed that several condensers C28, C36, C41 in various parts of the circuit are employed to limit intentionally the frequency response of the modulator to prevent spreading and "splatter." The overall response of the complete transmitter exhibits a sharp fall-off at 4 kc, which is the characteristic required.

Some adjustment to the values of these condensers may be necessary for differing types of microphones. G3FRV actually uses an ACOS Mic 33/1, but any good crystal type will be satisfactory. Care should be taken in purchasing any of the surplus crystal inserts available on the market, as some of these are very unreliable. In the writer's experience it is much more economical to purchase a reliable new microphone in the first place. This is, of course, assuming that no satisfactory microphone is already available.

Control Circuits

Another requirement of the transmitter was that it should fit in with the relay control system at G3FRV. Briefly, each piece of equipment has a relay fitted. These relays are operated, *via* a selector switch, from a control unit fitted at the operating position. The control switch (S1) selects "Tune," "CW," and "Telephony"; the functions in each position may be readily ascertained from the circuit diagrams. The control relay (A) is only used on the telephony position and is operated externally, as previously explained. "A" relay has three make contacts :

- A1 lights the red indicator lamp on the front panel.
- A2 short circuits the key jack J1 to bring the carrier on.
- A3 completes the circuit for the screen grid of modulator valve V8.

In the "Tune" position the VFO may be zero beat with a station without causing any interference. As soon as the switch is moved to either "CW" or "Telephony," the transmitter is in the stand-by condition. With the switch at "CW" the transmitter can be brought into operation at the touch of the key. In the "Telephony" position the whole transmitter is under the control of the external switch. A GPO type key-switch is recommended for change-over : other units such as the station receiver may then be connected to the spare contacts.

Aerial Tuning

The subject of aerial tuning is well-worn, and in any case outside the scope of this article, but a few suggestions would not be out of place. The author has chosen to keep the aerial tuning separate for a variety of reasons, not the least of which is the requirement for a really flexible transmitter. Link coupling is also preferable, as it enables "hot" leads to be kept out of the way instead of draping around the back of

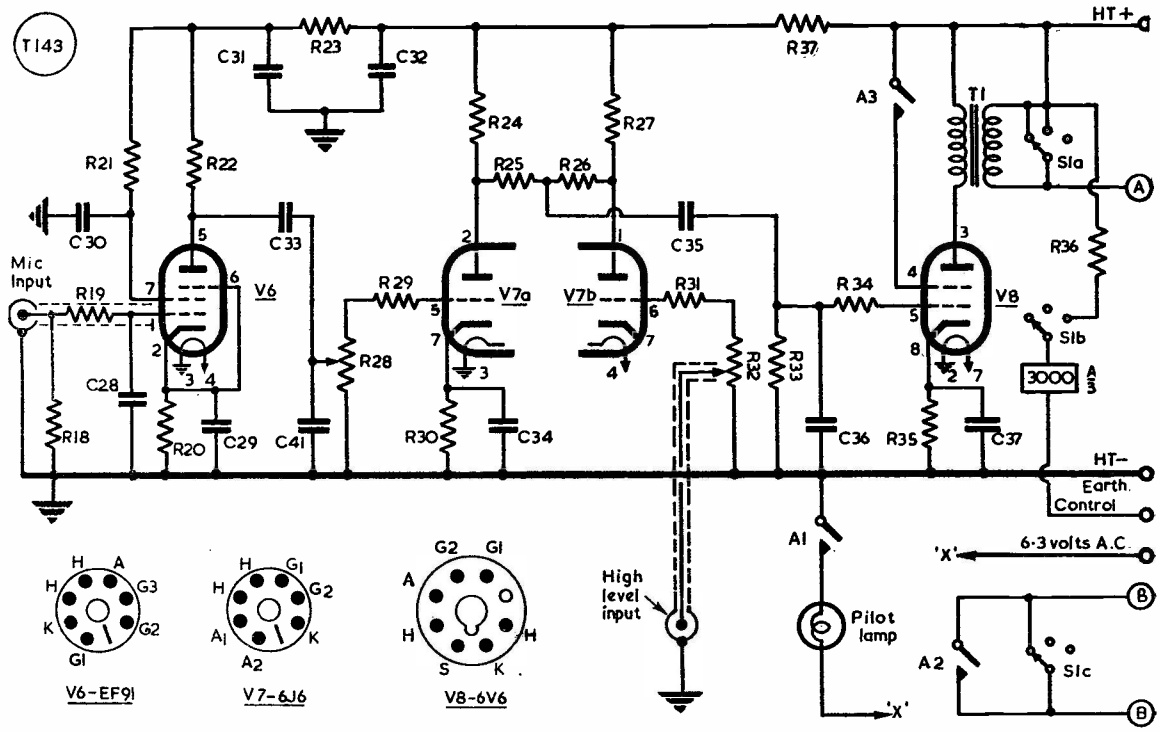


Fig. 4. The modulator circuit for the 160-metre transmitter described in this article. Full control is obtained, with good speech quality, and the circuit is arranged for alternative high-level audio input at V7B, as when " playing back " from a tape recorder or the receiver output. Points A, B-B, connect as shown in the circuit on p.351, September issue.

equipment as is found in so many stations. An 80-ohm point is also handy for switching, measurement of standing-wave ratio, and so forth. Naturally the method of aerial coupling employed depends to a large extent on the type of sky-wire available. One word of warning: Do *not* immediately assume that a Collins or Pi-coupler is the be-and-end-all where tuning the aerial is concerned. A Pi-coupler properly designed should not " load up any bit of wire," and in fact won't. It may certainly *appear* to load, but in fact your PA is probably looking into a big slice of reactance. It is wise not to lose sight of the fact that the adjustment of these networks can be critical, and a SWR meter is really essential for best results. Summing up, it is better on these Top Band frequencies to use a Marconi-type aerial with series or parallel tuning, link coupled to the power amplifier. Reference to the *ARRL Handbook* or similar publications should provide ample data on this subject.

Power Supply

This is again fairly conventional, *see* Fig. 5, and is mounted on a chassis which is approximately the same size as the transmitter unit.

Table of Values

Fig. 4. Modulator Section and Control Circuits

R18	=	680,000 ohms, ½w.
R19	=	10,000 ohms, ½w.
R20	=	4,700 ohms, ½w.
R21	=	4.7 megohms, ½w.
R22	=	1.0 megohms, ½w.
R23	=	270,000 ohms, ½w.
R24, R27	=	100,000 ohms, ½w.
R25, R26	=	47,000 ohms, ½w.
R28, R32	=	1.0 megohm variable
R29, R31, R34	=	20,000 ohms, ½w.
R30	=	1,000 ohms, ½w.
R33	=	180,000 ohms, ½w.
R35	=	180 ohms, 2w.
R36	=	25,000 ohms, ½w.
C28	=	50 $\mu\mu$F, mica
C30	=	15 μF, 500v., working
C31, C32	=	16 μF, 500v., working
C33, C35	=	.01 μF, 500v., working
C36	=	150 $\mu\mu$F, mica
C29, C34.		
C37	=	50 μF, 25v., working
C41	=	100 $\mu\mu$F
T1	=	SCR 522 modulation transformer, or Woden type UM1 (*see text*)
A3	=	Post Office Type 3000 relay, with 3 " make " contacts
V6	=	EF91, 6AM6, or similar
V7	=	6J6, ECC91
V8	=	6V6, 6BW6
S1	=	(a, b, c, d and e), 5-pole 3-way Yaxley, or similar

The two are linked by a cable which should be kept as short as possible to reduce voltage drop in the heater leads. The bias supply is obtained from one half of the HT winding. The VFO HT is fed separately to the transmitter from the stabilisers. G3FRV uses a mercury vapour rectifier, actually an 83, but a 5U4 or any other 200-250 mA rectifier is suitable.

[over

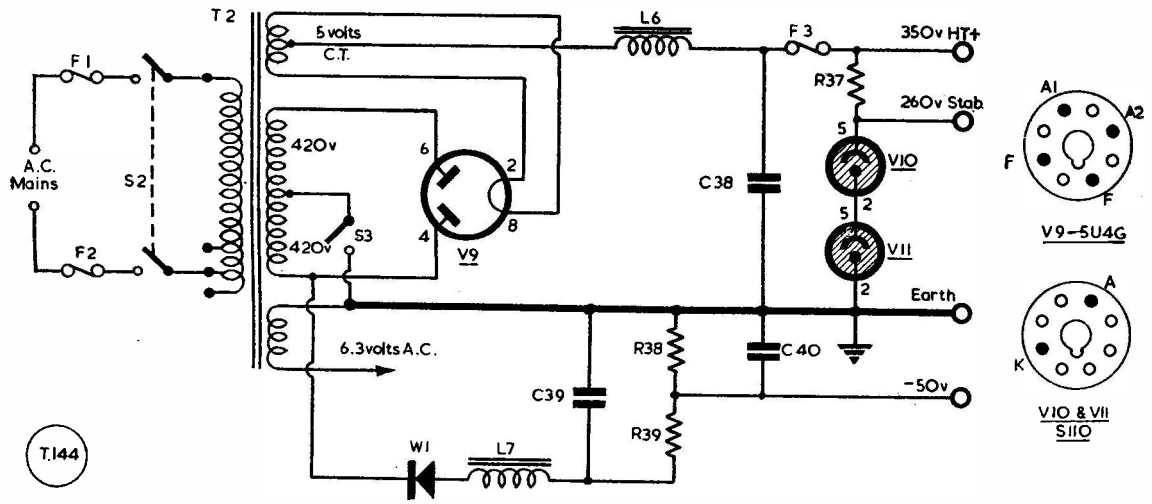


Fig. 5. A suitable power pack, as a separate unit, for the Top Bander designed by G3FRV. All values are given in the table.

The VFO stage should be checked externally with filaments and HT applied to facilitate any adjustment of the frequency coverage that may be necessary. CT and C1, the tuning condenser, should be set at maximum capacity. Check the frequency on the receiver; with any luck it should be between 1750-1780 kc. Set the receiver to 1800 kc and decrease CT until the beat is heard. Leaving CT where it is, rotate C1 to minimum capacity and check the frequency, which should be about 2010 kc. If all is well CT may now be set so that the overlap at both ends of the band is the same, and the VFO unit can be installed in the chassis. Having checked all wiring, switch on. With the function switch in the "tune" position check that the VFO can still be heard in the receiver and make any small adjustment to the coverage that may be necessary. Switch to CW and press the key when some drive should be observed on a meter temporarily inserted in the PA grid. L2 and L3 may then be adjusted for flat drive over the band. Adjustment of the two Philips trimmers C17 and C20 may also be made. There is, of course, no objection to using fixed capacities in place of these, but G3FRV found that fine adjustment to the drive could be made with the variable component. Settings will be quite critical, but once found can be sealed and left. The PA should dip and load up in the normal fashion and keying may be checked for chirp and drift. Stability can also be checked at this stage by removing the VFO valve V1 and placing a fairly high value of resistance in series with the bias supply so that about 20 mA of PA anode current is seen on the meter M. The PA tuning C27 should be rotated; no spurious dips should be obtained, nor any RF indicated in a neon coupled to the tank coil. Restoring the circuit to normal, switch to the telephony position of S1 and operate "A" relay. This should bring the complete transmitter into action. Speech quality is best checked by connecting the transmitter to an artificial aerial and monitoring on a local receiver.

Table of Values

Fig. 5. Power Supply for the Transmitter

C38, C39 = 32 μF, 500v. wkng.
C40 = 8 μF, 300v. wkng.
R37 = 1,500 ohms, 12w. w/ wound
R38 = 2,500 ohms, 5w. w/ wound
R39 = 15,000 ohms, 12w. w/ wound
L6 = 10 Henry, 200 mA
L7 = 10 Henry, 50 mA
T2 = 420-0-420v., 150 mA, 5v. 3A., 6.3v. 3A.
W1 = 250v. "Sentercel" or similar metal rectifier
V9 = 5U4G rectifier, or similar
V10, V11 = S130 Stabilisers
F1, F2 = 1.5 amp. fuses
F3 = 500 mA fuse
S2 = DPST toggle, mains
S3 = SPST toggle, HT on

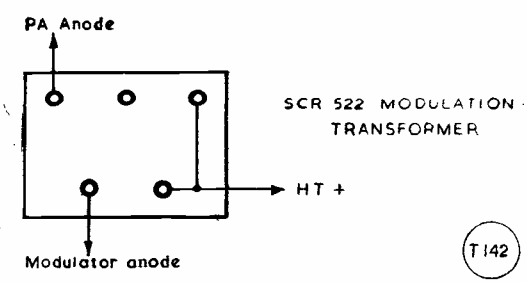


Fig. 3. Connections for the modulation transformer in the G3FRV transmitter with an SCR-522 mod. xformer. When a Woden UM1 is used details are: Strap 3/4, 9/10; take HT + to 5/11 strapped; 6V6 anode to 2; QVO4-7 anode to 8.

Recessed Pan Construction

NEW APPROACH TO STANDARD RACKING

J. A. PLOWMAN, A.M.Brit.I.R.E. (G3AST)

While rack-panel and table top are the constructional forms favoured by most amateurs, there are other methods of putting the gear together. Our contributor describes a new variation of the rack-panel layout, which has many advantages, not the least of which is full accessibility, both in front and at the back. Many commercial assemblies are now being built in recessed pan form because, apart from accessibility, it also saves space.—Editor.

WHILE today the tendency is towards miniaturisation and table top rigs, the more complex equipment still calls for compact stowage. This article shows how quite involved combinations of gear can be arranged to yield maximum space utilisation yet retain the accessibility which is so necessary to the average amateur.

A year or two ago the writer was in the unfortunate position of having most of his equipment partially wrecked by unsuitable storage, and was in consequence faced with what was little short of a total rebuild.

However, the lessons learned from the wreckage were very valuable, and showed, among other things, that where damp is present, untreated steel is almost out of the question ; wherever it is used it must be neutralised by cadmium plating.

Bearing these factors in mind, as well as many others, it was decided at G3AST that the rebuild should go hand-in-hand with a redesign.

In view of the multitude of units involved, together with the desire to rebuild the HF/VHF rig with the minimum of heartaches, it was decided to make two major design changes : First, that the use of mild steel should be discontinued, owing to difficulty of working, and secondly, the standard 19 in. chassis-and-panel form be abandoned in favour of a new system rapidly gaining favour, and known very descriptively as " recessed pan construction."

The choice of material to replace the steel needed a little thought, as gauge for gauge, standard aluminium would not be sufficiently strong. It was decided that one of the many hard alloys of aluminium that are now available should be used. Of these, one of the stiffest and strongest is undoubtedly duralumin, known by aircraft manufacturers as L72.

Unfortunately this material is extremely brittle unless it is heat treated, or " normalised," and where bending is involved, its use is rather precluded, as the normalising process requires quite a protracted subjection to a very high temperature.

A very good alternative to this material is readily available, however, and while still possessing extremely good strength characteristics is capable of being folded without prior treatment. This metal is available from most firms advertising non-ferrous materials, and if 16 SWG is adopted where 18 SWG steel was used previously, it can be employed as a direct substitute for steel sheet. It is known as manganese-aluminium, and can be identified by the code number L59.

Constructional Points

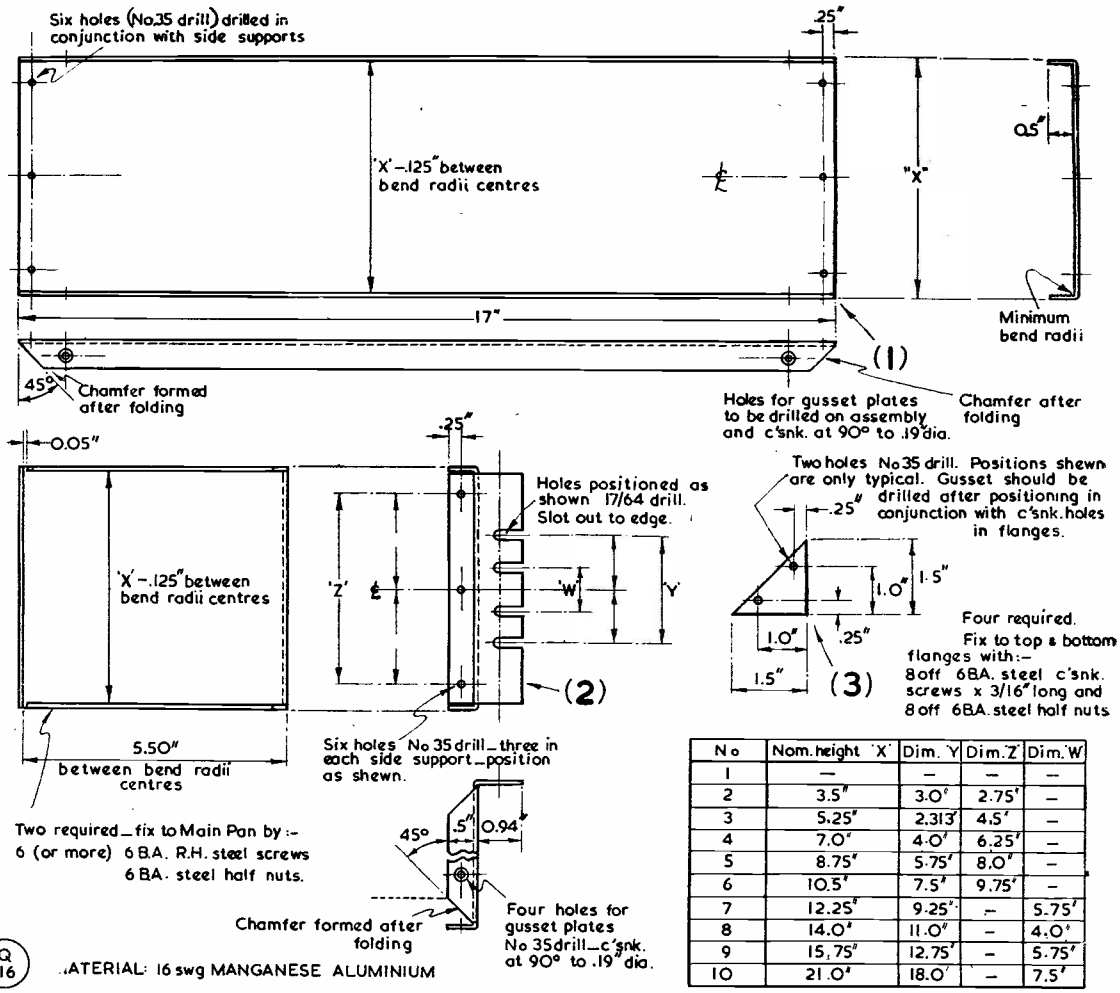
Few amateurs possess, or even have access to, a box folding machine and the writer has therefore been careful to design the assembly described in such a way that it can be made in three easily fabricated parts, and put together as an assembly. The only requirement is that the bed of the folder be provided with a 1 in. deep slot at some position.

Reference should be made to the diagram. It will be seen that the pan is quite straightforward, being 17 ins. long overall, and any of the standard panel heights, *e.g.* (x × $1\frac{3}{4}$ ins.) — 1/32 in., where " x " is any whole number.

The pan is supported by the two side pieces, (2) and joined thereto by two flanges in the rear. To provide stiffness in shear to the whole assembly, a triangular gusset plate (3) is bolted to each corner. These pieces should be fitted carefully, and when tightly fixed result in a very rigid job.

The front portion of the side pieces are also flanged, and " dee " slots cut in a manner familiar to those conversant with standard panels. The dimensions are given in the drawing. The position of these slots is critical, but with care, the constructor can be spared the galling experience of finishing the assembly, and then finding the slots will not line up with the rack assembly holes, as in the writer's case on two occasions.

It should be noted, that while 6BA roundheads are used to assemble the three main " chassis " components, it is essential to employ countersunk metalthreads to fix the triangular gusset plates, as nothing must pro-



No	Nom. height 'X'	Dim. 'Y'	Dim. 'Z'	Dim. 'W'
1	—	—	—	—
2	3.5"	3.0"	2.75"	—
3	5.25"	2.313"	4.5"	—
4	7.0"	4.0"	6.25"	—
5	8.75"	5.75"	8.0"	—
6	10.5"	7.5"	9.75"	—
7	12.25"	9.25"	—	5.75"
8	14.0"	11.0"	—	4.0"
9	15.75"	12.75"	—	5.75"
10	21.0"	18.0"	—	7.5"

These drawings illustrate the mechanical construction of the chassis units suggested by G3AST. The general arrangement can be followed by a study of the photograph on the opposite page.

trude beyond the overall width of the unit, or interference with the next pan in the rack will result.

Fabrication should be commenced in a definite sequence, as it is possible to go wrong very easily and be landed with a virtually impossible "fold" operation.

In this respect, the writer found it a good idea to "practice" a few times with a piece of cardboard. After a few attempts the sequence becomes second nature, and the units can be made up with no difficulty whatever.

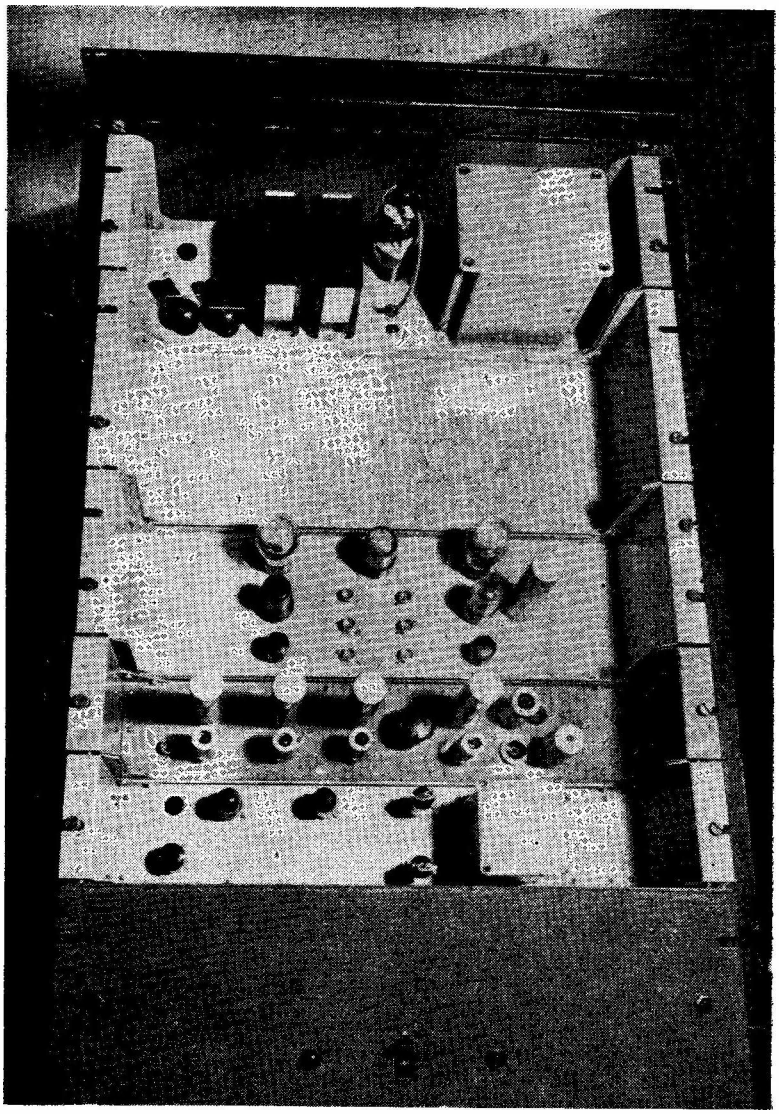
The construction can be started with the main portion (1), which should be marked out and folded before the corners are chamfered. By chamfering the corners after folding a much neater job results, and bulge out at the ends is avoided. Be sure the angle of chamfer is 45 degrees on these flanges, otherwise it will not be possible to mate them neatly with the flanges of the side portions. One word of caution here. It is the finished height of the unit that is important, and if sharp flange folds are not envisaged then the distance "x" between the scribe lines must be adjusted accordingly. While most engineers' pocket books carry a somewhat involved formula for this bend allowance, the cut-and-try method often has the final word. To avoid wasting a lot of metal, the constructor might try some practice folds on a narrow strip of the material to be used.

The side pieces are identical in most cases, but a few are "handed" by the dee-slots only;

they should be made together. Scribe out the fold lines as before, making sure the distance "x" between them is not only accurate, but identical to the "x" distance in the "pan." The dee-slots can be marked out and cut to the drawing dimensions before folding, as can the three 6BA clearance holes in the "rear" flange. The flange chamfers should be left until after folding, as before.

Folding

The folds must be made in this order: First, the front flange containing the dee-slots, and secondly the side flanges, allowing the front flange to sit in the slotted folder bed. Before the rear support flanges can be folded, the side flanges must be chamfered, as this provides clearance for the top blade of the folder. With this accomplished, the final fold may be made and the unit is practically complete. "Offer up" the side portions to the main pan and drill six 6BA clearance holes in the support flanges as templates. To assist in mating snugly, the sharp end edges of the pan should be removed with a fine file. The job now is comparatively easy and the remainder is almost self-explanatory.



Showing mounting of the recessed-pan chassis, as described by G3AST. These chassis are carried on a standard rack and the widths can be made variable, in the usual way, to suit the equipment to be built on to each unit. The main advantage of this sort of layout is that the gear is readily accessible both front and rear; extraction of a pan need rarely be necessary, even to carry out major modifications. Variable controls can be mounted in positions appropriate to the circuit, thus shortening leads and greatly simplifying construction.

Only one final constructional point remains. Unless the constructor is the unlikely possessor of a set of rubber drills, he will find it easier to work out the hole positions in the gusset plates using the countersunk holes in the unit as template, and not *vice versa*. Be sure to identify these plates individually, as it will avoid confusion in final assembly.

Being of non-ferrous material, protective treatment is not essential, but to produce a pleasing pale grey appearance, the parts can be degreased and anodised for a few pence. This process is quite cheap as nothing is added—in fact, a small amount of material is taken away.

Advantages of Recessed Pan Construction

The advantages of this system are many. First, accessibility is beyond reproach, and the

writer has on several occasions actually strolled round to the rear of the rack and modified the circuits with the rig running ! This is not to be recommended, of course, but it does give some idea of the ease with which the equipment can be handled. All the valves are visible, and, being pointed forward, distress is indicated at once. Crystals, switches, jacks, and potentiometers can all be wired at the most convenient *electrical* position on the chassis, and result in very short leads without reducing knob control in the least.

One great advantage, which, in the writer's opinion, outstrips all the others, is that units can be removed from and replaced in the rack without assistance, as the side flanges from the unit below act as excellent runners. Where heavy units are involved this feature is indeed a boon, as it is virtually impossible to support say, a heavy power pack, and have two hands free for fixing rack screws with the old system. The recessed pan construction has proved so satisfactory at G3AST that practically all the old equipment has been relegated to the graveyard, awaiting the " new look."

In conclusion the writer would like to thank Mr. Colin Bent for his assistance with the drawings.

APPOINTMENT WITH EAR

FRED ON SKED

By G3COI

BERKELEY had introduced Fred to the game, but although he had a finely-built rig, an AR88, etc., etc., he was very inactive when compared with his protégé. Berkeley came on the air only when forced into doing so by a sked and did most of his ragchewing on the telephone.

Fred just could not understand Berkeley's attitude at all—an FB rig collecting dust and not a QSL card in the house! What sort of a ham is that? So one night, when he was in the local net, which consisted of nine lids who each had an over lasting twenty minutes, Fred wrote Berkeley a long letter chronicling the delights of 160, 80, 20, 14, 10 and even 40 metres. He told of the gripping excitement of contests and how he thought he was getting an ulcer as a result. He enlarged on the idiotic conversations one could have with the 11's and how some Old Timers said there was no such thing as a TVI-proof transmitter. Finally, he proposed a sked on Eighty—in fact, with foolish alacrity he even mentioned a spot frequency, although how he could claim even to stay inside the band was a mystery; the scale on his receiver was quite arbitrary and any similarity to actual frequencies was coincidental.

Writing ceased as he took his turn of speech in the net. It was 0130 hours, so Fred made it short and did not once, in his customary half-hour, mention that he had trouble " with 'um in his moddlator." Then, leaving the rig on to dry out a wet coat, he went out to post the letter, so deep in thought about the impending sked that he omitted to take the portable rig (that he had made from a portable rig) with him.

The night of the sked arrived, and, in spite of a knot tied in his headphone lead, Fred completely forgot it until ten minutes after the appointed time, when the telephone rang. " What's the trouble, old boy? Don't tell me you can't get enough drive on *Eighty*, old boy, or is it TVI? . . . " Fred explained his lapse and both went to their respective rigs. Fred had a desperate time loading the PA round about 3.5 megs., until he remembered to change the coil; then he squealed his VFO up and down the CW end a few times, let it remain at a random spot, and called his sponsor for about five minutes solid with that peculiar fist of his. (We will describe his fist one day when we have a page to spare; it is a story of Triumph Over Perversity). He went over to receive, but from the welter of signals that smote his ears he could not discern Berkeley's slow swing. It did not occur to him to search, so he put out another long call, reading, in the meantime and at the same time, a hot piece in *Reveille*. (This knack of doing two things at once was a faculty he had developed over the years—born of calling CQ to an unfeeling multitude). He went over again to hear Berkeley's call-sign once and QRK? AR K K K K.

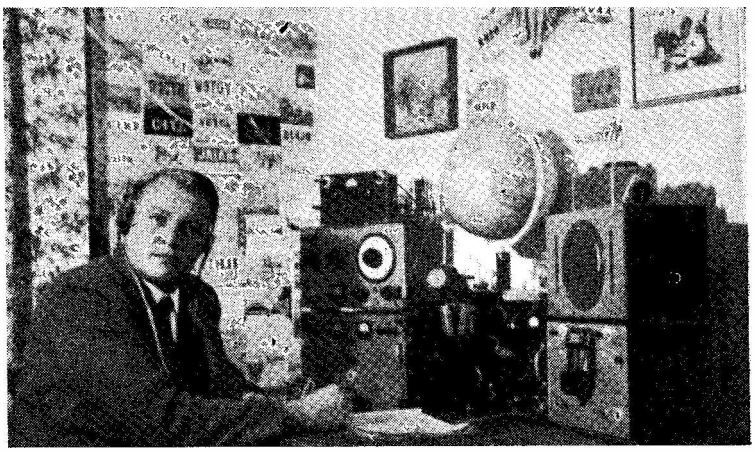
With blinding rapidity, Fred flicked and thumped over to transmit and replied with a delighted RST-448. Actually, the merited report was 589, but Fred held strongly to the theory that a poor report humbled the other fellow from the outset of the contact and made his Morse more careful. Berkeley came back with RST-347 and launched himself into a lengthy harangue about the undoubted merits of a good receiver *and* a frequency meter. But, sadly, even his 589 signal was blotted out by a G5 who started to work cross-band with another G5.

Fred managed to hear Berkeley's 'K,' went over faster than ever and told him to QSY. It took a good twenty minutes before this scrap of intelligence was conveyed to him, whereupon Old Berkeley, who was beginning to feel a good deal older, shifted up to the edge of the 'phone men—that is say, about 3.547 mc. They again exchanged reports, and this time Fred set off on a long one about the advantages of break-in. Inevitably, he was sat on by a DL trying out his multi-sideband, whisker-growing extended-carrier outfit, and Berkeley had to make a guess when to go over. He guessed wrongly and so they were both on at the same time—for a long time.

Well, eventually they managed to exchange 73. But the thing is: If you are after a finely-built rig, AR88, etc., etc., at a reasonable price, let me know so that I can put you in touch with Fred, who knows somebody who . . . .

DX COMMENTARY

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



OE6ET

THERE is no doubt, by now, about the tendency of all bands to show improved conditions and increased activity. Perhaps the most interesting of all has been 21 mc, which really has been wide open on numerous occasions. *Twenty* fills up with more and more QRM every day—commercials and short-skippers being the major contributors—until it is difficult to decide whether one is not really listening on *Forty* by mistake. Even *Ten* has given encouraging indications of stirring in its long sleep. At last one can say definitely that we are on the climb up the next sunspot cycle, and that we shall have to adjust our ideas to better and better conditions for some years to come.

With so many open bands to choose from, we might justifiably expect a falling-off in Top Band activity. Far from this being the case, it continues almost to embarrass us by the volume of correspondence that it brings in. And no sooner have we reported the end of summer-season Trans-Atlantic activity than a new series of DX tests—with New Zealand and the Far East—is upon us. We will start with this Top Band DX and work our way to the HF bands as we go along.

CALLS HEARD, WORKED and QSL'd

VS6 Tests — Top Band

VS6CQ (Hong Kong) has been on this band every night since October 1 at 2200 GMT, and will continue until October 14. This was duly reported last month, but here are further details.

VS6 stations will be calling at 2200, 2210 and 2220 GMT for five minutes in each case, and will continue to search the band until about 2245. They will centre on 1862 kc and will be listening on 1800-1830 kc, the best portion for them being 1810-1820 kc. VS6CW has arranged his leave to correspond with the second week of the sked, and will be located on the top of a 3000-ft. hill from October 9-14. VS6CO, 6CW and 6CZ will also be on; all have good locations and aerials, but VS6CW seems to be the lucky one, as he intends to launch "a ginormous length of wire on the end of a ginormous kite" during the second week. QRX, everyone, and *keep their frequency clear.* If you can't hear them, you certainly won't work them.

The New Zealand Tests, with ZL3RB on the search, start at 0600 GMT every morning. ZL3RB will be on 1882-1886 kc, and will be listening between 1800 and 1830 kc—right through October and November.

Normal Activity, Top Band

Last month we remarked that 105 stations each working 60 counties meant quite a lot of activity. This is underlined by the statement from G3JAM (Woodford Green) that getting up to 61 confirmed has taken him three years and 1200 QSO's! He wishes that some of the rare ones would not be so consistent in choosing fish-fone channels on which to operate, and also wonders why so many people use a quarter-wave aerial (very poor unless one has a superb earth system) when they can quite easily make it into a half-wave by folding. And G3JAM also issues a timely warning against using two different earth connections of dissimilar metals (such as a lead water pipe and a copper earth tube). Simply asking for crackles and other undesirable effects, as he says.

GC3HFE's recent expedition to Alderney came a sad cropper, about which he is very apologetic. He had to go there on duty at short notice, and the site was chosen *for* him. On arrival he found it at the bottom of a 200-ft. valley, and the telephone poles on

which the supposed aerial was to hang were quite inaccessible! So, although he heard a lot of G's, not a single QSO resulted. On the way back, he fired up the rig from the airport and had a "9 plus plus" contact with GC3EBK in Guernsey, which proved to him that the site was the whole trouble. GC3HFE expects several more visits to Alderney and will do better next time, he is sure. Meanwhile, he wants to thank G3GZB and G3JEL for lots of co-operation in connection with this last visit.

G3CWX (Newcastle) operated GM3CWX/A from Berwickshire recently. He didn't realise that it was a "desirable county" and was shaken by the treatment he received when he showed up on the band. So much so that he disagrees somewhat with our recent remarks about "good behaviour and friendliness" on the Top Band. A QRZ call resulted in "a terrific racket" that drove him right off the air.

G3KIM (Worksop) says he is being extensively pirated on Top Band by a character giving QTH as Chigwell and name as Derek. The real 'KIM has actually heard this one, and is continually receiving cards for him, which he promises to forward on receipt of a stamped addressed envelope . . .

G3KEP (Bingley) worked GM3UM in Midlothian, and now notches up 69 and 74. G3IGW (Halifax) has received his card from ZB1BJ (who is QRP and has only a 35-ft. aerial), which gives him his necessary 15 countries and 3 continents for the Top Band section of the *Magazine* DX Award. (All he wants now is 180 countries on Twenty, 90 on Ten . . . and so on!)

New GDX Outpost

A late note from GM3KLA to say he lives on remote Unst, the furtherest north of the Shetlands. He will be CC on 1881.5 kc, 2200 to 2300 clock time most Mondays and Fridays—give him a chance, as his sole source of power is a vibrapack run from batteries kept up by a wind-charger. There is no public electricity supply at all on Unst. He wants to work GDX and says "will do my best with my Vib. pack." Good show—and good luck to him.

Another Five-Bander

A welcome newcomer to the Five-Band table, and one who will take some watching, is W8KIA (Defiance, Ohio). He enters 247 in the 20-metre column, and by the time he has worked a few more countries on the higher frequencies he should be well towards the top. He tells us, by the way, that he will be very active on Top Band with "the same old stand-by"—a 200-foot vertical!

Farewell to DL2RO

Old-Timer Jack Drudge-Coates, well-known with many calls on many bands (we worked him as Y-DCR, in India, during the twenties) is returning to the U.K. after four years in Germany, and DL2RO closes down for good. During those four years he worked 223 countries spread over six bands (67 on Eighty and 110 on Fourteen, for instance) and qualified for numerous certificates, including FBA, WBE and WAC. He also scored a 2nd, a 3rd and a 4th in BERU and was the leading overseas station in the 1954 NFD. If that isn't what you call activity, we should like to know what is. Jack will now become G2DC once more, with a delay dependent upon where the new QTH happens to be. He should be just in time for the real awakening of all bands. DL2RO was featured in our "Other Man's Station" series in the October 1953 issue of SHORT WAVE MAGAZINE.

Opening Box 88?

GM3ITE (Glasgow) worked UA1BS on Twenty phone; the op. said he was running 330 watts and was putting in a 59-plus from a QTH "near Moscow." Furthermore, he said QSL'ing was now OK, *via* Box 88, Moscow. This may be a sign of a new opening—but we didn't think any UA1's could be described as "near Moscow," so we wait with interest! Still on QSL's—G3HSM (Clacton) has a 21-mc card from DL6MU, on the reverse of which is a list of 23 G stations who have not QSL'd his cards. If your conscience smites, please drop a QSL to DL6MU.

SWL Ray Small (London, N.W.9) passes on the news that ZS8L is now running 50 watts into a Vee-beam on Europe, and worked 70 countries during his first 20 hours on the air. He hopes to put up a better Vee, aimed at Great Britain, and also to get on phone soon. Ray Small was second op. of G3ALI in 1946-48, and asks us to mention that this call was being pirated last year on 80 metres; his brother, the holder of the call, went to America in 1948 and was most

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	21 mc	28 mc	Countries
DL7AA	691	99	159	219	109	105	222	G2BW	368	24	57	144	100	43	165
G6QB	602	52	108	222	85	135	236	G8KU	347	23	52	161	36	75	171
G5BZ	585	63	113	231	112	66	233	W6AM	335	13	32	254	32	4	254
G3FXB	523	67	121	184	101	50	193	ZB1KQ	284	6	34	118	64	62	139
W8KIA	522	54	138	247	4	79	247	G8VG	284	36	77	124	21	26	141
G2VD	511	48	94	180	90	109	189	G3IAD	272	41	88	129	9	5	149
G4ZU	504	12	45	212	115	120	216	GM3JDR	211	39	36	101	34	1	108
G2WW	488	23	70	190	98	107	198	GM3EFS	189	22	39	96	12	20	105
G2BJY	466	48	78	141	83	116	181	G2DHV	172	19	25	110	6	12	113
G3DO	462	24	46	201	84	107	223	G3IGW	162	36	53	24	18	1	77
G2YS	412	60	79	146	81	46	161	GM3DOD	58	6	14	30	7	1	35
GM2DBX (Phone)	376	33	31	158	73	81	169	G3HEV	43	8	19	14	1	1	26

tragically killed in a car smash. He queries the VK9's, and we should like to mention that the Admiralty Islands count as New Guinea, not Papua.

Heard at Sea

G3FGM (Wallasey) is radio officer in the s.s. *Carolyn*, a "Panamanian Wagon," as he calls her, and moves between the East Coast ports and the Mediterranean. He hears a lot of G's on Twenty (mentions G5HH, 3JGT and 3GGS) but hasn't yet taken to listening on the Top Band, which we hope this paragraph will induce him to try. He tells us that his son is VO1QE/VO6QE and is looking for G contacts on Twenty, and, finally, he suggests that a little more attention to good Morse formation would improve CW contacts and reduce the number of repeats that seem to be asked for.

Another very interesting report under this "heard at sea" heading is from G3JXE (*via* G3HYZ, Oxford). G3JXE is R/O of the deep-sea trawler *St. Nectan*, who does listen on 160 metres, and reports hearing the following when off the Westamann Isles, Iceland: G2BB (56F), G2SC (59F), G3AZY (579), G3DKP (569), G3GQS/A (569), G3HEK (569), G3HQX (579), G3HYZ (589), G3KFT (569), GC3EBK (569), GI3BHX (569), and GM8SQ (579). G3JXE is varying the monotony of his watches on the *St. Nectan* by listening for HABC and has QSL'd G stations in nearly 50C heard from the Spitzbergen fishing grounds. His own score for WABC, from the home QTH in Hull, is 13C—but G3JXE says he gets very little time on the air between trips, besides which he is active on all bands.

TOP BAND COUNTIES LADDER

(*Starting Jan. 1, 1952*)

Station	Confirmed	Worked
G5JM	97	97
G2NJ	97	97
G3HIS	94	94
GM3EFS	94	94
GM3OM	93	95
GI6YW	93	93
G3JEL	92	94
G3HIW	92	93
G6VC	92	92
G3JEQ	92	92
G5LH	92	92
G3EUK	89	93
G3CO	89	92
G2AOL	87	91
G5JU	87	87
G2AYG	83	84
G3JHH	79	81
G3BRL	79	80
G3GYR	74	76
G3JKO	73	85
G3DO	72	72
G3KEP	69	74
G3GGS	67	79
G3HZM	67	69
GM3DOD	66	70
G3FAS	64	79
G3JJZ	63	74
G3GGN	61	79
G3JAM	61	70
G3JJG	61	68
G2HKU	61	62
G3JBK	60	71
G5FA	60	66
G3DGN	60	64
G8CO	50	65
G2CZU	50	53
G3FNV	45	68
EI8J	38	48
GM3JZK	38	41
G3HQT	20	29

DX Strays

The usual collection of "shorts" from all over the place is compiled with due acknowledgment to KV4AA, the West Gulf DX Club, and the North and South California DX Clubs, as well as sundry correspondents both by mail and over the air. And they *have* to be shorts—they get more prolific every month.

ZM6AT is active but troubled with high noise level. He finds it difficult even to work W's . . . ZS9I is on Twenty CW . . . PX1EX (*see* last month) has about 700 QSL's to send out, so patience, please . . . C3WV is genuine, in the American Embassy, Formosa, and was formerly C3AR. BV1US is in the same country but 150 miles away. There are no other Formosa licences.

ZD3A and ZD3BFC have the same QTH—Box 285, Bathurst . . . ZD9AD (Gough Island) should show up soon; he will be active for about six months, and stations calling on his frequency will be black-listed, so call him at least 10 kc high or low. It is said that GW3HEU has the ZD9AD schedule, which is being kept "a closely guarded secret" . . . .

FX8BB, queried by many, is just what you would think—a phoney. FD8XA apparently comes in the same category, but FD4BD is genuine—QTH Lome Airport, Togoland, French West Africa. FB8BK is on Tromelin, FB8XX is active again from Kerguelen, and FB8AX will be on from Adelie next year.

VR3A, 3B and 3C are all in residence on Fanning Island, but not very active . . .

Pirate VQ5's

Writing from Kampala, Uganda, VQ5EK reports that there are several pirates disporting themselves with VQ5 calls. As at mid-September, the only genuine VQ5's known to be active are: VQ5AU, VQ5AX, VQ5CL, VQ5DM, VQ5EK, and VQ5FS. VQ5BVF has been on but is now QRT for leave. A station that may have been in Zanzibar recently is VQ1AZ (possibly VQ4AZ on a trip, says VQ5EK), who was being frantically called by W's during September.

Chasers' Chances

Some good ones being worked by various DX-chasers all over the world include the following: XW8AB (early afternoons, around 14010 kc); VQ8AL (same time, but 14100 kc phone); VQ6LQ (14060 kc, various times); VQ8AG (1300, around the low end); VQ8CB (afternoons, 14100 kc or 14070 kc); ZS7C (14200 kc phone); and VS1AY, 1BO and ZD9AC, all 21 mc phone.

The two legs of the LABRE Contest were blessed with good conditions, and the CW half of the European Contest was almost equally good, although 21 mc was not wide open. The best week-end for that band appears to have been September 10-11. On the 11th, in particular, the East-West path was phenomenal, and W6's and 7's were being worked non-stop by Europeans from about 1800 GMT onwards.

[*Over*

If you want Madagascar on phone, it is reported from W5-land that FB8BC, 8BS and 8BZ are all in the band between 14100 and 14200 kc, and all peaking over there around 0330 GMT. VQ8AL (op. Theresa) is also in evidence, same time and frequency.

VP2VB/P (the sloop *Yasme*) should be well on his way across the Pacific by now, if he hasn't already made an appearance with an exotic prefix. Another one due to show up by mid-October is ZD8AA. VK4YP reports a contact with ZC5SF, around 0730 GMT, 14015.

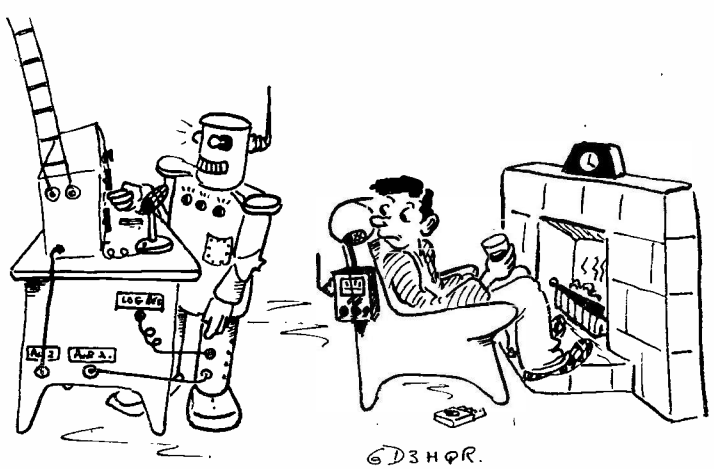
Twenty Metres

As usual, this band has been active almost round the clock, with conditions varying from poor to brilliant. Any part of the world can be worked if you are on at the right time; the elusive ones are difficult, and the really rare ones just about impossible This is due, not to conditions, but to arithmetic! There must be some 2,000 really keen DX-chasers in the world at present—that is to say, those who specialise in working rare ones exclusively. If they call that ZD5 on his first CQ, you may take it that, at any particular time, your chance of raising him can be measured by the proportion of the 2,000 likely to be on at that time. Say, 500-1. And even *that* is assuming that your signal is as good as the rest of them!

As far as we can, we keep you informed of new ones—but don't expect us to tell you how to *work* them! It ought to be repeated that the number of DX enthusiasts whose only interest is the collecting of new countries and the amassing of their QSL's represents but a *very small percentage* of the whole DX fraternity. Some of those with the best signals, best gear and best operators are interested only in *working* DX rather than chasing it—and they don't mind where that DX is. They are just as happy chewing the rag with a VK or a W6 as they would be trying to penetrate the pack round a VK9 or a KJ6—and they lead a much happier and less worrying existence.

G5BZ (Croydon) was one of those who put their score up with XW8AB (Laos), who is now accepted by the ARRL for DXCC. G3GGS (Preston) was another, hooking him in between a couple of W6's. Others for G3GGS were CX, OD, OQ, SU, VS2 and ZS8L, but he reports missing on KC6CG, FM7WF, PJ2BA, FB8BR, YS1O and quite a few nice ones; he found the openings rather brief, and always with the accompaniment of colossal short-skip QRM.

G3BID (London, N.W.3) had a nice "round-table" with KL7NFC, KØAAZ/VE8, KG1FR and SM5BOC, and also raised VK2ID, 6FD and 6FL *via* the long path one morning. These QSO's were made from Abbotsbury, Dorset.



". . . : CQ on Eighty, please, Arabackle . . . ."

TRANS-ATLANTIC

TOP-BAND TESTS, 1955/56

Dates: Every Sunday, December-March inclusive.

Times: No set limits, but peak activity 0500-0800 GMT.

Frequencies: American stations will be listening for Europe between 1830 and 1870 kc. *DO NOT* call W/VE stations on or near their own frequencies, as they will not be listening there.
Full details of W/VE frequencies later, also of other stations participating.

G3IGW (Halifax) worked FF8, GC, IS and IT on phone for new ones; CW brought him CE7ZT, HB1KU/HE, JA5AA, KG4AV, TI2PZ, W7TQO and VP8BD. He asks for clarification of the CE7Z, LU-Z and VP8 situation. Our interpretation is that the CE and LU stations in the Antarctic just count for whichever location they are in, whether one of the Falkland Is. Dependencies or on the Antarctic Continent. They do not, in any circumstances, count as different countries from the various VP8 sub-divisions. In other words, South Orkneys are South Orkneys, whether you work a VP8, a CE or an LU claiming to be there. Sounds almost too simple, that that's it.

ZE3JO (Salisbury) says "Twenty is, as usual, the only band where one can find a signal at all times of day, but not much good here after 2000 GMT. During past few weeks have worked XW8AB, lots of JA and KA, W6 during early evening. Heard ACØAA recently, giving QTH as Sinkiang, but he was only interested in W stations."

The DX on 21 mc

One or two openings have shown what this band really can, and will, do. G4ZU (Croydon) says "Activity has grown to such an extent that I am beginning to wonder whether tables indicate much except for the amount of operating time available. Anyone starting from scratch, even with a long wire and 25 watts, could

knock off 150 countries on the band, providing they had a couple of months at home with nothing to do but tune around." G4ZU sends a picture of his beam, covering 14, 21 and 28 mc with one feed line ; total span 24 ft., boom 12 ft. and weight 10 lbs.

G2YS (Scarborough) collected HB1KU/HE and some W's, but missed JA3AH. G3IGW found IT1ZZM, FQ8AG and VQ2AS on phone, as well as CR6AI, ET3AH, VQ2HH and ZS3E on CW.

G3BID heard and worked all U.S. districts except W7 on September 10, and found VP8AQ a good signal on 21100 kc at 1850 GMT, when they had a long and solid QSO ; another new one on the band was VP7NK, at the high end. Yet another interesting contact was with W2KZS/M, made while the car was stationary, but continued while on the move. The mobile's aerial was only a bumper-mounted whip, and signals were perceptibly better with the car facing away from Europe!

G5BZ worked nothing new, but says the ZS's and VP8's and ZD9AC were roaring through on phone one evening, just like the locals down the road. ZE3JO still finds a shortage of signals, but worked VK4NG and SVØWO on phone. He can usually get to Europe on CW, but reports a lot of QRM from DL and SM in particular. All this with 40 watts and a Vee beam.

Ten Metres

Many correspondents make the odd mention of *Ten*, so here is a summary of their remarks. G4ZU worked VQ2AS, who said he was the first signal ever heard on the band at VQ2AS! G2YS logged FB8RG on both CW and phone. ZE3JO describes it as "useless," and says he has not heard a signal for about a year.

Forty Metres

Those who care to brave the terrors of this small strip surrounded by enemy country still manage to emerge with a trophy or two ; those who remember when it was a band 300 kc wide shed the odd tear but otherwise don't do much about it. G3GGS raised KP4 and KZ5 for new ones, but missed out on HH3DL and HB1OP/HE. The usual W1, 2, 3 and 8 were worked. ZE3JO finds 40 metres pretty useless owing to the broadcasters, and although he hears a lot of UA and SP stations in the evenings, never finds a G. He did work an LU early one morning, but says it wasn't worth the trouble of getting up so early!

G2YS collected HB1KU/HE. Other HE's have been active, also at least one PX, a 3A and an M1. Forty seems to be the band for clearing up those elusive Europeans.

Eighty Metres

Just two reports for this one—from G2YS, who worked PX1ZA and hopes he is genuine, and from G3JHH (Hounslow), who reports "the usual near-DX" and hopes to do better now he has extended his aerial to 132 feet.

Strays

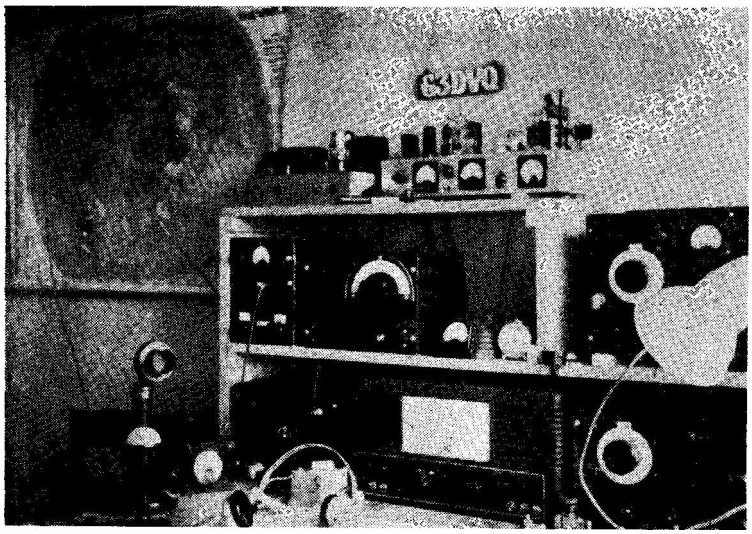
G3TA (Iver Heath) has a junior op. who is with the RAF at Khormaksar, Aden. He has not yet settled down to serious listening, but mentions G5XW and G8RX on phone (both 57F on Twenty). He hopes to get a ticket, or at least to settle down to some serious listening, and would like to contact any active amateurs in the Aden area.

SWL A. D. Moore (Goole) mentions some "queriable" calls he has heard, such as FK8NI, VU2HF and 10A, VP8BH, XW8AB and VQ8CK. (We suggest the latter was VQ8CB, and the VP and XW are well known). He would also like to know the whereabouts of XV2LD, heard at 2050 on September 3.

We are told that there is no actual activity on the Nicobar Islands, and that the VU5AB recently reported must be a pirate . . . . YJ1DL (New Hebrides) *is* genuine, despite some early suspicions among those who heard him.

Next month we shall be publishing the full details of the winter season's Trans-Atlantic Tests on

In our July 1955 issue G3HVP was featured as "The Other Man's Station" (see p.273). This is a view of his equipment as it was in January 1952, when the gear in use was essentially T.1154/R.1155, operated mainly on 80-metre CW.



G3DVQ, Purley, Surrey, is active mainly on 14 mc CW, running 80 watts to a ground-plane. Transmitters cover all bands 1.7-144 mc, and the receiver is an S.640. The two-metre equipment is separately installed on the top shelf.

160 metres, including, we hope, some of the rarer stations taking part and their frequencies. As far as other Contests are concerned, remember the CW half of the VK/ZL Contest (October 8, 1000 GMT, to October 9, 1000 GMT) and, of course, the International DX Contest, of which the Phone leg runs from October 22-24 and the CW leg from October 29-31, all starting and finishing at 0200 GMT. Entries for the latter must be sent to the International DX Club, Box 100, Buchanan, Mich., not later than December 15.

Deadline for next month is first post on **Friday, October 14,** and for the following one *Friday, November 18* (overseas readers please note). Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Meanwhile, salutations and BCNU next month.

TOURING MOBILE IN SCOTLAND

FORTNIGHT WITH GM3AMM/M ON EIGHTY

G. F. C. LAYZELL (G3AMM)

HAVING recently returned from a two weeks' tour of Scotland, operating /M, the writer feels that a brief account of his experiences may be of interest. The 80-metre mobile outfit taken was as described in the September 1954 issue of SHORT WAVE MAGAZINE, and good use was made of it on that band. At the same time, amateur activity as such was not the priority consideration, as XYL-and-junior had also to have their fair share of attention.

From the Edinburgh district, contacts were made with GM3HGU and GM3IVZ. After crossing the Queen's Ferry, we stopped to put the whip up again, and along came GM3CIG in his van with an offer of hospitality; he led us part of the way on our route and then returned to his home station to direct us from there. Soon, the QSO became a three-way with GM2DBX, who homed us in to Methilhill. A spell on his rig was followed by a most excellent meal, prepared by Mrs. GM2DBX at short notice and under difficult conditions, as there were other visitors in the house.

Heading through the Trossachs towards Aberdeen, we were concentrating on the magnificent scenery rather than on CQ's until the Aberdeen area was reached, when further contacts were made, with GM2DBX, GM3CIG and GM3FSV. Police in a patrol car showed considerable interest in GM3AMM/M; they were surprised at the ranges we were getting and the fact that they could not hear us on their receiver! Thence on to Inverness towards Wick, with GM2DBX and GM3JDR in a three-way, one getting stronger as the other became weaker. Once again, a fine piece of homing, together with a running commentary on places of interest *en route*, by GM3JDR, who guided us into Auchingel. While at his QTH, along came GM3GUI. Our party had been booked in advance at the John o' Groats House Hotel, so we went on there to try and fix accommodation for the GM3GUI's, keeping in contact with GM3JDR while GM3GUI remained with him. Unfortunately, there was no room available, which we were able to communicate back to GM3GUI. (Even the XYL's were becoming convinced that Amateur Radio can be useful at times!).

Next morning, from John o' Groats, contact was again made with GM2DBX and a 100% QSO resulted, which ensured a card posted to him from there. As far as we know, this was the very first amateur working from John o' Groats over any great distance (we had been talking to GM3JDR the previous day over the few miles to Auchingel) and Jimmy of GM2DBX now claims to have the only QSL card with the John o' Groats postmark! *For the record*: 10 August 1955, 0900 GMT, 3714 kc.

From John o' Groats (which is, of course, the most northerly point in the British Isles, as Land's End is the most southerly) we travelled across the north of Scotland to Cape Wrath. But whilst down behind the slopes of the high hills in this region, very little was heard on 80 metres, and no contacts could be obtained. Similarly, on the way to Lairg through the mountains the screening effects were bad. A disappointment was not being able to make any QSO from the Isle of Skye. Conditions were fairly good at the time it was tried, but QRM was the main difficulty.

Heading south from Fort William, we managed to raise G2CGQ in Lancaster with the 9½ watts maximum input on GM3AMM/M—he was our only G contact—and later we had yet another two-way with GM2DBX.

Through the Lake District and homewards to Scunthorpe, little was done on the air, due to week-end QRM on the band, on the roads and in the hotels. It was the GM's we had been out to work, and in that we had succeeded beyond expectation. The mobile equipment behaved very well, the only attention needed on return being to remount the aerial loading coil which, after some two thousand miles of motoring, had assumed a slight list to port, due to impact of the whip with low trees—when the XYL was driving!

During the whole of our tour of Scotland we were greatly impressed by the grandeur of its scenery and the kindness, generosity and helpfulness of its people. Even the eagles turned out for us in Sutherlandshire. On the Isle of Skye we met some Australian tourists, who said they had travelled through several European countries without seeing anything to equal Scotland; incidentally, there was even an Amateur Radio link here, as at home in Australia they were friends of VK3KV.

Finally, the writer has the feeling that the keen county chasers on Top Band and Two Metres may ask why it was that G3AMM was not mobile on those bands. To which the answer is: We'll see what can be done next year!

"NEW QTH's"

As space allows, we publish under this heading the call-sign/addresses of newly-licensed amateurs and those whose addresses have changed since their appearance in the *Call Book*. Publication is only, and always, at the direct request of the individual concerned. Hence, new licensees are asked to advise us as soon as they receive their permits; changes of address should also be notified immediately. This enables the G sections of the *Radio Amateur Call Book*—the world directory of radio amateurs, of which we are sole agents for the U.K. and Europe—to be kept up-to-date. Publication in "New QTH's" in SHORT WAVE MAGAZINE is open to any U.K. (and Eire) licence holder, irrespective of being a subscriber to the *Magazine*, or even a reader. (In the case of our own direct subscribers, however, it does help a lot in checking our records if that fact is mentioned when sending in the notification). The main object of "New QTH's" is to keep the *Call Book* straight on G QTH's. We also accept, of course, overseas readers' addresses for the *Call Book*, but in general these are not published in "New QTH's" in SHORT WAVE MAGAZINE itself, due to space considerations and the fact that the publishers of the *Radio Amateur Call Book* have their own agents in most other countries.

G.E.C. EQUIPMENT FOR TWO ITA LINKS

The General Electric Co. Ltd. is supplying the GPO with equipment for two new television links which will extend the coverage of the ITA transmissions. The first of these is a microwave radio link between Birmingham and Lichfield, which will provide two channels from Birmingham to Lichfield and one channel in the reverse direction. The G.E.C. is providing all equipment for this link, which is similar to the links supplied by the G.E.C. for the Euro-vision network. The second link is from Birmingham to Winter Hill, near Bolton. The G.E.C. is supplying all the line equipment needed for the transmission of ITA signals over a coaxial cable link between these points.

LEARNING ELECTRONICS BY HOME STUDY

The latest idea in home study courses is for the student to combine theoretical instruction with the actual design, construction and use of the radio or television receiver or other technical equipment supplied with the course he chooses. This is the method adopted by E.M.I. Institutes—the only postal college which is also part of a world-wide industrial organisation.

The student receives the appropriate equipment—specially prepared sets of radio parts—with his first lesson, and so starts by learning in his own home the working of fundamental electronic circuits; progressing by easy stages to the design, construction and servicing of a complete radio or television receiver, tape recorder, record reproducer and so on, which he retains as his personal property.

It is claimed, and proved by experience, that these courses teach the science and practice of radio, television and electronics more quickly and thoroughly than any method—and the students find them much more enjoyable! The cost is only from 15s. a month, depending on the course and the equipment. Special arrangements are made for overseas students, and courses are also available in the theoretical principles only of radio and other branches of engineering.

XTAL XCHANGE

This space is available free to those wishing to exchange crystals. Notices should be set out in the form shown below, and all negotiations conducted direct.

G3IOZ, The Gables, Kilsby, Nr. Rugby, Warks.
Has FT-241 type 6010 kc crystal, ½-in. mounting, and 6080 kc, ¾-in. pins. Wants 100 or 1,000 kc bar, and 6 mc frequencies for multiplying into Zone E.

G3KH, 133 Station Road, Cropston, Leicester.
Has 1792 and 7136 kc crystals. Wants 1000 kc bar.

"THE AMATEUR TRANSMITTING LICENCE"

With further reference to the article in our August issue, p.327, we are informed by the City and Guilds of London Institute that the sitting fee for the Radio Amateurs' Examination is now 20s.

The Codewriter

SIMPLIFIED ELECTRONIC KEY

G. L. FLINT (G3IIH)

This is yet another design in the long sequence of automatic and semi-automatic keys, and has the merit of being valveless. It will be of interest to all who practice the art of Morse. —Editor.

WHEN we run through the envelopes containing the morning mail, instinctively we look out for a familiar handwriting. Similarly, when we tune across the CW end of a favourite band we can often recognise the identity of many of the stations working simply by the individual style of the "codewriting," without hearing the call signs.

There is something personal and individual about both which is lost when a letter is typewritten or an "automatic" key is used for sending Morse. Nevertheless, the typewritten letter is often much easier to read and quicker to write, and a properly used El-bug or bug key can send nearly perfect Morse code with a fraction of the energy required to use a straight key.

Many different designs of key have been evolved. Often, the circuit is somewhat complicated and extravagant of parts in the case of the El-bug, while even a well-made one can send very poor stuff in the wrong hands.

The main advantage of the El-bug type of key is that it shapes its own characters; each dash is the same length, and each dot is of the same duration, and the spacing between them is always the same. This tends to give a pleasant flowing style to the transmission and makes for easy reading. Fifteen words a minute on an El-bug sounds like "tens" and is as easy to copy.

Many operators would like to try this type of key, but do not feel like spending the time and material on a complicated piece of apparatus, only to find it does not suit them when the job is done.

These were the sentiments which encouraged the writer to work out a simple keyer, perhaps not having the refinements of the best, but good enough to show if it suited, and economical of time and material.

General Arrangement

The circuit Fig. 1 is practically self-explanatory. Only one relay, one 8 + 16 μF condenser C1, C2, and two variable resistances, R1, R2 are required, and in fact, it is possible to dispense with one of the latter by replacing it with the correct value of fixed resistor.

The principle of operation is simple—a condenser C1 is connected in parallel with a battery and relay coil, one of the pairs of contacts on the relay being used to break the coil circuit while the relay is energised.

When the condenser C1 is charged, thus actuating the relay, and discharging through the coil of the latter, the contacts are held open for a period depending on the capacity of the condenser, and the speed of discharge is varied by a resistance connected across the condenser.

The main difficulty in applying this principle to a keyer is to obtain the correct mark/space ratio for dots and dashes. In the keyer described here the combined capacity C1, C2 of 24 μF is used for dashes, and the 16 μF section C2 is disconnected when the paddle arm is moved to transmit dots. It will be noted that the respective capacities give the required ratio of 3/1 for dots and dashes, but the inertia of the relay armature assembly and other factors upset this, making it necessary to provide a separate control for adjusting the

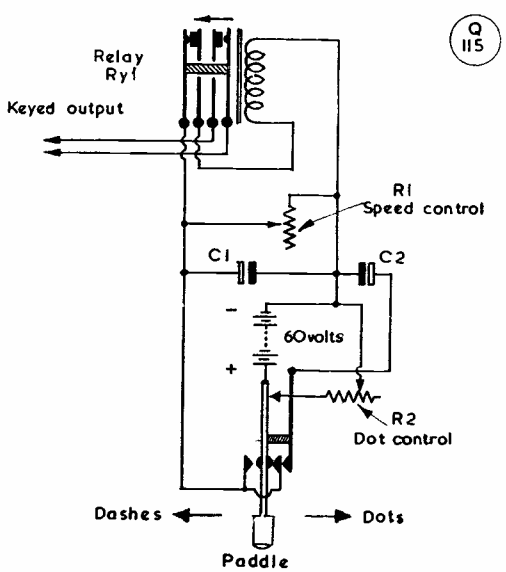


Fig. 1. Circuit of the auto-key described by G3IIH. Using no valves, it is easily put together; the secret of success lies in the adjustment — see text.

LIST OF PARTS

Ry1 = 1 relay, 6,500 or 10,000 ohm coil, with one single-pole "make" and one single pole "break" contacts.
C1, C2 = 8 + 16 μF, electrolytic, rated 100v. working or over.
R1, R2 = 10,000 ohms variable (*but see text*). Paddle assembly, as shown in Fig. 2. 60v. battery supply.

dot length ; this is arranged by connecting a resistance R2 across the 8 μF condenser section C1. this resistance being cut out of circuit on dashes. It is the latter resistance which can be variable, or may be fixed once the correct value is found by experiment.

If required, a similar contact and resistance can be provided on the dash side to give similar control of dashes, but this was unnecessary on the prototype, since the tendency was for the dots to be too long in comparison with the dashes.

Construction

The sketch plan Fig. 2 of the paddle assembly will help to clarify the constructional side, but one point should be emphasised ; this is that all contact points should be grouped as closely as possible to each other and to the paddle handle, to reduce the chance of poor and indefinite contact caused by the bowing of the paddle arm when in use. This tendency is reduced if a fairly heavy gauge material is used for the construction of the paddle arm. There is plenty of scope for experiment. Different relays can be tried, and also alternative values of capacities, but the values given are those used in the prototype and happened to be at hand.

The speed range using the constants given is from 15 to 25 words per minute, or thereabouts, but the range may be moved up or down by connecting resistances in series or in parallel with the speed control.

This simple keyer, using no valves or rectifiers, and the minimum of components, will at least enable you to discover if a Codewriter is your type of key.

Note on Relays

When using some types of P.O. relays it may be found that the armature assembly is too rapid in its response, causing the spaces between dots and dashes to be so short as to upset the balance of the keying rhythm. It is possible to obtain a degree of control by damping the movement.

This can be done by fitting a small slip of springy metal strip under the armature retaining screw, arranged so as to apply a light pressure on the arm on the side away from the contacts. The pressure can be adjusted by manipulating the retaining screw nut, and the effect is assisted by placing a small rubber grommet under the tip of the spring resting on the armature.

Adjustment of this damping, combined with variation of the tension of the relay contact tongues, will give good results with a relay which, when first tried, seems to be useless for the job.

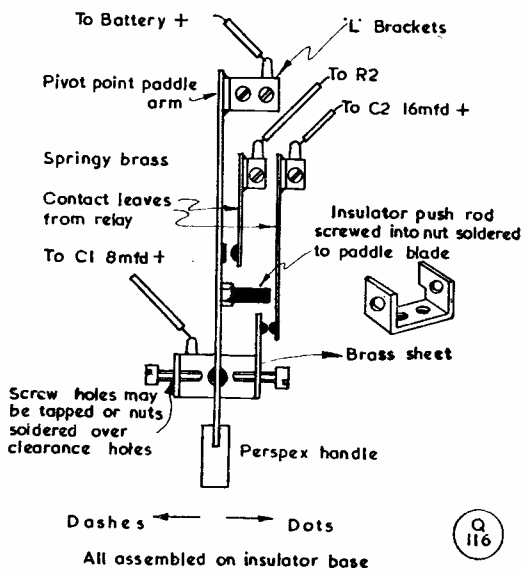


Fig. 2. Electro-mechanical assembly of the auto-key. It should be mounted on a firm, insulating base; if this base is heavy enough and is fitted with rubber feet, the key can be made non-slip in operation.

★ ★

TRAVELLING SCHOLARSHIP

British Insulated Callender's Cables Ltd. have instituted a Travelling Scholarship as a tribute to Sir Alexander Roger, K.C.I.E., for many years Chairman of the Company and now its first Honorary President. It will be known as the Sir Alexander Roger Travelling Scholarship. With a value up to £1,000 in addition to normal emoluments, it will be awarded annually to an employee of BICC or of one of the various companies of the BICC Group and will enable a young man or woman of ability to travel overseas for study, training and general education for a period of twelve months.

CARDS IN THE BOX

Cards are held in our QSL Bureau for the operators listed below, for whom we have no forwarding address. Please send a stamped, self-addressed envelope, with name and call-sign, to BCM/QSL, London, W.C.1. If publication of the call-sign/address is required, that should be mentioned at the same time.

G2BML, 2BOQ, 2DVW, 2RW, 3AL, 3HIJ, GB3GP, GM3KEZ, GW3IHN, 3IWF.

Frequency Setting on 25 Centimetres

WAVEMETER FOR 1215-1300 MC

A. G. WOOD (G5RZ)

There is no need to stress the fact that without some reliable method of determining frequency, the UHF operator making his first sorties on 25 cm is completely in the dark as to where to find the band. The simple indicating wavemeter discussed in this article, if made up exactly as described, will cover the band with certainty and can be calibrated for the mid-point against an oscillator set up from Lecher lines. It then becomes a "standard of wavelength" which is sufficiently reliable for SEO working.—Editor.

IN the early days on 5 metres, when self-excited oscillators were the rule rather than the exception, much confusion was caused between different groups due to misunderstandings over the question of frequency. These difficulties were only ironed out after physical contact had been established between such groups and on-the-spot comparisons made to check calibration. Thereafter two-way QSO's were quickly established.

A similar state of affairs is tending to arise as the 25 cm band develops since at the present time SEO's are once more being very largely employed.

Lecher lines are satisfactory enough to determine whether the oscillator is operating within the legal band, but at best it is a cumbersome piece of apparatus even at this frequency and subject to too many variants for accurate repetition work.

In an effort to circumvent this problem the writer has built the frequency check meter which is described herein and which is based on a design by G2HCG, to whom all credit is due. It should be made clear that the instrument is not primarily intended as a *calibrated frequency meter*, although there is no reason at all why it should not be used in this manner if the fortunate user has access to a UHF oscillator of known calibration accuracy.

The main object is to have an easily transportable device that can be taken to other co-operating stations for the purpose of making frequency comparisons or for adjusting different transmitters to the same frequency, and which can be relied upon as a yard-stick for future development work.

Design and Layout

The general appearance of the meter is shown by the artist's sketch Figure "A," whilst Figure "B" gives the circuitry and all relevant dimensions of the cavity unit; Figure "C" is a sectional constructional view. The cavity body is made from $\frac{7}{8}$ in. o/d copper water pipe which is readily obtainable in scrap lengths from any plumber; the remaining fittings are machined up from suitable odd pieces of brass unearthed from the junk-box.

Tuning

The $\frac{1}{4}$ in. brass rod to which the knob and pointer are attached and the bush through which it passes are tapped 0 BA and care must be taken to see that this is a tight thread so that the knob turns rather stiffly. It can be seen that rotation of the knob alters the air gap between the two faces of the centre rod assembly and thus the capacity, thereby tuning the resonant frequency. It is true to say that this form of tuning is non-linear (becoming even more so as the air gap approaches infinity) but as this setting is well LF of the desired tuning range no inconvenience is ex-

COMPLETE 25 Cm STATION

With this fourth practical article on 25 cm equipment for amateur construction, we have now covered in SHORT WAVE MAGAZINE all the elements of a station operational on the 1250 mc band: Transmitter, in the February-March issues; Aerials in July; and Receiver (August issue). Equipment built to these designs, which are themselves based upon actual results achieved, will enable activity to be commenced on the 25 cm band in the most practical manner possible in the present state of the art. In other words, it enables the experienced VHF operator to make a beginning with confidence — that he will be able to generate RF, radiate it effectively, receive any signal that may be reaching his aerial, and be sure that he is in the band.

Further experimental work is in hand to improve equipment and extend the range and scope of 25 cm working. In the meantime, we shall be glad to hear from readers who are "Starting on 25 cems."

Editor.

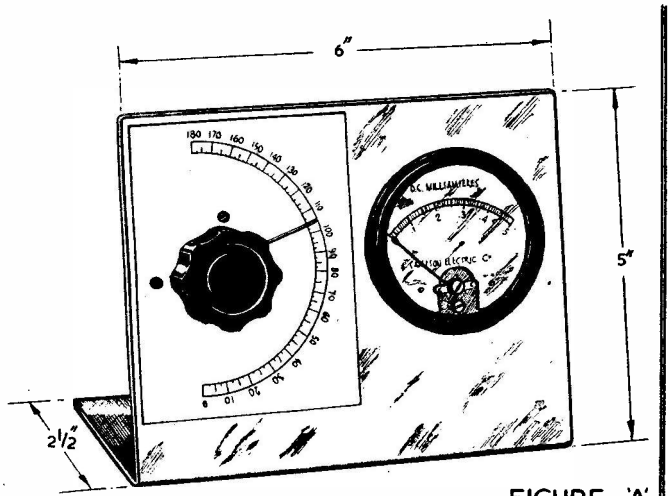


FIGURE 'A'

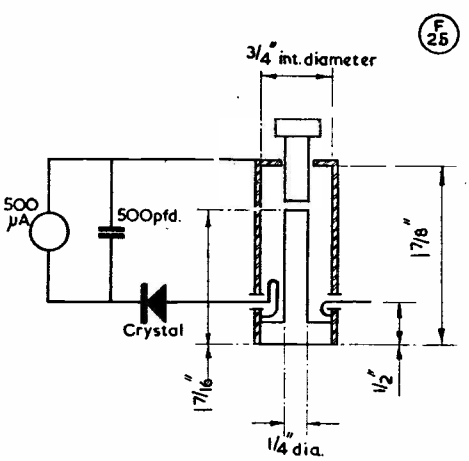


FIGURE 'B'

1. Dial pointer.
2. Scale.
3. Crystal housing (push fit on Item 9).
4. Cavity.
5. Tinned copper connecting wire.
6. Microammeter.
7. 500pfd. Micadisc condenser.
8. Crystal.
9. Locating flange for Item 3.
10. Coil spring contact.
11. Pick-up loop.
12. Short circuit plug.
13. Polythene bush.
14. Input pick-up loop housing.
15. Input pick-up loop.

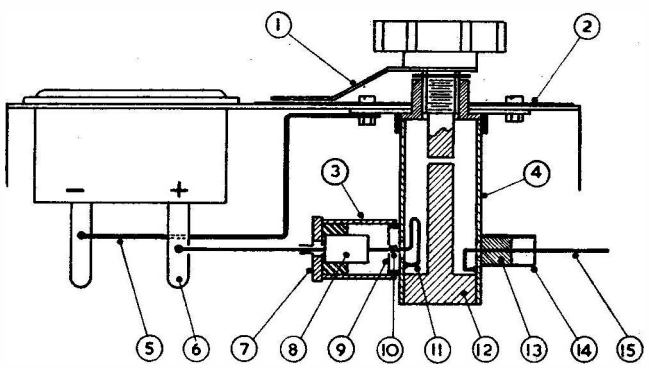


FIGURE 'C'

General appearance, circuit and construction mechanically of the 25-centimetre wavemeter described by G5RZ, after an original design by G2HCG. If made up exactly as shown here, it will cover the 1215-1300 mc band.

perienced. In an earlier "mark" of the instrument the writer attempted to overcome this failing by designing the condenser somewhat along the lines of a Philips concentric trimmer, the rotating rod carrying a female member which enshrouded the fixed ¼ in. rod as the knob was screwed home; however, true concentricity was very difficult to attain in practice, resulting in an uneven variation in capacity and, hence, in frequency as the tuning was altered. The arrangement as designed and illustrated here will be quite satisfactory.

Pick-Up Loops

As will be seen from the drawings, one end of each loop is soldered to the cavity. These soldered points should be as near as possible to the short-circuit plug (12) in order to obtain maximum inductive pick-up.

Crystal

The fitting for the crystal will depend largely upon the type of rectifier employed, but irrespective of this it is important to see that adequate screening is provided and that the crystal output is also fully screened and by-passed by a Micadisc condenser (7) or similar device. Failure to attend to this point will result in stray RF being picked up, rectified by the crystal and thus producing an untunable reading on the microammeter.

Tuning Range

The *full* tuning range has not, so far, been accurately determined, but in the writer's model the whole of the 1215-1300 mc range can be accommodated very nicely within one 180° swing of the pointer. For setting up it is suggested that an oscillator be adjusted to

the mid-point of this band, as determined by careful Lecher line measurement; the meter is then set up about six inches away and tuned until the resonant point is found, as shown by a sudden reading on the microammeter; pick-up is then arranged so that a sharp reading is obtained; the set screws on the knob to which the pointer is attached are then loosened and the pointer turned until it reads about 90° on the dial, the set screws then being locked up tight once more.

This device is not, and is not intended to be, as sensitive as the UHF field strength measuring instrument recently described by the writer (*Short Wave Magazine*, July, 1955), but nevertheless if the oscillator is going well, look out for a bent meter needle as the resonant point is reached, since over 500 μA can be obtained!

BBC TV and VHF/FM STATION in WEST WALES

The BBC announces that it has placed a contract for building work at the Blaen Plwy, Cardiganshire. Television and VHF sound broadcasting station. The contract covers the construction of the transmitting station building, installation of water supply and drainage, together with the provision of access and service roads and fencing. Work is starting almost immediately and it is hoped to bring the station into service towards the end of 1956. It will serve the coastal areas around Cardigan Bay.

EDISWAN 21-in. CATHODE RAY TUBE

The CRM.211 21-in. aluminised rectangular-faced CRT, with a 70° deflection angle, operates at a maximum Anode 2 voltage of 18,000v. It costs £30 4s. 9d. (i.p.t.), and is offered by The Edison Swan Electric Co., Ltd., 155 Charing Cross Road, London, W.C.2.

A NEW INCREMENTAL INDUCTANCE BRIDGE

Salford Electrical Instruments, Ltd., has introduced a new incremental inductance bridge for the measurement of incremental inductance and equivalent series resistance. It incorporates several unique features, such as continuous frequency coverage and an unusually wide inductance and resistance range. It will be of particular interest to the manufacturers of tele-communications and similar components, since it can be used for testing such equipment as output transformers and filter chokes.

The new unit is a reversed Owen bridge which has provision for passing direct current through the inductor under test. It enables the incremental inductance and the associated dynamic series resistance of an inductor to be determined under known conditions of AC and DC excitation. The instrument incorporates a 45-1500 cps variable oscillator, but can be used from 20 cps to 5 kc with an external source of 7,000 ohms output impedance. It covers an inductance range from 0.1 mH to 1,000 Henry in six switched ranges, the accuracy of direct measurement being about 1 per cent.

The resistance range covered by the bridge extends from 10 milliohms to 1 megohm, and the inductance and series resistance can be read directly off the instrument, independent of frequency and with a common range multiplier. Very high and very low Q coils can be measured, and, since the inductance dial is calibrated from zero, the bridge can be used for measuring the AC resistance of non-linear devices, such as lamps, thermistors and rectifiers with DC bias. The instrument can, in addition, be used for resonance measurements of frequency and dynamic resistance.

EMERGENCY IN XE

Much is being heard of the series of devastating hurricanes which have swept the eastern seaboard of the United States this season. In the American press as well as in the radio periodicals, the part played by American amateurs in providing emergency communication services is well publicised. On this side of the Atlantic, the first public reference to the American amateur contribution was in a BBC broadcast on September 19, when it was stated that "amateur short wave broadcasters" had reported two-thirds of the town of Tampico, Mexico, destroyed by Hurricane "Hilda."

The reason why communication circuits are so vulnerable to gale damage in the United States is because construction is almost entirely by overhead pole-line. In fact, telephone lines can be found tacked up to any available support, such as trees and houses. The great distances involved would make buried construction prohibitively expensive, and in the end it is cheaper to maintain overhead systems. Due to the comparative frequency of these gale and flood disasters in the U.S., American amateurs are well organised to give immediate assistance and have done extremely valuable work.

BBC ENGINEERING TRAINING DEPARTMENT

The BBC Engineering Training School at Wood Norton Hall, near Evesham, is being enlarged. Work is starting straight away, and is expected to take about nine months. The new block will accommodate between 90 and 100 members of the BBC staff while attending the residential engineering courses provided by the school. The provision of this accommodation will increase the total capacity of the Training School to about 200.

SMALL ADVERTISEMENTS

If you have anything to sell or exchange, or a particular requirement, use the Small Advertisement columns of SHORT WAVE MAGAZINE. The charge is 3d. a word, with a minimum of 5s., box numbers 1s. 6d. extra. Draft your advertisement as clearly and as economically as possible and send it, with remittance, to the Advertisement Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

VHF BANDS

A. J. DEVON

G5YV Again Leads Annual Counties—

The Manchester VHF Meeting—

Overseas Notes and News—

French Results on 25 Cm—

Station Reports and the Tables—

THE general trend of DX conditions remains quiet, with occasional GDX openings, and it would seem that the next manifestation we can expect will be one of those winter periods when, quite unexpectedly, the EDX appears for one or two evenings in succession.

However, it is always unwise to attempt to predict conditions, so your A.J.D. will content himself by reminding you that, all through the years, we *have* had EDX spells in mid-winter, so it is as well to be on the *qui vive*—as, in fact, the regulars always are.

As usual, we show in this issue final placings in Annual Counties for the year ended August 31, 1955. With a total of 45S listed, the honours this time go to the North, with G5YV of Leeds—who was also in front last year but with a smaller number of counties worked — closely pressed by G3GPT (Preston), supported by G3IUD (Wilmslow, Ches.). As they would each agree, their success is partly attributable to the very helpful /P and /M working in Scotland during the height of the DX season; in addition to this, the impression we get from where we listen is that G3GPT in particular has been much more active this year. Anyway, congratulations to the leaders and, indeed, to all who raised 50C or more, which can be regarded as exceptionally good going in a year's work on two metres.

Some claims for the new Annual Counties table are already in, but are being held for the next issue. For those who have just come in on this, and may be wondering vaguely what it is all about, the idea is to work as many different U.K. counties as possible on two metres in the year September 1 to August 31, 1956, taking 14C as the starting figure. In other words, you must have worked 14 or more counties before you can claim; this, which does *not* involve anything to do with QSL cards (heaven preserve us!), is made simply by listing a station worked in each county claimed. The score is added to from time to time by sending in a claim showing further stations worked in new counties claimed, and thus the Table is built up and progress up the ladder can be observed.

We very much hope that a number of the newer operators will start scoring for Annual Counties this year, as it is a useful and interesting yardstick and does much to encourage activity. The Counties Tables are in no sense competitive, be it noted, even if on occasion a "local Derby" does develop between keen operators in the same district.

The Manchester VHF Meeting

We show a page of photographs selected from a large number taken at this very successful gathering on September 17 last, at the Grosvenor Hotel, Deansgate. For the Dinner, no less than 110 places were taken, and the "identification parade" disclosed that there were visitors from considerable distances, as well as very good support from VHF operators in the North. Among the well-known calls from outside the immediate district were EI2W, F9CQ, G2AIW, G2HCG, G2UJ, G3BW, G3CCH, G3GHO, G3WW, G5BD, G5ML, G5TZ, G5YV, G6NB and G6XM. There were contingents from the Midlands and the London area, and one gallant SWL all the way from Cardiff with greetings from the South Wales group.

During the afternoon, there was a visit by coach to Ringway Airport, where most interesting talks were given on the radio and radar equipment and the methods of flying control. The working two-metre station, installed in the hotel and using gear provided by G3GB and G3JZN, kept continuous watch and effectively performed its duty of talking in the mobiles—later in the evening, they even succeeded in talking G5ML into a garage without lights on his car!

After the Dinner, for which the Editor of SHORT WAVE MAGAZINE was in the chair, G2HCG discussed, by question and answer, the Skeleton Slot principle, on which he gave a short opening talk. Following this came the draw for the donated prizes and the raffle, for which tickets had been sold during the evening.

In the main, as was the firm intention of the organising committee, the time was given over to personal QSO's, ragchewing and discussion of the various items of VHF equipment that had been brought along. The general feeling was that the arrangements were most excellent; everyone present was provided with a neat call-sign badge and the menu cards had ample space for signatures and circuit diagrams.

This event once again demonstrated the strength and virility of the VHF interest in this country and the keenness of VHF operators, who are prepared to make the effort—sometimes involving a long and tiresome journey—just to be present for the occasion.

G3AGS, G3GB, G3IEA and G8SB, who undertook all the local planning and arrangements, have every reason to feel that their efforts were not only successful, but also appreciated.

News from CT, HB, ON, VK and ZS

From a correspondent, we have it that several CT1's are active on two metres in the Lisbon area—

CT1AB, CT1CO, CT1SK and CT1TK, all using modern equipment with QQE-06/40's or 829's in the PA running up to 150 watts, and CC converters. The FA's are heard occasionally but have not been worked; CT1TK runs a pair of 24G's and has a 32-element stack with which he is trying to put a signal into North Africa. CT1CO in Lisbon is on 430 mc with 120 watts, but has had no contacts. There is also two-metre activity in the Azores and Madeira. All this is of interest for next season.

HB9RO writes that his proposed trip to Mt. Döle, mentioned in this space in August, was abortive—due to a combination of circumstances, he never got there, but hopes to make it in the spring, with gear for both VHF bands. HB9RO also hopes that these HB failures will not be taken to mean that they are not very serious about VHF out there! Of course not: one quite understands how intentions can be frustrated and plans go wrong.

Going back to the great July opening, Guy of ON4BZ reports contacts with GM2FHH, GM3BDA/A, GM3EGW, GM5KW/P, LA1KB, LA2BC, LA8RB, OZ1PL, OZ2IZ, OZ7SP, SM6ANR, SM7BE and SM7BZX. On July 26 he had the extraordinary experience of finding GM2FHH the *only* DX station on the band; they had a 589 both-ways CW contact, but no other DL's, G's or PA's could be heard at ON4BZ! On August 7, Guy made it with HB1IV at 1300 GMT, 579 both ways. Since then, he says, the band has not yielded anything outstanding in the way of DX.

From VK6BO (Bassendean, W.A.) comes an interesting report on activity in Australia. Their power limit is 100 watts, and there are many stations operating on the 50, 144 and 288 mc bands, with six metres the most popular channel; 576-585 mc is also allocated for amateur operation, but it is not yet in use. The VK's are out to beat the world distance record for Two (held in the U.S.A.), and VK6BO himself has had 144 mc contacts of over 1300 miles, with VK5GL and VK5QR. Another over-1000-mile QSO is that made by VK2AH-ZL3AR. VK6BO runs 50w. to an 815, and he says that the great difficulty in Australia is to get components suitable for VHF; in general, the VK's have to import what they can from this country.

Next, we hear from ZS1B (Capetown), who is on 50, 144 and 430 mc and, in collaboration with ZS1SW, is having regular 70 cm contacts over a 25-mile path, usually RS-59 both ways; in wet weather, however, signal levels drop to S2. ZS1SW has 40-50 watts into a QQE-06/40 as a straight PA and a 40-ele beam on 70 cm. At ZS1B, the 430 mc output stage is also a QQE-06/40, but tripling, and the beam a 20-ele stack; his receiver is the G2DD converter, as described in the March 1953 issue of SHORT WAVE MAGAZINE, fed into an SX-28. At ZS1SW, the same front end is used, but built as a complete receiver for 70 cm. Both stations are active on 144 mc as well, and have worked to distances of 120 miles over the very high ground round Capetown. ZS1B says he believes he and ZS1SW are the only two South African stations actually in QSO on the 430 mc band—so, for the time being at any rate, they hold the ZS distance record.

TWO METRES

ANNUAL COUNTIES
1954-55

FINAL PLACINGS

Worked	Station
67	G5YV
66	G3GPT
59	G3IUD
56	G3GHO
51	G3CCH
47	G2FJR
46	G3WW, G6TA
43	G5DS
42	G2HDZ
41	G3HBW
40	EI2W, G3BJQ, G3DLU
39	G3IOO
36	G2DVD
34	G5MA, G8VN
32	G2ADZ, G3IIT
31	G2CZS, G3IRA, G5ML
30	G3DO, G3FGT, G3FIH, G3IER
29	G3FYY
27	G3CKQ, G3JZG
26	G3ITF
25	G3KHA
24	G5JU, G5MR
21	G3JXN, GW3GWA
20	G2AHP, G3DVQ, G3HWJ
19	G3HHD, G5BM
18	G3DBP
17	G3EGG
15	G8NM
14	GM3DIQ

This Table is a record of Counties Worked during the 12 months September 1st, 1954 to August 31st, 1955. The total of stations placed is 45. The Table re-opened again w.e.f. September 1st, 1955. Claims are invited from operators who have worked 14 or more Counties since that date; with the first claim a list should be sent showing the station worked for each county claimed. Thereafter, counties can be added as they accrue.

French Results on UHF

While on the subject of records, we might also mention that on May 13 last, F8QL (Bulles, Oise) worked FA8IH (Nr. Algiers) on their 72 mc band—this being a first contact—and that recently the first 25 cm QSO ever to take place between French stations was made by F3SK-F8OL, on 1260 mc, over a distance of about 9 miles.

On 25 cm, F8OL has a 2C39 driven as tripler from his 430 mc transmitter and giving about 3 watts RF out; this valve, with grid and plate cavities, is a blown job, "refroidie par l'air soufflé," as the French say. At F3SK, transmission on 1260 mc was apparently by third-harmonic from the 420 mc transmitter, this being coupled to a waveguide-fed corner reflector giving a gain of 16 dB on 25 cm; since this system was designed to resonate at 1260 mc, it "selected" the third harmonic from the hard-driven 70 cm PA without radiating the fundamental. Reception in both cases was by means of a 1N21B crystal mixer in a tuned cavity, the local oscillator being a CO multiplied up to give a difference-frequency of 145 mc, enabling the

AT THE MANCHESTER VHF DINNER MEETING

September 17, 1955

And who should win the demonstration Skeleton Slot assembly from the raffle but Old Timer Freddie Miles, G5ML.

Here we see, left to right, front: G2HCG, F9CQ, G3JZY and G8SB. Behind G3JZY is G6NB, whose signal must have been heard at some time by all the 100 VHF operators present on this memorable occasion. YL-G3JZY of Timperley, Ches., who holds her call-sign in her own right, is active on two metres and 70 cm, and she is engaged to G3GMX, also of Timperley.

G3BW (foreground) looking over a converter in the VHF equipment display. On his immediate left is G6XM, with G2FKZ in an attitude of concentration, and G3FZL (standing, left).

The organizing committee for the Manchester VHF meeting, left to right: G3IEA, G8SB, G3GB and G3AGS. It was generally agreed that they had achieved a very successful result.

G2HCG of Northampton, well known in the VHF world, gave a talk and answered a number of questions on the design, operation and installation of Skeleton Slots, of which he is the originator. The demonstration Slot assembly was subsequently donated by him to the prize draw.

Discussing the pros and cons — left to right: G2BVW, F9CQ, G3IOO and G3WW.

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
75	G5YV
70	G6NB
68	G3BW
66	G3IUD (302)
64	G3CCH, G5BD (435)
63	EI2W (258), G3GHO
62	G3BLP (630)
60	G3DMU
59	G2FJR (427), G3EHY, G4SA
58	G8OU
57	G2OI (349), G8SB
56	G3WW, G5DS (639)
55	G2HDZ, G2HIF, G5BM, GW5MQ
54	G3IOO
53	G2AJ (519), G2HDZ (416), G3FAN, G4CI
52	G2NH, G6RH, G6XX, GW2ADZ
50	G3ABA, G3GSE (518)
49	G5MA
48	G6TA (487)
47	G5ML, G5WP
46	G3HAZ (315), G4HT (476), G5BY, G6YU (205)
45	G2XC, G5JU, G6XM (356)
44	G3BK, G8DA
43	G2AHP (500), G3BA, G3BJQ (225), G3COJ, G4RO, G5DF
42	G2DVD, G3BNC, G3DLU*, G3FIH, GM3EGW (146)
41	G2FQP, G3DO, G3HBW, G6CI (184)
40	G2DD, G3CGQ, G3HWJ, G8KL
39	G2IQ, G3GBO (434), G3VM, G8IL (325)
38	G2FCL (234), G3APY, G3WS (183), G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, G3IER
36	G2DCI (155), G2HOP (161), G3CXD, G3IIT, G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224), G5MR (303)
34	G2CZS (243), G3BKQ, G8IC
33	G3HHY (125), GC3EBK
32	G2FVD, G8QY, G8VR
31	G3HXO, G5RP
30	G3FRY, G3GOP (208), G3GVF (129), G3IRA, G5NF, GM3D1Q, GW8UH
29	G3AGS, G3AKU, G3CKQ (107), G3FIJ (194)
28	G3ITF, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G6GR, GI3GQB, GW3GWA
26	G3AEP, G3CFR (125), G3SM (211), G4LX, G4MR (189)
25	G3JMA, G5SK, G6PJ
24	G3FD, G3FXG, G3FXR
23	G3CWW (260), G5PY
22	G3AGR (135), G3ASG (150), G3BPM, G3HIL, G3JHM (113), G3YH, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWJ, G3JXN (145), G6XY
20	G3EYV, G3HSD, G3IOE, GC2FZC
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G2AHY, G3FRE
15	G2BRR, G2DRA, G3IWA
14	G2DHV, G3CYY

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.

* New QTH

normal two-metre receiving equipment to be used as IF/AF amplifier! Signals were R4-5 both ways on CW, the note being "un peu RAC," due to the high multiplication factor, 162, on both transmitters using an 8 mc crystal.

The foregoing contains one or two ideas that will be new to UHF operators in this country. One is that useful power on 25 cm should be obtainable by pushing a 70 cm PA really hard, and selecting the third harmonic by means of a tuned high-gain aerial system—such as the T-fed Slot described by G5RZ in our July issue—thus obtaining enough 1250 mc radiation for preliminary local testing and calibration purposes. For real results, of course, a valve like the 2C39 or Mullard TD03-10 (ME1000), operated fundamentally in the 25 cm band, is necessary.

The French solution to the receiving problem is an ingenious one, and again extremely useful for first tests and finding one's way about on the 1250 mc band; a suitable crystal would be the Osram GEX-66. Data for receiver cavities will be found in G3CGQ's article in the August issue of SHORT WAVE MAGAZINE.

We congratulate F3SK-F8OL on their most interesting and encouraging results, and acknowledge *Radio-REF* as the source of our information.

Station Reports

G3IEX is now installed at R.A.F. Alderton, Woodbridge, Suffolk, and has already been in action, working a number of G's and several Europeans, with F and ON heard; for those who want Suffolk, G3IEX is on 1900-2200 clock time each evening and most week-ends. G5MR (Hythe, Kent) quotes from his prized LX1AS card: Tx, QQE-06/40 50w.; Rx, Cascode; Aerial, 24-ele; Freq. about 144.78 mc when Vernon worked him. On September 4, G5MR heard HB1RD several times, but was unable to raise him; PE1PL got a contact with HB1RD.

G2AHY is now on from Crowthorne, Berks., with 20w. to a 4-ele Yagi, frequency 145.34 mc; he is 290 ft. a.s.l., with a good take-off in all directions except south. His receiver, of his own design and construction, is a 9-valve job with a 3-stage front end, using a tunable oscillator with IF at 8 mc. So far, some 40S have been worked in 16C, with G6XM, "Big Bill of York," as best GDX. G5AM (Witnesham, Suffolk) says his schedules have proved disappointing so far as results go; he has only once been able to raise G8VN, and though he can hear G3CCH, is unable to put a signal into Scunthorpe; G5AM's "heard" list includes quite a lot of GDX, and would include a lot more if some of the phones would use CW. G2CZS (Chelmsford) was glad to work G5UF for Dorset and logged a total of nine new stations during the period; F9CQ was worked on September 10 and GC3EBK heard.

G3CKQ (Rugby) has got up to 107S worked, with G3NL/P for Herefordshire as a new county. GM3EGW (Dunfermline) says "no news, as I've been on holiday," and is now at 142S worked from the home QTH; this, for a GM station, is good going and represents much hard work.

G3HBW (Bushey Heath, Herts.) has commenced to climb the ladders once more, and from this new QTH made it 41C in 13 weeks with an *indoor* 3-ele flat-top; this compares with 39C worked in 4½ *years* from Wembley, and that with a high outside 3/3. Arnold now has an outdoor dual beam installation for both bands, and on 70 cm has accounted for 10C, nine of them during the one week-end September 10-11, when 16S were worked, with G3IOO at 145 miles as best DX. From Bushey, G3HBW finds both G2WJ and G2XV to be regular RS-59 signals on 70 cm.

G2DVD (Slinfold, Sx.) puts in claims, as does G3CCH (Scunthorpe), who is now at 64C in the All-Time. G3IOO (Oswestry) moves up in the Tables and was glad to work F9CQ, as well as GC and GI stations after giving up hope of even hearing them; but Nat remarks that there is still a Faraday screen between his QTH and GM! G8NM (Lincoln) claims for the tables, and so does G3IUD (Wilmslow, Ches.), who has done so well this season; he goes into Countries Worked with nine, and has got five counties on 70 cm. During the good spell, Arthur of G5BD (Mablethorpe) worked 13 countries, missing only on GD, HB and LX. G8VN (Rugby) managed to raise some of the Lancs. stations on September 10, but in general has found conditions poor. G2DHV (Blackheath, London) was doing well during the Big Opening. G2FJR, still "flying his jolly roger" in Sutton Bridge, Lincs., says he badly wants GD and GI, and reports that locals G2DRT and G3ANM are now on two metres; the latter is at Moulton, Nr. Spalding, on 145.27 mc. Apart from a few Europeans heard or worked, conditions have been rather flat with G2FJR, who is starting to get things together for 25 cm.

G3KHA (Knowle, Bristol) opened on two metres in April last and has qualified for the Counties tables; he is on 145.512 mc, scores for Somerset, runs 30w. to a QQV06-40A into a 4-ele flat-top, and his converter is to the well-known design by G2UJ, into a home-built HF band receiver. Work is already in hand to improve the gear, taking the beam first.

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
26	GW2ADZ
23	G3BKQ
18	G2XV
16	G3IOO, G6NF
15	G4RO, G5YV
12	G2HDZ
10	G3HBW
7	G2DDD, G2HDY, G3IRW
6	G3FAN, G3JMA, G3WW
5	G3FUL, G3IUD
4	G3JGY

On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue

From Our SWL's

A comment by SWL Ball (Hutton, Essex) is worth repeating: "My word, those other SWL's certainly dug them out last month; I shall have to start thinking up a better aerial"! However, he has been getting a good share of the DX, with several PA's heard and F9CQ logged on six occasions; the outstanding GDX is G6XM, always a strong, very well modulated signal.

SWL Drybrough (Coventry) has pushed his 8-ele bi-directional stack up a bit further, and has achieved some improvement thereby; during the month ending September 18 he heard a total of 68S, including F9CQ and GC3EBK, and of the other G's, 29 are in the DX category. SWL Cox (London, S.W.18) now has 106 QSL's from 31 counties and 8 countries and lists nearly 60S heard during the period.

TWO METRES

COUNTRIES WORKED

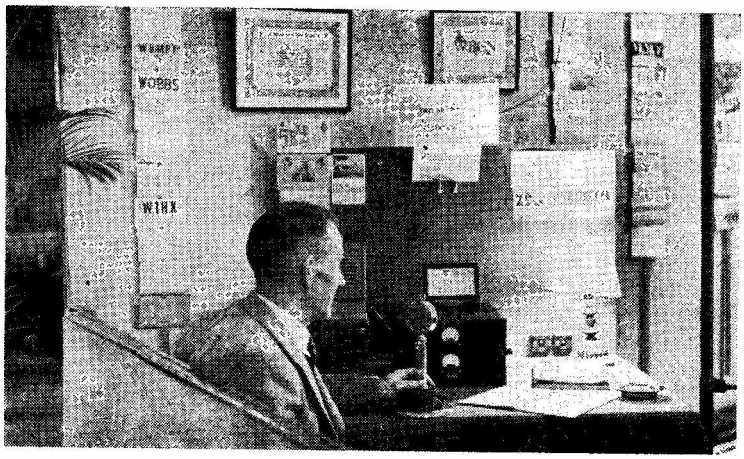
Starting Figure, 8

15	G3GHO, G4MW, G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM)
14	G2HDZ, G5BD, G8OU, ON4BZ
13	G2FJR, G3BLP, G3CCH, G3DMU, G3IOO, G5DS, G6XX
12	G2HIF, G2XV, G3GPT, G3WW, G6LI, G6RH
11	G2AJ, G3ABA, G4RO, G4SA, G5UD
10	EI2W, G2FQP, G3BK, G3BNC, G3EHY, G3FAN, G3GHI, G3GSE, G3HAZ, G5MA, G8IC, GM3EGW, GW5MQ
9	G2AHP, G2DVD, G3FIJ, G3IUD, G3WS, G5MR, G6XM, PAØFB
8	G2CZS, G2DDD, G2XC, G3GBO, G3HCU, G3VM, G5BM, G5BY, G5ML, G8SB, GC3EBK.

Contest Note, and Trophy Awards

EI2W (Dublin) found conditions very poor for the "European VHF Contest," only 12 stations being worked, with G3WW and G6NB as best DX. Incidentally, touching again on this wretched contest, even the rules as published were not accurate! Whose fault this may have been, it is not for us to say, but what is certain is that the U.K., with more active VHF stations than the whole of the rest of Europe put together, was effectively debarred from making an entry. It is true that a few G logs will go in, from operators who found the rules in some foreign periodical or were otherwise able to get authentic copies at the last moment, but they would be the first to agree that this hardly constitutes a representative British entry.

We are informed by Henry of EI2W that the Irish Perpetual Trophy for 1955 has been awarded to G2ADZ in recognition of his outstanding 70 cm work when GW2ADZ in Oswestry; another trophy, known as the "Caledonian Cup," goes to EI4E, of Killarney, who has persevered on two metres over a long period from a very difficult location, eventually working G2ADZ and G3GPT for good



Two metres in South Africa. The station of ZS5DHE, operated by ZS5JF.

DX contacts. It had been intended to present the Irish Trophy at the Manchester Meeting, but as G2ADZ was not present, it was decided to defer this till a later occasion.

More Station Reports

G5YV (Leeds) brings his scores up to date, and very impressive they are, and G4JJ (Barnsley) writes that he is now operating more or less permanently /A from a site in Derbyshire, which is much more favourable for VHF than the home QTH; with only 8w. and a pair of Slots at a mean height of 10 feet, he worked 22C in three weeks as G4JJ/A. During the fortnight or so to September 4, G3DO was /P in the Torquay area, from where he had a number of good QSO's, including F, GC and GW; from the home QTH in Sutton Coldfield, G2ADZ gave him another county.

G3WW (Wimblington, Cambs.) reports an exceptionally good 70 cm contact — with F9CQ on August 21, giving 59F and 589 reports; G2HDZ was also worked on 430 mc. G3WW wonders why the "London UHF Group" seem to listen only for locals and stations to the south—though he specifically excludes G2HDY, G2HDZ and G3KEQ from this comment. G3EOH. G5DT and G8SK have all been heard and called on 70 cm. G3WW reports that, of the stations known to be taking some sort of part in the "European VHF Contest," G5KW/P had over 100 contacts (and a correct copy of the rules!), G2DVD had 66, and G3IEW/P 32 by the Sunday morning, September 4.

70-CENTIMETRE FIRSTS

G/DL	G2WJ-DL3FM	10/8/53
G/EI	G5YV-EI2W	14/7/55
G/F	G3DIV/A-F8GH	5/9/51
G/GD	G2JT-GD3DA/P	26/8/51
G/GW	G4LU-GW2ADZ	5/7/50
G/ON	G3DIV/A-ON4UV	15/10/51
G/PA	G3DIV/A-PAØPN	15/10/51
GD/GW	GD3DA/P-GW5MQ	29/7/51
GI/GD	GI3GQB-GD3DA/P	14/6/53
GM/GI	GM6WL/P-GI3FWF/P	9/9/53
GW/EI	GW2ADZ-EI2W	10/7/54
GW/ON	GW2ADZ-ON4UV	3/3/53
GW/PA	GW2ADZ-PAØNL	1/7/53

SP1AC Not Good

Through the courtesy of G2AIW, we are informed that, according to DL3FM, the "SP1AC" reported during the July opening was not genuine, and is suspected of having been a DL trying to see how many DX calls he could get back. Well, not being much of a signal in the U.K., he did not get many G's! It is a pity this sort of thing has to happen on VHF, where we have been relatively immune from irresponsible behaviour and spiv tactics. As it happened, the "SP1AC" bearing was more or less correct and the signal characteristic about what one would have expected from an EDX station at that distance.

While "SP1AC" may not be good, we have on file details of SP3AC, unquestionably genuine and active on two metres from Warsaw, which from this country bears about 85 degrees magnetic, or a little bit north of East.

VHFCC Elections

This month, we have some most interesting, not to say unexpected, claims. The first is from G. Stilwell, W6NJU, Los Angeles, Calif., who puts in cards for 100 two-metre contacts, all in the W6 area, and thereby gains VHFCC Certificate No. 182. A glance through his batch shows that many modified SCR-522 equipments are in use by the W6's; otherwise, the gear is the conventional 832 or 829 PA on the transmitting side, and 6J6 converters into various types of communication receivers. The most-mentioned commercial equipment is the Gonset Communicator, a relatively low-powered transmitter/receiver. Only one station in W6NJU's 100 cards showed home-built gear with more than 100 watts input on two metres.

VHFCC Certificate No. 183 goes to R. J. Everingham, VK6BO, Bassendean, W. Aust., whose batch of 100 showed QSO's on 50, 144 and 288 mc. On the two latter bands, the 17 cards are all from the VK5/VK6 areas. His six-metre coverage is very much wider, including all Australian districts and 25 cards from ZL stations—50 mc is certainly a DX-worthy band, as

BRITISH ISLES 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., Hunts., 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.

some of these distances are over 3,000 miles. An interesting 6-metre station worked by VK6BO is VK9DB in Papua, this being about 2,500 miles.

VHF Century Club Certificates are also issued to: J. Wren, G3IRA, Swindon, No. 184; to P. Malvern, G8DA, Exeter, No. 185; and to A. Clarke, G3BII, Beaconsfield, Bucks., No. 186.

Hitherto, overseas readers appear to have been in some doubt as to whether they would be eligible for a VHFCC award. Provided the stipulated conditions can be fulfilled — cards to prove 100 or more two-way contacts on any VHF band or bands from 50 mc up — all readers are eligible, irrespective of prefix. But we must see the cards (agency or certified claims can *not* be accepted for VHFCC) with a check list, and the cards should be sent by registered post for the attention of A. J. Devon, "VHF Bands," at our office address.

The G/GI "First"

Last month we touched upon this matter, which brings a letter from Johnnie of G3BLP (Selsdon, Sy.). He says that though he worked GI2FHN on August 20, 1949, he is pretty sure that he was forestalled by either G2OI, G3BW or G3DA, and that, in fact, it was one of them who gave him the clue to work GI2FHN. So we are getting nearer the truth, and it now seems to be a matter of GI2FHN checking *his* log around that date, finally to settle the matter—and complete our list of "Firsts."

Calls Heard and The Tables

This month's offering having bulged more than usual, the Editor insisted that we could not have the Manchester photographs *and* the Activity Report. So your A.J.D. can only apologise to those many readers who sent in useful calls heard/worked lists, asking that they should not be discouraged because the Activity Report is not in this time. Lists are always welcome, and we hope that all interested will continue to send them regularly.

The tabular matter is right up-to-date, with all claims received by the dead-line, and your A.J.D. hopes devoutly that he has not perpetrated any ghastly error in this department. We hope to begin the new Annual Counties with the next issue, so all operators who can claim 14C or more worked since September 1st this year are asked to put in lists, to start them up the Ladder.

G3IIT, Cambridge, first licensed in June, 1952, has been operating exclusively on two metres ever since. All his gear is home-built except the BC-454 used as IF/AF strip. The converter is RF 6AK5 into 6AK5 mixer, CO 6C4-12AT7 multiplier, and the IF range tuned is 3.4-5.4 mc. The transmitter consists of CO EL91-QVO4/7 doubler-QVO4/7 doubler-832 PA and the modulator is 6SJ7-6SL7 into p/p 6V6's. The beam is four stacked Skeleton Slots.

Dead-Line

And with that, your A.J.D. wraps it up for yet another month. There has been much to report and discuss, and we hope that you have not found it uninteresting. Reports for next issue should be with us by **Monday, October 17 certain**, addressed A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And let all be well with you till we meet again on November 4.

BELLING-LEE'S G9AED AT LICHFIELD

Having exhausted the possibilities at Croydon, G9AED—the Band III pilot transmitter operated by Belling-Lee, Ltd.—is being moved to the neighbourhood of Lichfield, Staffs. (NGR 43/161044). It will commence operation on October 10, radiating a test vision signal on 189.75 mc, with accompanying sound on 186.25 mc. The transmitting schedule is: Monday-Friday, 9.30-12.30, 2.0-5.30 and 7.30-8.30 p.m.; Saturdays, 10.0-1.0 p.m. There is no activity on Sundays or Bank Holidays. The test card, which is radiated continuously, is somewhat as illustrated on p.84 of our April 1955 issue. A major change is that the "ghost scale" is calibrated in miles. Reports on these transmissions are requested.

PREMIUMS FOR TECHNICAL WRITERS

CHEQUES UP TO TWENTY-FIVE GUINEAS FOR NEW MATERIAL

In the field of interest covered by SHORT WAVE MAGAZINE, we are constantly on the look-out for new material by new contributors and those who have something useful to say in a new way.

Almost anyone can produce one good, saleable article, because nearly everybody is expert on some particular angle of radio practice. We also know of those who can design and build excellent equipment, but lack the ability or the inclination to write it up for publication—though thereby they might be making an important contribution to the art while earning fame (and money) for themselves. On the other hand, there are those who can write, but have nothing much to say, and perhaps little time to build equipment worth describing in print. This is where a partnership project would be fruitful.

The Rewards

For a long time now, we have been paying upwards of £1,200 a year for work by contributors outside our own organisation; much of this is for commissioned material, to *Magazine* specification.

To encourage new writers and the flow of new work, we have decided to offer cash premiums up to twenty-five guineas for articles considered suitable for publication in SHORT WAVE MAGAZINE, with lesser amounts for contributions which do not merit the full rate.

General Requirements

Broadly, articles are wanted on all aspects of Amateur Radio—technical, operating, constructional, theoretical, argumentative and comic. To specify particular subjects might well stifle inspiration, but for guidance it can be said that practical-constructional contributions earn the highest rates, and theoretical-discursive the lowest.

In some cases, a brief synopsis of the suggested article may be desirable, which will enable the Editor to say whether he would like to see the completed work for possible publication.

What we are *not* interested in are re-hash offerings, unless it be a new angle on an old theme, which is often acceptable. Nor do we want to be bothered with straight re-writes from other sources —unless, again, it is another way of achieving the same object. In such cases the reference should always be quoted, not only as a matter of courtesy but as guidance for readers.

Preparation of Work

Articles, of whatever length or character, must be clearly set out on one side only of quarto or foolscap sheets, with wide margins and double spaced lines. It is always desirable that they be typed, but if hand-writing is used it must be clear and legible without affectations.

The *Magazine* convention must be used throughout, *e.g.*, PA, and not P.A., pa, p.a.. pwr. amp.; mA, and not Ma's, mills, m/A, m/a or milliamps.; μF (or $\mu\mu$F), and not pF, puffs, mfd., mF or mmF; the correct sign convention to use can be found by study of any technical article in any issue of SHORT WAVE MAGAZINE.

In writing the article, the subject should be logically discussed from point to point in natural sequence. For instance, in a constructional article the logical sequence is: Introduction — what the equipment is and what it is intended to do; Circuit Design—points of particular interest or importance arising from the choice of circuit; Construction — how the author built it, with suggestions as to how the construction could be varied; Setting Up—with tables showing voltage/current values which might, or ought to, be found under practical conditions; Results with the equipment; and Conclusion.

Drawings and Diagrams

Circuit diagrams must conform to the C1, L1, R1 notation, reading from left to right across the drawing; except in small diagrams, actual values should never be marked on circuit elements. Put the values, corresponding to the C1, L1, R1 markings, separately in a table, set out as shown in the Table of Values in any *Magazine* technical article.

All drawings and circuit diagrams should be numbered only Fig. 1, Fig. 2, Fig. 3, and so on, with the appropriate table of values similarly numbered and shown separately. Captions for diagrams or drawings should also be listed separately.

While these sketches must be neat, accurate and electrically correct, they need not be copper-plate, as all have to be re-drawn to our convention and suitably sized for block-making.

Illustration

Good photographs enhance the value of most articles, and are almost essential for constructional designs. Few amateurs are also expert photographers, and much time and effort can be wasted trying to get a good picture with a box camera in ordinary light. Rather, it is better to have the photography done professionally. Any local studio photographer can usualy produce prints good enough for block-making — and quite cheaply, as with the proper equipment a piece of radio apparatus is much easier to take than most human subjects! For our purpose, prints should be half-plate size, finished black-and-white glossy, with high lights touched out or toned down.

General Advice

The object of the author in preparing work for publication should be to make the article, as submitted, look as finished a job as it will appear in print.

It is also essential that the whole of the work be checked, re-checked and *checked again* before being sent in, particularly in regard to details such as circuit references and values.

AMATEUR RADIO — For The Beginner

PART VII

MAKING COILS AND CHOKES

By **A. A. Mawse**

THE Old Timer of 30-35 years ago had very little choice in the selection of his components, for the simple reason that Amateur Radio was in its infancy and, generally speaking, very few firms concerned themselves with the manufacture of these components. As a result, the amateur had no alternative but to build his own condensers, both fixed and variable, and to wind his own coils. Moreover, in consequence of the frequency allocations of those days — now known as the Broadcast bands — the winding of these coils was no light task, and strange indeed were some of the pieces of equipment which were produced. Further, the choice of insulating material lay between a very doubtful form of ebonite—which would sweat in humid weather—and cardboard, somewhat improved by being impregnated in paraffin wax.

Nowadays, of course, there cannot be a single amateur who does not buy his condensers ready made—apart from a few special applications—but not always is it convenient to buy just the right kind of coil that is required, nor is it always possible to obtain a suitable former. The receiving end is exceptionally well catered for in these respects, and the high-powered merchants have also quite a wide, if somewhat expensive, choice; but there does seem to be something of a gap between these two extremes. Nevertheless, the general tendency has been towards purchasing, either a ready-wound coil, or else a suitable former—more often than not grooved to take a fixed number of turns. As a result, the art of making low-loss coils has, to some extent, receded into the background and, indeed, some of our younger readers may be quite unaware that it is still possible to make what you want. A few observations on this subject, therefore, may not come amiss, even at the expense of arousing nostalgic memories amongst any Old Timers who may chance to read these lines.

Materials

The most efficient form of coil is still one which is entirely self-supporting, *i.e.* without any kind of former, but unfortunately, except at the higher frequencies, this is not a practical proposition. The next choice, then, is to keep the supporting material to a minimum consistent with mechanical strength, and to choose a material with a low-power factor or dielectric loss.

With modern developments in plastics, a very wide range of materials become available, but as it is a big subject and outside the scope of the present article, it is only possible to present some general guidance in a condensed form. Broadly speaking, this material can be divided into two groups: Thermo-plastic compounds which, under the influence of heat, will soften and become pliable; and Thermo-setting compounds which, once moulded, will harden and retain their form permanently.

Under the former heading one finds Perspex, Celluloid, Bextoid and Polystyrene, to quote a few examples. Obtainable in sheet and rod form and easily worked, these materials are very useful stock in any application where they are subjected to a high-frequency field. Suitable cements are also easily obtainable. Polystyrene is recommended for greater efficiency in the VHF range.

Bakelite is one example of a thermo-setting compound, and the field of usefulness of this form of plastic is confined more to the manufacture of pre-formed articles, such as valve-holders, coil-formers, radio cabinets, and so on.

There is, however, one form of thermo-setting compound which should find a home in every amateur's stock, known as Laminated Plastics, and consisting of a resin-bound combination of paper or fabric. Paxolin is a material in this group. Cheaper than Polystyrene, the laminates possess very good electrical properties, are easily worked and readily available, and can be employed without measurable loss in efficiency except in the VHF range — with which we are not at present concerned in this series.

Choice of Wire Gauge

14 SWG tinned copper is probably the ideal size for coil winding, combining good surface area with mechanical strength, but at the lower frequencies such a gauge may result in a coil size which is physically too large. Especially is this so for Top Band working, where quite a compromise must be accepted. Where possible, however, it is desirable to use a gauge not smaller than 16 SWG. At one time silver plating was considered essential for maximum efficiency, but it is very doubtful indeed whether the improvement is measurable in the HF range and whether the gain justifies the cost at any frequency lower than about 400 mc.

Coil Data

The first thing to decide before making a transmitting coil is the amount of inductance required to cover the desired frequency range in conjunction with the amount of capacity known to be available. The actual diameter is by no means critical—2 ins. to 2½ ins. will usually cover most requirements. By reference to the charts and formulæ given in most text books, and in particular in the *Radio Amateur's Handbook*, it is then possible to determine the

number of turns required; the gauge of wire most suitable; and the winding length, bearing in mind that the wire should be spaced its own diameter apart.

Construction

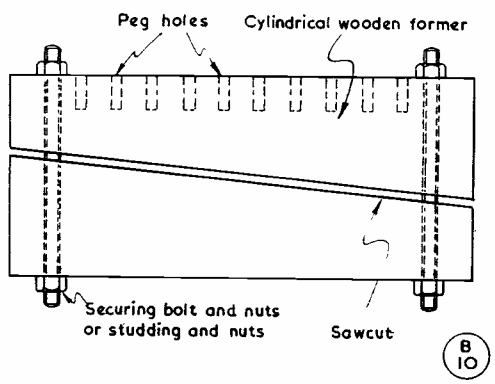
With these details settled, the next step is to construct a suitable mandrel. This can be made from wood, and a length of old-fashioned curtain pole can very often be unearthed in the attic or cellar having a diameter equal to that required for the coil. Cut off a piece about 6 ins. long and make a diagonal cut right through the length, so that you are left with two wedge-shaped half-rounds. Place these together again to re-form the original shape and secure with wood screws at each end or by means of screwed rods and nuts (after drilling holes to receive the rods). Drill a series of holes in line down one piece, spaced about half-inch apart and of a suitable diameter to accept pegs made from nails with the heads sawn off. The mandrel is then complete and appears as shown in Fig. 1. It is worth while going to a little trouble over this, because it may be used over and over again in the production of coils having this diameter and up to a maximum length as measured between the two outside peg-holes.

The next stage is to cut and prepare the coil supports, consisting of $\frac{1}{8}$-in. wide strips of the insulating material chosen and of a length slightly greater than the length of the projected coil. Three of these should be a minimum, four perhaps better. One of these should be drilled $\frac{1}{4}$-in. hole at each end, later to receive banana plugs, to which the ends of the coil will be secured.

Next, it is necessary to work out the actual length of wire which will be required, from the formula $2\pi rn$, π being 3.14, r the radius of the coil, and n the number of turns, and to measure off slightly more than this total from your reel. For a really neat job, it is also a good plan to measure off a similar length of string of approximately the same diameter as the wire being used, but this is not essential.

The actual winding process requires a fair amount of space for a coil of any size, and is usually best done in the garden. Fix two pegs in your mandrel spaced just sufficiently to accommodate the calculated length of the coil; set out the three or four insulating strips equidistantly around the circumference of the mandrel, securing them in place with a few turns of cotton at each end or a turn of insulating tape, and retire to the garden with the prepared mandrel, wire, string and a pair of wire cutters. Loop one end of the wire to a strong nail or hook in a wall or fence and tie one end of the string to the same support. Lay out both wire and string in a straight line, hitch the far end of the wire round the handle of the cutters and gradually take the strain on the wire until you feel it stretch and can see it to be pulled beautifully straight.

Hitch the wire and string round the first peg and start winding under tension by rotating the mandrel, winding from the top, so that you can watch that the wire is going on evenly, with the string



Sectional view of the wooden mandrel which can be made, as described in the text, for the winding of self-supporting transmitter coils. The mandrel collapses by taking out the securing bolts and can then be withdrawn easily after the coil has been formed. Other methods of coil construction are suggested in the text.

acting as a spacing guide. Keep your weight on the wire by leaning slightly backwards and draw yourself gradually towards the termination. On reaching the end, take a half-turn round the second peg to prevent the wire from springing undone, cut off the surplus inch or so attached to the support and wind off the string.

The next process is to apply a dab of a suitable cement ("Durofix" will do) at each point where the wire crosses each of the strips, and, as additional strength, bind the first and last turn to the drilled strip by means of cotton, which should also receive a dab of cement. When quite dry, remove the cotton or tape binding the strips to the mandrel, remove the screws or bolts holding the mandrel together and, with a light hammer, gently tap the thin end of one of the mandrel sections, when both sections may then be withdrawn from the coil. All that now needs to be done is to screw a pair of banana plugs into the holes provided in one of the strips, having first removed the black or red insulated ring, and to lock-nut the ends of the coil to the plugs. The result is a rigid, low-loss coil of excellent appearance.

Using Cardboard Mandrels

If you are in an immediate hurry for a coil (as most of us are!) and do not want to go to the trouble of preparing a mandrel for permanent use, you can form the coil on a piece of cardboard tubing of the required diameter, this being broken out after the coil has been made. (By the way, very useful for this purpose is the stout cardboard tube in which we send out the *DX Zone Map*; it is about $2\frac{1}{4}$ ins. in diameter by 22 ins. long and is quite strong enough.—*Editor).* The permanent insulating strips for the coil itself are set out round the tube, as previously described, the wire stretched from the anchoring point, and the turns laid on by "winding towards you," as already explained. When the coil has been formed and the fixative is hard-dry, the cardboard tube is simply collapsed by destruction—

tearing it in a few places and twisting it inwards. The formed coil will then slip off.

While about it, you can make yourself a coil a full 20 inches in length, a section of the required number of turns for the job in hand simply being cut off. You are then left with a nice length of spare formed coil, which can be cut as needed. In this way, in one energetic spasm, the writer made himself about two *yards* of coil, 2½-ins. in outside diameter, using 16g. enamelled wire spaced two wire diameters. This was more than five years ago, and there is still about a foot of coil left! Sections from the original lengths have been used in all sorts of transmitters.

After making one or two coils by the methods described here, you will find you can put the turns on accurately enough to dispense with the cord for spacing the turns.

Another Method

In the case where a coil is required for one of the higher frequency bands, having only a small number of turns, the following method will give equally good results: Prepare three or four strips of Perspex or Polystyrene more or less as before, and on one of these centre-punch a line of dots, spaced twice the diameter of the wire to be used and of the same number as there are turns. Using this strip as a template, set all strips up in the vice, staggering them very slightly lengthwise; with the punch marks as centres, drill a line of holes, using a clearance sized drill relative to the wire diameter. Measure up and stretch the wire as previously described, and wind the required number of turns, close-spaced, on any convenient former having a diameter slightly smaller than the required coil diameter. (The pantry will generally provide a suitable bottle for this job!) Let the coil spring back to its natural shape and cut off the misshapen ends. Thread the formers on to the wire, taking care not to distort the shape of the coil, and continue this process until all holes are occupied. Space out the formers equidistantly round the coil and complete by cementing at each junction point as before. The ends of the coil can be shaped suitably to be attached to banana plugs or any other form of termination decided upon.

Radio Frequency Chokes

These are necessary in almost every circuit, but unless correctly designed may sometimes cause unexpected trouble. It is not unknown for a choke or one section of a choke, if "pie" wound, to form, in conjunction with an external capacity, a resonant circuit which may cause parasitic oscillations of a most undesirable nature. The remedy, of course, is to break up the resonant circuit or circuits by changing the characteristics, generally by substituting a choke of different shape or design. One very simple way of building an efficient choke will now be described.

For this purpose a simple former must be prepared, consisting of an ordinary lead pencil and an odd number—five or seven—of household pins. These are stuck into the pencil so that they radiate outwards like the spokes of a wheel. The wire can be enamelled or cotton-covered and of about 30 SWG. Winding is accomplished by weaving in and out of the pins round and round, so that a flat "pancake" is built up to a diameter of about one inch. The outside turn is temporarily secured by a turn round one pin, and the wire is cut off with an inch or two surplus for connecting up. Give each side of the pancake a smear of "Durofix" or other suitable cement, and, after a period allowed for drying, remove the pins and slip the coil off the pencil.

Repeat the whole process until three or four similar coils, or pancakes, have been built up. The exact number of turns is not important so long as there are not too few for the frequency it is desired to suppress, and the individual coil sizes may vary slightly—in fact, it is better if they do. The coils are then mounted on a suitable former—a piece of Perspex rod is ideal, but at the lower frequencies a wooden skewer or even a pencil will serve. The sections are spaced out about half-inch apart and cemented to the former and wired up in series. It is important to see that all coils are placed so that their windings are in the *same direction* and that the inside turn of one coil is connected to the outside turn of its neighbour, otherwise the inductances will tend to cancel out and the device will be ineffective. With this form of RF choke construction, the result should be something like that shown in the "Beginner's Transmitter" on p.381 of the September issue.

Fast Winding

When winding up coils having a large number of turns—such as single-section RF chokes, or low-frequency receiver tuning coils—don't forget the method of the hand drill mounted in a vice, with the coil former secured in the chuck. Then, you just turn the handle slowly and feed on the wire. It takes a little practice to get even tension.

Finally, a hint or two about soldering when in the vicinity of a plastic or other easily-damaged material. This is best done by making use of what is known as a "heat shunt." This consists simply of gripping the wire to be soldered firmly in the jaws of a good-sized pair of pliers, the wire being held close to the soldering point and between this point and that requiring protection. The effect is for the mass of metal comprising the pliers to conduct the greater part of the heat away and to prevent it from running up the lead to the possible detriment of the adjacent plastic former. In any case, a good hot, clean iron is preferable to one which has not attained its full working temperature—and be sure that both surfaces are nicely tinned beforehand, so that the job can be completed quickly and cleanly.

The "Beginner's Transmitter"—80 Metres

In response to enquiries, the inductance value of the tuning coil L in the circuit on p.378 of the September issue of SHORT WAVE MAGAZINE is 29 μH

for the 80-metre band. This can consist of 35 turns of 16 SWG tinned copper, spaced out to give a coil length of 3 ins., wound to a diameter of 2 ins.

A crystal somewhere in the range 3500-3600 kc should, of course, be used; otherwise, the adjustment and operation of the Transmitter will be as for the Top Band. And in reply to one or two other correspondents—Yes, most of the parts for the model as illustrated on p.381 of the September issue *were* salved from a "surplus" T.1154. But so long as values are adhered to, any suitable components can equally well be used. It is one of the objects of this series to specify values and types, rather than particular items which may not be easy to obtain.

Lightweight Aerial Assembly

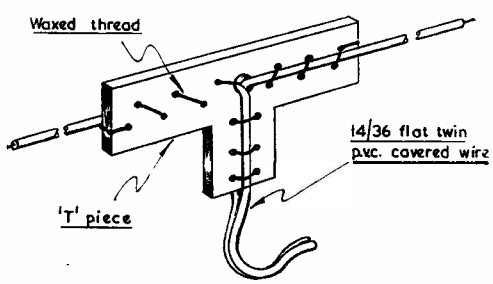
SIMPLIFIED CONSTRUCTION FOR CENTRE-FED DIPOLES

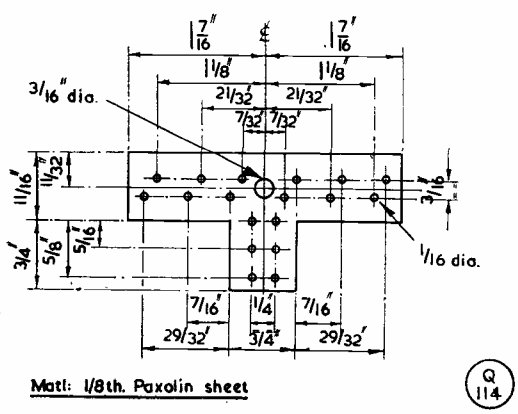
A. PARSONS (G4XB)

LOSS of effective aerial height due to sag consequent upon feeder weight is a problem which is difficult to solve unless one has stout masts which will stand a heavy pull.

For nominal powers the writer uses a lightweight dipole that allows of a taut top. Even for 3·5 mc the whole aerial and feeder-line, together with the dipole centre section, weigh only a matter of ounces, and there is practically no sag. To gain, say, ten feet in thirty or forty feet is worth something.

The wire used by the writer is actually by Rist's Wires and Cables Ltd., and is referenced 20/202/16. It is a thermo-plastic multi-strand flat twin electric lighting cable, such as can be obtained at any electrical shop. Only the cable with *coloured* plastic should be used as the transparent insulation is hygroscopic, *i.e.* it absorbs moisture from the atmosphere.





For 3·5 mc the writer used forty yards of the twin. The first twenty-two yards were pulled apart into two single wires of sixty-six feet giving a top of 132 feet. The remaining eighteen yards (fifty-four feet) comprised the feeder-line, and the wire was not cut anywhere. At the point where the wires separate, a paxolin T-section was made, as shown in the sketch. One sixty-six foot leg goes through a centre hole and turns left at the back of the "T," whilst the other leg comes through the centre hole from behind and runs to the right at the front of the "T." Small holes were drilled to allow the wires to be laced to the paxolin by thin waxed string.

Finally, the centre T-section was given a couple of coats of shellac. The illustration depicts the centre section assembly.

The aerial may be pulled taut, and when on load draws and radiates well.

BBC EUROVISION SYSTEM

Eurovision is now established on a permanent basis, and programmes will be seen simultaneously by people in Britain, France, Italy, Switzerland, Western Germany and Berlin, the Netherlands and Belgium. Austria will join later this year, and Denmark perhaps next year. This link-up is exclusive to the BBC.

Much progress has been made since programmes were exchanged on temporary links last year. In Britain the Post Office has established a permanent co-axial TV cable between London and Swingate, near Dover, which will take the place of the radio links operated by the BBC in 1954. The radio and cable links within Britain that bring the programmes within reach of nine-tenths of the population amount to 1200 miles. The radio links across the English Channel to Cassel in France, and to the various Continental transmitting stations, amount to 4,400 miles. The television audience in Britain is now estimated at about fourteen million people, and the Continental audience has grown in a matter of years from a few thousand to about two million. The BBC will take programmes from the Continent on an average of once a week.

CALCULATING PI-NETWORK TANK CIRCUITS

The whole subject of pi-network tank circuits is very interesting. For those who may be desirous of pursuing it, herewith the calculations, step by step, for deriving values for a pi-section coupler or PA tank circuit based on this principle. The latter is an arrangement that is becoming more popular as its working is understood.

A typical pi-section tank circuit is shown in the diagram, where the values of C1, C2, L, for any required frequency can be found from the formulæ. In this diagram E represents the HT voltage, which does not appear across the tuned circuit due to the presence of the blocking condenser. R2 is the impedance of the aerial system, which may vary over a wide range—say, 50 ohms for a ground-plane feeder, 72 ohms in the case of current-fed systems, 300 to 600 ohms where open-wire feed line is used, up to perhaps 2000 ohms or more in the case of an end-on aerial. The pi-section coupler can be designed to take care of all these. The value of R1 is determined as shown in Step (1), from E/I = R.

The correct capacity and inductance combination can be worked out to suit any desired load impedance for any frequency.

A.G.W.

(1) $R1 = \frac{500E}{I\ (\text{in mA})}$ ohms. R2 = Impedance of aerial system

(2) $\frac{R1}{R2}$ ratio must not exceed 100:1 ; Q not less than 12.

For any frequency first determine reactance of C1, C2 and L :—

(3) $XC1 = \frac{R1}{Q}\left(1+\sqrt{\frac{R2}{R1}}\right)$ ohms

(4) $XC2 = \sqrt{\frac{XC1}{\frac{R1}{R2}}}$ or $XC1 = \sqrt{\frac{R2}{R1}}$ ohms

(5) $XL = \frac{R1}{Q}\left(1+\sqrt{\frac{R2}{R1}}\right)^2$ ohms

(6) Check for accuracy since XL = XC1 + XC2

(7) Select the frequency of operation (in mc)

(8) $C1 = \frac{10^6}{2\pi f\ XC1}$ $\mu\mu F$

(9) $L = \frac{XL}{2\pi f}$ μH

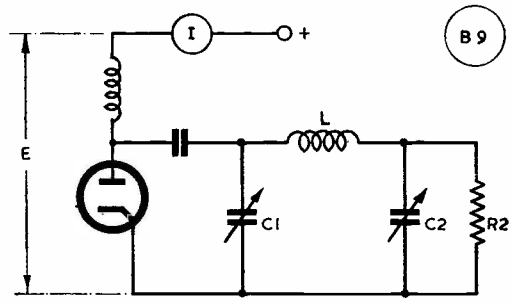
(10) $C2 = \frac{10^6}{2\pi f\ XC2}$ $\mu\mu F$

(11) The number of turns to give the desired value of L may be obtained from :—

$$N = Lx\left[1+\sqrt{1+\left(\frac{9}{a\,L\,x^2}\right)}\right]$$

L = μH
N = number of turns
d = diam. in inches
a = radius in inches
n = No. turns p-inch

$$x = \frac{20}{nd^2}$$



In the formulæ are given the calculations, step by step, for deriving values for a pi-section coupler. This is the circuit arrangement in which all such couplers are used.

RADIO-ASTRONOMY AT CAMBRIDGE

We are informed by Prof. N. F. Mott, F.R.S., that the University of Cambridge has recently received from the Mullard Company an offer to provide over a period of ten years the sum of £100,000 for the purpose of continuing and extending the work in Radio-astronomy which is in progress in the Cavendish Laboratory. With this benefaction it is intended to set up a new observatory to be known as the Mullard Radio-Astronomy Observatory. It is hoped that a site near Cambridge will be available for this purpose and that there will be space on it for making a number of observations which have not yet been possible.

Important work in Radio-astronomy was started soon after the war both in Cambridge under Mr. M. Ryle and in Manchester under Professor A. C. B. Lovell. At Cambridge special types of radio-telescope have been developed and have been used for detecting the astronomical bodies known as "radio stars" and for special investigations of the sun. With the instrument which is now in use in Cambridge it has been possible to detect and to measure the radio waves from nearly 2,000 radio stars, and the results suggest that many of these are at distances greater than those of the most distant stars observable with optical telescopes. At the new site, and with the help of the benefaction offered by the Mullard Company, it is hoped to construct a new radio telescope, capable of observing and investigating radio stars beyond the reach of the present instrument. It is also proposed to install a number of smaller instruments designed for special purposes.

The investigations which will be made at the Mullard Observatory will be largely complementary to those for which a different type of equipment, the large paraboloid radio telescope at Manchester University, is best fitted. The combination of the two different types of instrument will be important in maintaining the lead of this country in this new field of astronomical research. This generous offer by Mullard Ltd. was accepted by Cambridge Congregation on July 30 and is a good example of enlightened industrial support for pure research.

NEW QTH's

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

MP4TAA, H. I. Martin *(ex-G3IBD/5A4TT)*, c/o Sgts' Mess, R.A.F. Station, Sharjah, Persian Gulf, M.E.A.F. 24.

ZB1PP, RM. 12469 Marine R. J. Ezra, 3rd Commando Brigade H.Q., B.F.P.O. 51.

GM3FHO, F. G. Dickinson, Sunnyside, New Galloway, via Castle Douglas, Kirkcudbrightshire.

G3IGN, L. C. Marshall, 37 Langley Grove, Sandridge, nr. St. Albans, Herts.

G3JDC, G. Metcalfe *(ex-ZE2KL/SU1GY)*, Green Hills, Skelton, Penrith, Cumberland.

GI3JDC, Sgt. G. Metcalfe, c/o Sgts' Mess, R.A.F. Station, Ballykelly, Co. Derry.

G3JHO, H. Orrell *(5A2CO/VS9AO, ex-MT2E)*, c/o A. J. Mitchell, 167 Southbury Road, Enfield, Middlesex.

GM3KAI, J. Bain, 23 Ladeside, Reston, Berwickshire.

G3KCT, D. W. Blythe *(ex-VS7DB)*, Radio School, R.A.F. Station, Cosford, nr. Wolverhampton, Staffs.

G3KFQ, F. J. O'Connell, 31 Celtic Road, Deal, Kent.

G3KGS, W. G. Simpson, 4 Nelson Road, Wanstead, London, E.11.

G3KHA, R. V. Hinchliffe, 54 Pensford Road, Knowle, Bristol, 4.

G3KHZ, D. Cox, Estate House, Freeby, nr. Melton Mowbray, Leics.

G3KIH, F. G. Unwin, 42 Bridge Place, Worksop, Notts. *(Tel.: Worksop 2504)*.

G3KJI, E. W. Pollard, Kiln Farm, Syresham, Brackley, Northants.

G3KJR, B. Down, 13 Rogerson Terrace, Westerhope, Newcastle-on-Tyne.

G3KJR/A, 2732922 J/T Down B., R.W.S., R.A.F. Station, Sandon Road, Stafford, Staffs.

G3KJW, P. E. W. Allely, 26 Marlston Avenue, Lache Park, Chester, Cheshire.

G3KJX, B. Alderson, The Lodge, Patrick Brompton, nr. Bedale, Yorkshire.

GM3KJZ, G. Paterson *(VS6CT, ex-VS6DC)*, 119 Sinclair Drive, Cowdenbeath, Fifeshire.

G3KKC, A. R. Rumbelow, 30 Pott Hall Road, West Row, nr. Bury St. Edmunds, Suffolk.

G3KKG, C. Charlton, 25 Chatburn Road, Chorlton-cum-Hardy, Manchester, 21.

G3KKH, R. Pearson, 90 Birchfields Road, Fallowfield, Manchester, 14. *(Tel.: RUSholme 6837)*.

G3KKM, K. R. Barton, 4 Wargrave Road, Clacton-on-Sea, Essex.

G3KKP, J. Burgess, 57 Cliffe End Road, Longwood, Huddersfield, Yorkshire.

G3KKV, J. W. Worth, A.R.I.B.A., 17 Sunnycroft Road, Western Park, Leicester, Leics. *(Tel.: Leicester 87205)*.

G3KLI, F. C. Beadle, 56 Balliol Road, Welling, Kent.

G3KLL, B. Mercer, 9 Ellis Street, Hulme, Manchester, Lancs.

G3KLV, G. Vine, 16 Glasgow Street, Northampton, Northants.

CHANGE OF ADDRESS

G2DGJ, R. Franklin, 435 Lea Bridge Road, Leyton, London, E.10.

G2DMR, J. Korndorffer, 23 Windsor Avenue, Clitheroe, Lancs.

G2FSJ, E. Thorne, 91 Barlows Lane, Andover, Hants.

G2FVX, S. A. Deverell, 15 Grosvenor Road, Broxbourne, Herts. *(Tel.: Hoddesdon 2900)*.

G3ALQ, H. E. Pointeer, 66 Sheaveshill Court, Colindale, London, N.W.9.

G3CEG, B. King, 126 Brooklyn Gardens, Cheltenham, Glos.

GM3DIQ, W. C. Bradford, 40 Kaimes Road, Corstorphine, Edinburgh, 12.

G3EHS, D. Cairns, 16 Bolland Street, Barnoldswick, via Colne, Lancs.

G3FPI, W. B. Hopkins, 122 Westmorland Avenue, Luton, Beds.

G3GHI, A. D. Naylor, Silvanus, Cullesden Road, Kenley, Surrey.

G3GSN, T. N. Reekie, 153 Cannock Road, Stafford, Staffs.

G3GVN, J. H. Butt, 19 Faulkner Road, Solihull, Warks.

G3HHY, J. C. Watson, B.Sc. (Eng.), 89 Lower Redland Road, Redland, Bristol, 6.

G3JJG, G. Gearing, 127 Lammas Avenue, Mitcham, Surrey.

GW4CG, H. G. Hughes, Clyne, Austin Avenue, Newton, Porthcawl, Glam.

G4FN, C. T. Wakeman, Broadwater House, Clifton Terrace, Southend-on-Sea, Essex.

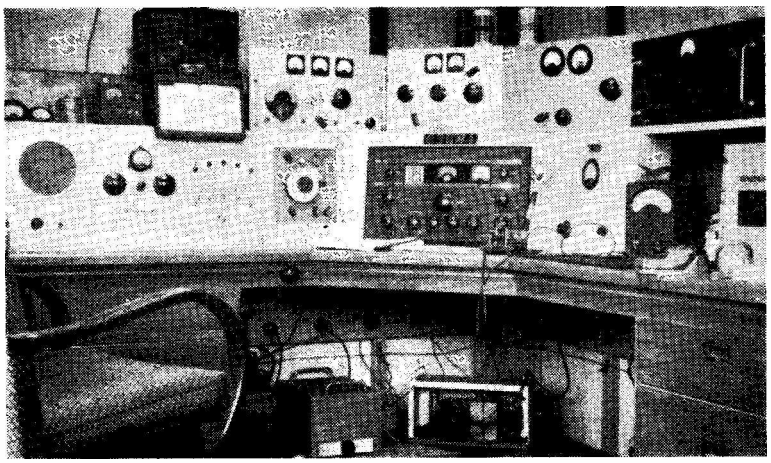
G5FN, S. A. Howell *(ex-GW5FN)*, 55 Barwell Road, Ashton-on-Mersey, Sale, nr. Manchester, Lancs.

G6AU, C. C. Algar, 197 Ramsgreave Drive, Blackburn, Lancs. *(Tel.: Blakewater 43074)*.

GM8JW, J. Wilson, 101 Crindledyke Crescent, Newmains, Wishaw, Lanarks.

THE OTHER MAN'S STATION

G3GWJ



THIS interesting layout is owned and operated by W. Steele, 23 Brook Vale Road, Langley Mill, Notts., who also has an unusually elaborate aerial installation to go with the fine array of equipment pictured here.

The aerial consists essentially of a Vee-beam, designed for the 14 and 21 mc bands, with 620 feet in each leg, at an average height of 42 feet; the apex angle is 35°, and the alignment S.18°E. The feeder is 70 feet of 600-ohm open-wire line, but made up of three wires, spaced equi-distant, with the centre wire open at the far end; the idea is that by using the centre wire and one outer at the transmitter end, either leg of the Vee-beam can also be fed as a separate Zepp aerial. Thus, on the one array, the following modes are possible: (*a*) Vee-beam, bi-directional NNW-SSE, fed by the two outers; (*b*) Zepp feed to westerly leg only, using centre wire and appropriate outer; (*c*) Zepp feed to easterly leg only, with appropriate feeder connection; (*d*) End-on long wire operation using easterly leg only; and (*e*) Same with the westerly leg of the Vee.

Activity at G3GWJ is mainly DX operation on the 14 and 21 mc bands, and experimental work with aerials and aerial coverage; he is not at all interested in contests or any kind of competitive work.

Equipment visible in the photograph includes, top shelf, left to right: F/S meter and harmonic indicator; BC-221; miniature-valved 160-metre transmitter, running ECO EF80-buffer EF80, WBC-coupled to PA EL41, modulated by EF91-12AU7-p/p EL41's, running 5-8 watts input on phone and CW. Next on this shelf is the exciter unit for the QRO all-band transmitter, band-switched over the range 80-10 metres, with an 807 RF output stage; this exciter can be operated as a 50-watt intermediate transmitter on its own, but is normally used to drive an 813 PA to full power; the latter has a band-switched grid circuit, and plug-in tank coils. At the right on the top shelf is an entirely separate band-switched transmitter, covering 3.5-21 mc, with a pair of 807's in the PA.

On the lower shelf, left to right, we have: Two-way, press-to-talk, intercom. speech line into the house; then a balanced aerial tuning unit, which pulls out on runners; next, the main control panel, from which all relays are actuated and power supplies controlled, with individual pilot lights, and carrying the master change-over switch, which is interconnected with the AR88 so that, muted, the receiver can be used as a monitor.

The VFO unit, on the left of the AR88, runs ECO EF50 stabilised into EF50 buffer, tuned EF50 buffer-doubler, with 6AG7 output; the RF drive from this is taken to the 807 exciter already mentioned, and thence to the grid of the 813 PA in the main transmitter. To the right of the AR88 is the speech amplifier-modulator, consisting of 6SJ7-6SN7-6SN7-p/p 807's in Class-AB2. An Acos Type 22 crystal microphone is used, and, for CW, a bug key.

Readers will agree that G3GWJ has a very fine installation, on the planning and construction of which he is to be congratulated.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Dead-line for November Issue : OCTOBER 14)

ELSEWHERE in this feature we publish the rules for the Tenth *Magazine Club Contest*, to be held on November 19-20 and 26-27. We hope that this event will be strongly contested, not merely by the faithful thirty-or-so Clubs who seem to enter every year, but by many of the newcomers who now hold their own call-signs and run their own Club stations. "MCC" is an exceptionally interesting opportunity for Club stations to make contact with each other over the air, and we should like to think that every active Club in the country will be taking part. Please note, in particular, the paragraph relating to the writing up of logs, and treat this with due respect as one of the rules of the Contest. Infringements of this (as of any other rule) will inevitably be met by disqualification, but we sincerely hope that this will not prove necessary.

WINTER PROGRAMMES

Indoor activities are now in full swing again after the best outdoor summer that most Clubs can remember. Fewer Field Days were washed out than ever before! The first nip in the air reminds us that *winter* activities must be planned, however distasteful it seems even to mention that word.

Deferring such thoughts as long as possible, quite a few Field Days have been organised for October. **Clifton** held one on the 2nd, and meet on the 7th to discuss it. On October 14 and 28 they have constructional evenings and ragchews, and on the 21st a lecture on RF Cables, by Mr. R. J. Slaughter, of Telcon. Their D-F Shield for the best performance in this year's three contests is retained by G3HZI, but the event on September 4 was won by P. Rogers, assisted by G3JIT.

Newark also inform us that they have arranged a D-F event for members, four teams having entered, but no date is mentioned. They meet on the first Sunday of the month at Northgate House (7 p.m.).

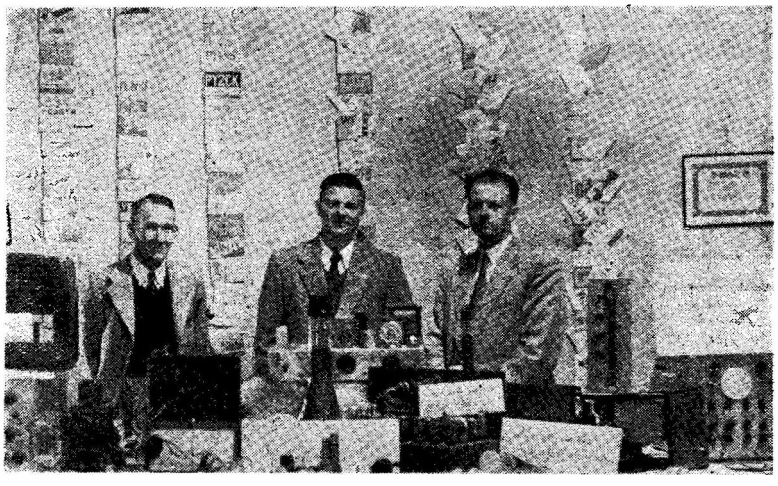
Purley will held all meetings from October onwards at a new venue, namely, the Railway Men's Hall, Whytecliffe Road, Purley—on the third Friday in each month. The main reason is economy, but the new location has excellent heating arrangements and facilities for tea-making, as well as being easily accessible.

Lothians (Edinburgh) announce a full programme, including a Bring-and-Buy Sale (October 6), a recorded lecture on TVI-Proofing, by G5RV, on October 20, and a visit to the BBC transmitter at Westerglen on the 29th. Normal meetings are held at 25 Charlotte Square, 7.30 p.m.

A new Club has been formed at **Deal,** Kent, to be known as the Deal and District Amateur Radio Club, its aim being to instruct members on all aspects of radio and transmitters. Morse instruction will also be given. The first meeting was held on September 22 at 2a St. Leonards Road, Deal.

East Berkshire College Radio Society, which held its AGM on September 22, has arranged a winter programme which includes lectures, film shows, visits and junk sales. RAE lectures and Morse instruction also figure in the syllabus, and, with the help of G3IXC, the Club hopes to establish itself on the two-metre band.

The Portable Amateur Radio Equipment Contest of the **QRP Society** is now closed, and results will be announced in due course. The annual Kaleveld Cup Contest will be run during the period November



At the Durban Crafts Fair, July 8-16, when ZS5DHE was in operation. In this photograph are, left to right, ZS5JF, ZS5EZ and SWL Brokensha, all members of the Durban Radio and Television Society.

5-12. All bands are used, with a maximum input of 5 watts. The Society's North American section, under the enthusiastic leadership of WØPRM, now numbers fifteen W and VE members.

Ravensbourne, now wide open again, meets every Wednesday at 8 p.m., in the Science Room of Downham Men's Institute, Durham Hill School. Members operate the new 40-watt Club Transmitter (G3HEV), and another 25-watt transmitter is available for 80 metres. The LCC Radio Class has already started, and includes Morse instruction, lectures and constructional work. An exhibition of home-built equipment, all operational, is to take place next May.

Liverpool has made its plans for the next three months, and those for the immediate future include a talk by G3DVI (October 11), a lecture on TTX by G3CSZ, of Wirral (October 18), an Open Night on October 25, and a Constructional Contest on November 1. All these meetings are at 8 p.m. at St. Barnabas Hall, Penny Lane, Liverpool, 13. Recent visitors have been W6ODR and an I1 . . . a cordial welcome is extended to any amateur or SWL who may find himself in Liverpool on a Tuesday evening.

Barnsley have an Open Night on October 14, a talk by G8VX on October 28 (subject to be announced), and another on Band II FM Reception, by Mr. W. Williams, on November 11.

Sutton and Cheam, meeting on October 18 at the Harrow Inn, Cheam Village, will hear a talk on Transistors by G3IEE. Their September outing to Worthing, unfortunately, missed the good weather, but everyone enjoyed it all the same. Meetings here are on the third Tuesday of each month.

Slade will be hearing about Test Instruments from G2RQ, on October 14, and on the 28th the subject will be Receiving Systems for FM (Mr. J. G. Harris, of E.M.I.). Their Annual Dinner is fixed for November 5.

Most of the members of **South Manchester** who took the last RAE course were successful in passing the examination, and there are already many new calls among the Club membership. Those wishing to enter for this winter's course should apply immediately. The AGM will be held on October 7, and the following meeting, on the 21st, is "to be arranged." For November 4 the subject is Getting on 420 mc — by G3IPN.

Cardiff report to us for the first time. They are meeting on November 14, 7.30 p.m., at the British Volunteer, The Hayes, Cardiff, to hold a Junk Sale and to discuss their winter programme. All interested are asked to attend, and will be welcomed.

Portable and mobile work seem to be in the news at **Scarborough,** whence it is reported that G3HFW has joined the mobile ranks and puts out a good signal from the wheel of his Minicar. G3FVW has built and tested a light-weight Tx for 7 and 3.5 mc working. An entry for MCC is possible if the new HQ is finished in time to permit aerial erection.

East Kent continue to meet on alternate Tuesdays at The Two Brothers, Northgate Street, Canterbury—8 p.m. **Nottingham** were given a demonstration of

MCC — TENTH ANNUAL 1.8 MC CLUB TRANSMITTING CONTEST

RULES

1. ***Duration :*** Saturday, November 19 ; Sunday, November 20 ; Saturday, November 26 ; Sunday, November 27. On each of these days between the hours of 1500 and 1900, GMT (sixteen operating hours in all).

2. ***Frequency and Power :*** All contacts will be made in the 1800-2000 kc amateur band, using CW only, with a power not exceeding 10 watts to the final stage. All reasonable precautions will be taken to avoid interference with other services using the band.

3. ***Call-Signs :*** Where a Club has its own transmitting licence and call-sign, that call-sign is to be used. Clubs without their own call may use a member's station, provided this is nominated as their official entry by the Club Committee.

4. ***Calling :*** Club stations will call "CQ MCC", (Magazine Club Contest) and will sign off at the end of each transmission with "AR MCC K," or "AR MCC VA." Clubs in contact with one another will identify themselves by giving, after the RST report, "QRA" instead of "QTH." This will be followed by the name of the Club, abbreviated forms being permitted, e.g. "*QRA* Clifton Club" or "*QRA* Salisbury Club," but **the word CLUB must be sent in every case.** Clubs working non-Club stations will send their QRA and will log the other station's QTH.

5. ***Scoring :*** Other Club stations may be worked once on each of the four days of the Contest, and will count for *three points* each time. Non-Club stations may be worked once only during the whole Contest and will count for *one point* only. The three points for an inter-Club contact will not be claimed unless the "QRA" and the word "Club" have been logged. Thus any Club station may be worked four times, for a total of twelve points, but other amateur stations only once, for one point.

6. ***Logs :*** Contest logs will be set out as follows. Quarto or foolscap sheets will be divided into seven columns, set out in this manner : Col. 1, *Date and Time.* Col. 2, *Call of Station Worked.* Col. 3, *QRA, if Club.* Col. 4, *QTH, if non-Club.* Col. 5, *RST, outwards.* Col. 6, *RST, inwards.* Col. 7, *Points claimed for contact* (3 or 1). Col. 7 must be totalled at the bottom of each page and the running totals brought forward.
   The last page should contain the following summary : Club contacts (number) at 3 points each :— total figure. Non-Club contacts (number) at one point each :— total figure. Grand Total.

7. Any Club stations receiving reports consistently worse than T9 will be liable to disqualification.

8. Logs, addressed to "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, must be posted to reach us by Monday, December 5, 1955. The Editor's decision on the results will be final, and will be published in the January, 1956 issue of *Short Wave Magazine.*

the Wearite Tape Deck and amplifier on September 16, and one novel idea shown was that of a continuous band of tape of about 10 seconds' duration, putting out a CQ call. Next meeting is on October 21, at the Sherwood Community Centre, when a recorded lecture on Mobile Operation will be heard.

Nottingham have accepted a challenge from **Newark** concerning an inter-Club Quiz, and are also organising an inter-County contest between the five radio societies in the county of Notts. This is to take place on January 21.

Cambridge University Wireless Society meets each Tuesday (of Full Term) in the Cavendish Laboratory at 8.15 p.m., when the club workshop and transmitter, G6UW, are available for the use of members. At meetings during this term there will be talks and demonstrations on Transistor Audio Amplifiers, FM Receiver Design, Germanium Junction Power Rectifiers and Industrial Television. There will also be a transmitter demonstration and a junk sale. All members of the University interested in any of these subjects are invited to attend—full details from the hon. secretary (*see* panel). It would be interesting to hear what the plans are for the winter sessions at the sister (sometimes called the senior) University.

Operating the Purley and District Radio Club station G3DPW/A at the fete held at the Rotary Field, Purley, Surrey, on July 23. G3GKF on the microphone, with G3DPW (right)

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE :

CAMBRIDGE : A. Brunnschweiler Pembroke College, Cambridge.
CARDIFF : R. Morris, GW3HJR. The Shack, St. Cenydd Road, Caerphilly, Glam.
CHELTENHAM : B. King, G3CEG. 126 Brooklyn Gardens, Cheltenham.
CHESTER : A. N. Richardson, 23 St. Mary's Road, Dodleston, Chester.
CLIFTON : C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
DEAL : J. O'Connell, 31 Celtic Road, Deal.
EAST KENT : D. Williams, G3JES, Llandogo, Bridge, near Canterbury.
LIVERPOOL : A. D. H. Looney, 81 Alstonfield Road, Knotty Ash, Liverpool 14.
LOTHIANS : J. Good, GM3EWL, 24 Mansionhouse Road, Edinburgh 9.
NEWARK : J. R. Clayton, 160 Wolsey Road, Newark.
NOTTINGHAM : M. Dransfield, B.Sc., G3JKO, 1 Cavendish Cresent South, The Park, Nottingham.
PURLEY : E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
QRP SOCIETY : J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames, Surrey.
RAVENSBOURNE : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
SCARBOROUGH : P. Briscombe, G8KU, Roseacre. Irton, Scarborough.
SHEFFORD : G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford, Beds.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTH MANCHESTER : M. Barnsley, G3HZM, 17 Score Street, Bradford, Manchester 11.
SUTTON & CHEAM : F. J. Harris. G2BOF, 143 Collingwood Road, Sutton.

Meetings of the **Shefford** and District Amateur Radio Society are held every Friday evening at 8.0 p.m. in Digswell House, where the club station, G3FJE, is located. New members and visitors are welcomed and refreshments are available.

Next meeting for **Chester** is on October 11, when there is to be a debate on the topic, "To key or not to key—that is the question." (If only Shakespeare could have known!—*Editor.*) G3HPM, of ZD9AD, Gough Is., is a member of the club.

NATIONAL RADIO EXHIBITION, 1955
A SORRY SHOW

This year's National Radio Exhibition can be written off as an unfortunate venture. Having got off to a bad start owing to the action of the ETU in holding the organisers to ransom—and not for the first time—two most important days, "dealer days," were lost. Up and down the country, the early closing day is either a Wednesday or a Thursday; it is on these days that the dealers come up to the Show, and it is the dealers who buy the sets and place the quantity orders. Moreover, overseas buyers who were expected did not come because of the uncertain opening and the counter-attraction of the German Radio Exhibition at Dusseldorf.

With the weather as it was, the public interest in the Show at Earl's Court was languid and the gross attendance was a bare 247,000, which was 25% down on last year and only about half the total for the peak year of 1951. Reports round the stands for this year's Show were that business was disappointing, to say the least; representatives of many important firms said candidly that the Show should never have been proceeded with at all as it could not be opened on time. This is in direct contradiction to the ebullient statement issued by Mr. F. W. Perks, chairman of the organising committee, who said that

the misfortunes of this year had "not had any important effect on business"!

Influence of the BBC

But there are other factors affecting the Radio Exhibition as it is at present organised. The huge BBC exhibit has been allowed to become a much publicised peep-show in its own right; indeed, even the official catalogue was wrapped round the theme of "come and see your favourite radio stars." It was significant that the 5 o'clock crowd made straight for the BBC section in the gallery, where they were content to queue for hours to get into the various live-broadcasting booths, or stand gazing into the back of somebody's neck for the opportunity of edging in to goggle through glass panels at a live TV performance.

The newspaper publicity given the Show greatly over-emphasised (and over-rated) the BBC's contribution, so much so that the majority of people found that, in fact, they could not get anywhere near their "favourite radio stars." and so went home disappointed.

Presumably, the intention underlying the National Radio Exhibition is that business should be done. This needs that *buyers*—from the public, the trade and from overseas—should be attracted, not just large numbers of people who come vaguely in merely with the idea of being entertained by the BBC.

The undertaking at Earl's Court could be a real National Radio Show, at which important business could be done, if the BBC were eliminated and the annual RECMF exhibition held concurrently in the gallery. The component manufacturers could be accommodated comfortably in the great spaces vacated by the BBC and, if necessary, the Forces' stands could be reduced in area. At present, the RECMF show is held in surroundings that are cramped and inadequate, which the artifice of making it "private" and "by invitation only" has done nothing to alleviate. The RECMF wishes, not unnaturally, to deal with buyers and those technically interested in their products. If they were at Earl's Court with the set manufacturing side of the radionics industry—and no BBC there merely to draw the crowd—they would be able to show their products to all who are interested, do business in reasonable comfort and make the contribution they should to a truly National Radio Show.

Whether these suggestions find favour or not, what is certain is that a radio exhibition held on the lines of this year's show at Earl's Court has lost much of its meaning and is no longer of the importance it should be from the business point of view.

And whatever the plans may be for next year, the quality of the TV picture piped round the stands needs to be considerably improved.

A.J.F.

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

APPOINTMENTS

WIRELESS STATION SUPERINTENDENT required for the POSTS and TELEGRAPHS DEPARTMENT, NIGERIAN FEDERAL GOVERNMENT, for one tour of 18 to 24 months in the first instance. Option of appointment (a) on temporary terms with salary scale (including expatriation pay) £864, rising to £1,392 a year with gratuity at the rate of £100/£150 a year, or (b) with prospect of pensionable employment with salary scale (including expatriation pay) £750, rising to £1,175 a year. Outfit allowance £60. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 annually for maintenance in U.K. Liberal leave on full salary. Candidates must have had wide practical experience of modern radio technique and equipment, in particular V.H.F. equipment, and preferably also V.H.F. muti-channel equipment.—Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience, and quote M2C/30086/SQ.

ASSISTANT TECHNICAL SUPERVISORS required by the NIGERIAN BROADCASTING SERVICE for two tours of 15-18 months each in the first instance. Candidates may be appointed (a) on agreement with prospect of permanent and pensionable employment in the salary scale (including expatriation pay) £750 rising to £1,175 a year, or (b) on contract terms with salary scale (including expatriation pay) £807 rising to £1,269 a year with a gratuity of £100/150 a year. Outfit allowance £60. Free passages for the officer and his wife and assistance towards the cost of children's passages or their maintenance in this country. Candidates should have administrative ability and have had wide theoretical and practical experience of low-frequency amplifiers and radio equipment.—Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/30482/SQ.

RADIO OFFICERS required for the POST and TELEGRAPHS DEPARTMENT, NIGERIAN FEDERAL GOVERNMENT for one tour of 12/24 months in the first instance. Candidates may be appointed (a) on agreement with prospect of permanent and pensionable employment in the salary scale (including expatriation pay) £750 rising to £1,175 a year or (b) on contract terms with salary scale (including expatriation pay) £807 rising to £1,269 a year with gratuity at the rate of £100/150 a year. Outfit allowance up to £60. Free passages for Officer and wife and assistance towards cost of children's passages or grant up to £150 a year for their maintenance in U.K. Liberal leave on full salary. Candidates must have recent experience in operating wireless and direction finding ground stations for air services, and possess a P.M.G. Certificate in radio telegraphy, an air operator's certificate, or equivalent service qualification. They must also have a thorough grounding in I.C.A.O. codes and procedures.—Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/41111/SQ.

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S 640, mint condition ; maker specification ; nearest £20.—T. Goodey, 10 Crow Green Road, Pilgrims Hatch, Brentwood, Essex.

TRANSMITTER, 150w., Phone/CW, Table Topper. 14, 21, 28 mc ; BC348, modified with power pack ; Q5'er ; £15. Buyer collect.—Warburton, 38 Railway View, Gt. Harwood, Lancs.

MUST CLEAR : CR100 (Civilian), 25w. amp 6L6 p/p O/p, W1191A Wavemeter, signal generator, mains tests sets, mains HRO p/p, AR88LF manual, various radio books. What offers?—Box 1619, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

QRT : Admiralty Modulator, 60-80 watts audio ; built-in Power Packs giving 500v. 200 mA and separate supply of 500v. 200 mA, 260v. 80 mA DC, 6.3v. 6A for Tx ; in grey steel case ; ideal table topper ; £9. Prop pitch Motor with mounting, £2 15s.; BC-342 with auto transformer, £14 10s.; BC-453, new and unused, £3 ; Type-D Wavemeter, 6.3v. AC, instruction book, £3 15s.; Type G79 Wavemeter, 150-200 mc, £1 15s.; GEC Miniscope, new, carrying case, instruction book, £8 10s.; Skyway 2-speed Tape Deck, new leads, £7 10s.; 813 valves, one new boxed, one used two hours, with one ceramic base, £3 15s. the lot ; 832 valves, new, unused, £1 5s. each ; Mains Transformers, 210/230 input, 1000-0-1000v. 300 mA, £1 10s.; 525-0-525v. 200 mA, £1 5s.; Woden Potted 650-0-650v. 250 mA, £1 15s.; Woden UM2 mod. trans., £2; 3in. Magslips, £1 pair. All above items in good condition and plus carriage.—West, 20 Cornist Lane, Flint, N. Wales.

SMALL ADVERTISEMENTS, READERS—*continued*

G3IDG wants *CQ*, January, March, April, June 1945; *QMF* before June 1952; G.E. *Ham News* before 1952; R.C.A. *Ham Tips* before 1950; *B.S.W.L. Review* before 1942, September 1948 to February 1949; *QRP*, November 1949; F.O.C., B.T.C.C. *Newsletters*.—95 Ramsden Road, London, S.W.12.

G.E.C. MINIATURE 'SCOPE; 1625's; PT15's, MHL6's (spares for 1154 Tx). Exchanges. WANTED: Rx, 14 mc xtal, 3.5 xtal, W-H-Y?—J. Brown, Waterworks, Penryn, Cornwall.

SELLING UP: 50w. Tx, 4 units, Labgear components, all bands, £15; Top Band de luxe rig, £10; Electronic Keying Unit with key, £8; Assorted Components; s.a.e. for list. — G3JUL, Box 1622, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CANADIAN 58 Set Trans./Recr., 6 - 9 mc, as new, including vibrator pack, mikes, phones and instruction book, £8 (or nearest offer).—Collins, 16 Woodlea Grove, Yeadon, Leeds, Yorks.

NEW ZEALAND ZC1, Mk. I, brand-new, unused, £6 10s., plus carriage. WANTED: Collins TCS Rx, preferably as new and unmodified.—Box 1623, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AR88, 100-watt Transmitter, complete with microphone, resistors, meters, valves, sundries. Call and offer after 6 p.m.—Hague, 21 Ellingham Road, Chessington, Surrey.

SALE: 150-watt Tx, fully metered, 813, 80m. band; superior job for 19in. rack; 1000v. power pack; £12. VFO to drive above, for 19in. rack; 6 valves, 1000 kc crystal calibrator, 3.5 mc, £12.—G2ASL, 68 Middle Park Road, Birmingham, 29.

HAMMARLUND SP400: 16 valves, 2 long waves, 3 short, covering 2.5 - 20 mc; every refinement, separate power pack (faulty), 110v. transformer, RF26 unit. Must be sold (now on DC!) First reasonable offer secures.—Box 1624, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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WANTED: Vibroplex or similar USA Bug Key; also compact QSO filing card system. Hallicrafters Sky Champion, £16.—Box 1625, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

BC-348, built-in Power Pack; good condition; £10. WANTED: Power Pack and Manual for B2 Tx/Rx.—G3HJT, 29 Unwin Ave., E. Bedfont, Feltham, Middlesex.

AR88LF (rusty but fully functional), £17. Ex-Canadian Navy equipment. Valves: 813, 60/-; 810, 866, 872, offers; all new in original cartons. Marconi Transmitters: LV500, 2-19 mc, 500 watts; TM11, 1.5 to 13.5 mc, 150 watts, with manuals.—Woodrow, 14 Pont Street, London, S.W.1. *Sloane 2477.*

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HRO SENIOR. 9GC coils, power pack, speaker, £25 (o.n.o.); set HRO Bandspread Coils, £9 10s.; Eddystone S750, S-meter, speaker, mint condition, £50 (o.n.o.); 24ft. 2in. Mast with wall mounting brackets, plus 10-metre beam, offers? Buyers collect.—Watson, 17a Deep Lane, Basingstoke.

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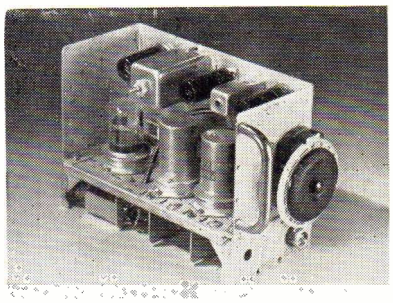

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