The SHORT WAVE Magazine

2/-

VOL. XIII NOVEMBER, 1955 NUMBER 9

Her Frequencies
Page 489

WORLD WIDE COMMUNICATION

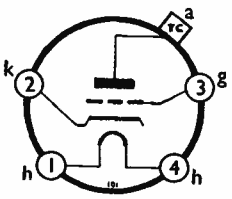
DA42

An Indirectly Heated Triode with 40 watts Anode Dissipation

(FOR CLASS B ZERO BIAS OPERATION)

The DA42 may be used as a replacement for the DA41. In such cases, since the heater and cathode of the DA42 have no internal connection, it is essential that pin 2 of the valve-holder is earthed.

BASE
Medium 4 pin



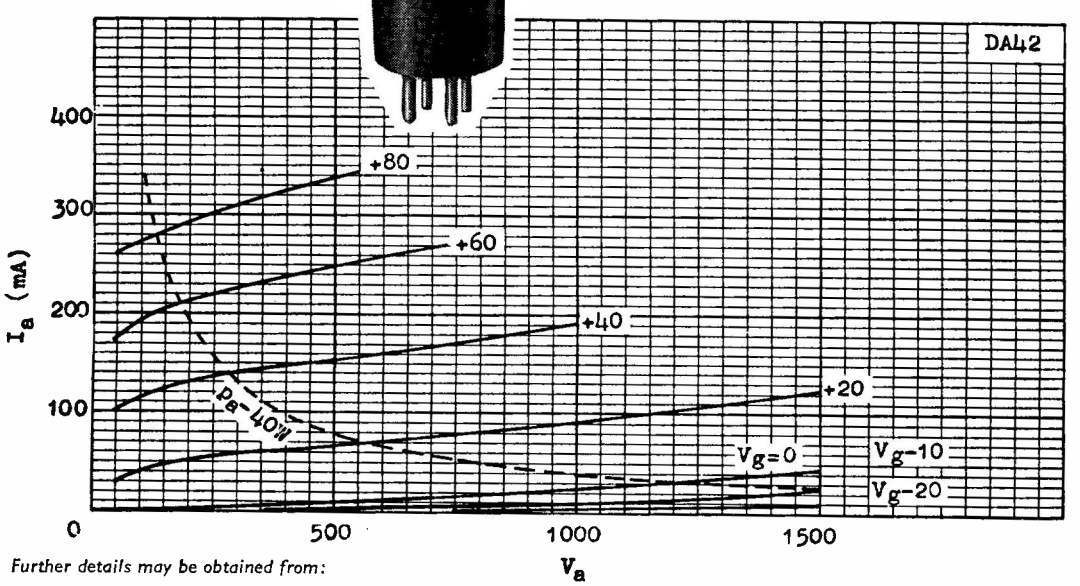
View from underside of base

HEATER

V_h	7.5	V
I_h	1.2	A

TYPICAL OPERATION
Push-Pull Class B Two Valves Data Per Pair.

V_a		1,000	V
V_g		0	V
I_a	(o)	50	mA
I_a	(max. sig.)	275	mA
I_g	(max. sig.)	60	mA
Vin	(g-g) (pk.)	210	V
Pdr		5	W
RL	(a.a)	10	kΩ
P_{out}		175	W
D		6	%
Z_{out}		15	kΩ



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SHORT WAVE MAGAZINE

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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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AUTHORS' MSS

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FOR THE EXPERIMENTER AND THE RADIO ENGINEER

The SHORT WAVE Magazine

EDITORIAL

Awakening

The long-awaited improvement in DX conditions on the HF communication bands has come rather more suddenly than had been expected. But now the amateurs of the world are in full cry once more, and are to be heard round all our bands right up to 21 mc, with Ten also open on occasion for real DX — and what a band that is when it is open ! Though we are not yet back quite to the best post-war conditions, they are well on the way, and it is already evident that amateur activity will reach a level higher than anything previously experienced.

Taking the world as a whole, there are now more than twice as many licensed radio amateur operators as there were before the 1939 war — in some countries considerably more. In spite of the poor DX conditions of the last seven years or so, there has been a steady nett increase in the numbers taking out licences ; also, it is a fair assumpton that a good many of those who allowed their permits to lapse during the dog days will return to the fold. It is axiomatic in Amateur Radio that once the bug has bitten, it never lets go !

Thus we see that our bands will be busier than ever before. But this does not necessarily mean an intolerable increase in QRM — because of the time-location factor for one thing and, for another, in 21 mc we have an additional very good band wide open to carry the traffic.

Nevertheless, those who are interested in DX communication — as most amateurs are — and want to make the best of it, will have to study the principles of good operating procedure — which implies a great deal more than the ability merely to send readable Morse or radiate good quality telephony. In fact, putting a good station on the air in the purely technical sense is a lot easier than working the world with it. Fortunately, there are stages in the development of the DX operator, and it takes a long time and much experience to reach the first flight. This is no different from the pattern in other spheres of activity — it is training and practice that make the Roger Bannisters, not just enthusiasm or the luck of the draw.

In the interests of all concerned, it will be our business to devote space to the finesse of DX operating in future issues of SHORT WAVE MAGAZINE.

Austin Forbes G6FO.

Top Band Special

TRANSMITTER DE LUXE FOR 160 METRES

J. N. WALKER (G5JU)

Our contributor is well known not only for the equipment, always practical and straightforward, that he designs for the amateur bands, but also for his own results on the air. For several seasons, he has been conspicuously successful in the Top Band DX Tests organised by SHORT WAVE MAGAZINE. *Here, he discusses in detail the transmitter he has evolved, and constructed as a finalised design, for DX operation on One-Sixty. Whether or not it is built exactly as described and specified, all 160-metre operators will be interested in the latest G5JU transmitter.—Editor.*

THE transmitter to be described is far from being a simple one and is offered to those readers looking for something well above average. For some time past, the writer has been using very successfully on the Top Band a similar design. After numerous modifications and additions, the original transmitter, built some years ago, was beginning to look not altogether presentable and it was decided to build a replica as far as the circuit went, but this time putting all the "works" in a totally enclosed metal cabinet. Many readers will be aware of the tendency for a properly built piece of apparatus to perform very differently from, and generally not so efficiently as, a hay-wire lash-up, and it is pleasing to know that the present equipment is an exception to this rule!

The design provides for either crystal or VFO control; gives a clean, stable clear-cut signal; possesses high overall efficiency; is easy to match into practically any aerial system; and can be modulated with a minimum of complication. In short, it is ideal for the Top Band enthusiast.

Circuit

The circuit utilises four valves, not including the stabiliser, and each pulls its weight. The first—a Z77 or equivalent—is the variable frequency oscillator and it will be seen from the diagram that the circuit is the standard one used in all the writer's VFO's, as it has proved eminently satisfactory in every respect. The fundamental frequency is in the region of 900 to 1000 kc and the degree of coverage has been adjusted exactly to the 200 kc of the Top Band allocation. The anode circuit is reactive but untuned and presents a sensibly constant impedance.

The second valve is again a Z77 and it acts as a buffer when the VFO is in use, or as a crystal oscillator of a most reliable type when spot frequency crystal control is desired. The only switching found necessary is to cut the voltage to the screen grid of the first valve when using crystal.

In the course of time, several different types of valve have been tried in this position, including the often recommended 6AG7 and the EL32. Both of these are good but they take quite a heavy anode current which is quite unnecessary since only voltage amplification is really required. The Z77, with its moderate appetite, has been found equally good if not actually superior, as after all it is designed for RF work and the makers quote figures for transmitting applications. The anode load in this case is made self-resonant, to give a useful degree of gain but at the same time retaining a broad-band characteristic.

In the next stage, some real power gain is called for, hence the inclusion of the ubiquitious 6V6. Here again other valves have been tested but the 6V6 proves perfectly adequate; it could be replaced by a 6AQ5 if required. The anode circuit is fully tuned, to provide the watts needed for driving the power amplifier.

This final stage may cause some comment since a triode is used, instead of a tetrode such as the popular 807. But this is definitely a case where a triode is to be preferred. The main disadvantage of a triode—the proportionately high drive required—need cause no worry when the input is low, whilst there are advantages in the way of circuit simplification, increased stability and very low minimum dip at resonance. The latter in particular makes aerial loading a more positive business than with a tetrode having a comparatively high standing anode current even with no load. An additional advantage is the ease with which modulation can be applied, there being no screen grid to consider. The driver stage provides adequate excitation for either telephony or CW operation.

The major difficulty is to find a suitable triode, in these days when tetrodes are so common. The ML6 chosen is a power triode used in the T.1154 transmitter and intended for RF work. It functions well and accepts 10 watts input easily. Alternatives are the 4074 twin triode, with both halves wired in parallel, or the 4033L, which latter is a most efficient high slope triode but unfortunately not easy to

Front view of the 160-metre transmitter described in detail by G5JU in the accompanying article. The VFO control is the large dial and the three scaled knobs control condensers C15, C21, C22, which can be located in the other photographs. The PA output circuit is designed to load into an aerial of " random length "— that is to say, any type of aerial, within reason, can be resonated in the 160-metre band.

obtain and then only at a price which may not suit many amateurs' pockets.

The output circuit in the original transmitter was balanced to earth, with a split-stator tuning condenser, and there were separate aerial tuning circuits to suit either a quarter-wave current-fed or a half-wave voltage-fed aerial. All this has been simplified by adopting a pi-network tank circuit, which appears to work equally well and also adapts itself readily to a random length of aerial wire.

Power Supplies

As explained in an earlier article, the writer much prefers separate high tension supplies for the exciter and for the PA stage. Since the best possible results are the intention, it is recommended that one supply giving 200/250 volts at up to 60 mA be used for the three smaller valves and another HT pack delivering 300/350 volts at about 30 mA for the PA. But as in this instance the total requirements are not heavy, it is quite feasible to use a single supply giving say 300 volts at 100 mA. Certain resistor values will require adjustment according to the actual HT voltage applied to the exciter section and information on this point is supplied later. A stabiliser valve is fitted and the regulated voltage of approximately 150 volts is applied to all screen grids.

Also required is a negative voltage for biassing the PA valve, adjustable at the source to a value of 50 volts or more so that the valve works very definitely in the Class-C mode. Some of this bias voltage is tapped off and applied to the screen of the 6V6 to ensure the driver stage cuts off completely when the key is up.

Other Points

The ten pin socket mounted at the rear fits in with the writer's own power supply system but of course it can readily be altered to meet other circumstances.

[over

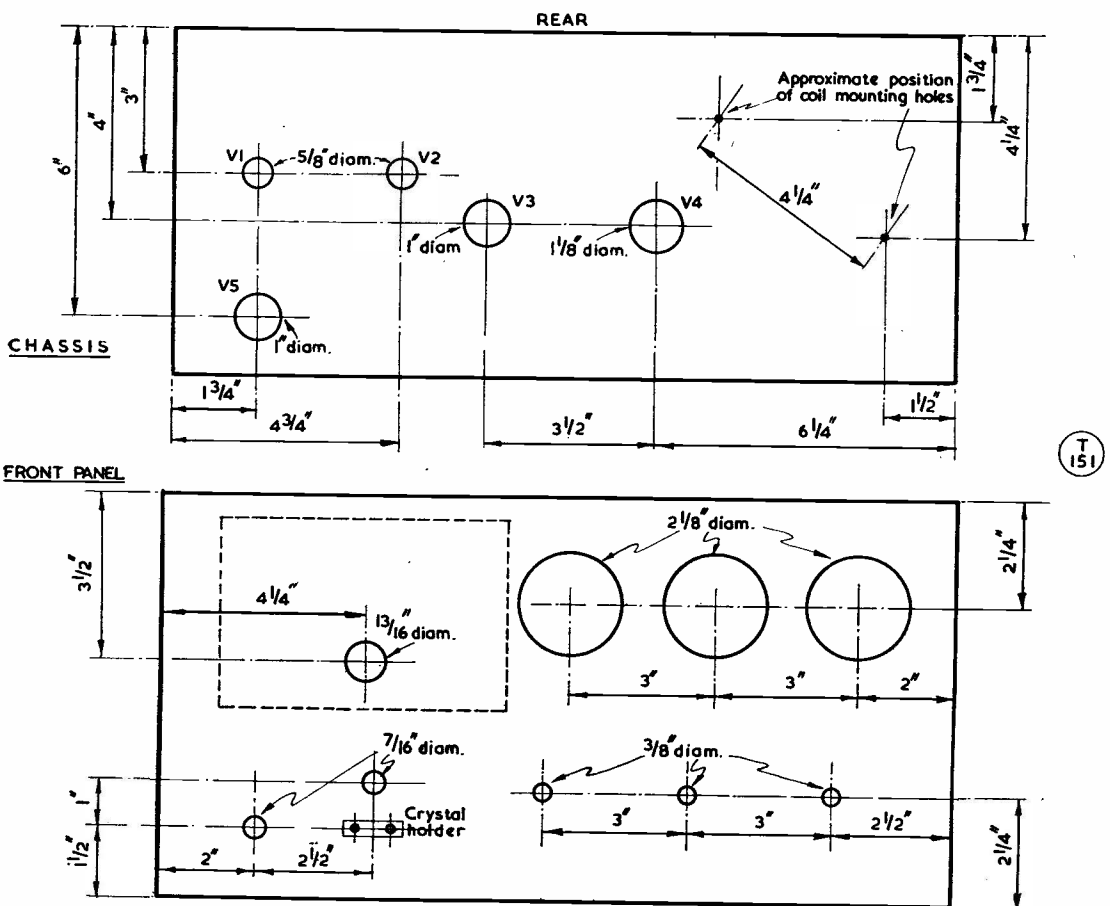
All controls are on the front panel and the only fittings at the rear are terminals for aerial and earth. A good earth system is strongly recommended. A thermo-couple meter reads aerial current and whilst the actual current flowing is not in itself an indication of the efficiency of the transmitter, it is an aid to tuning-up and shows the transmitter is functioning properly. Meters to read PA anode and grid current are also permanently fitted.

Keying is in the screen of the 6V6 driver valve, the jack being on the front panel. No key click filter is included, it being assumed this unit will form part of the external key wiring.

Construction

The complete transmitter is built inside a metal cabinet, with the majority of the components below chassis level. Layout dimensions are given in the drawing but considerable flexibility is permissible. The panel space is well filled and to get in three meters, they must be of the 2 in. flush mounting type (panel hole is actually $2\frac{1}{8}$ ins.) and a neat, orderly appearance results. By following the drawings and the photographs, the intending constructor should experience no difficulty in making up a near copy of the original. An error was made by the writer in that the full-vision VFO dial is actually mounted too far to the left and this prevents the fitting of handles to the panel. Allowance for this has accordingly been made in the layout drawing.

Three variable condensers are mounted directly on the panel and consequently their spindles are earthed. C15 and C21 are easy to fit but the method of mounting C22 will depend on the type chosen. It is, as usual, a BC type three-gang condenser, with the sections wired in parallel to give around 1500 $\mu\mu$F capacity



Chassis-and-panel layout sketch for the Top Band Special. In the panel drilling detail, allowance has been made for a slight re-adjustment of the VFO dial position to enable carrying handles to be fitted to the cabinet — see text. The cabinet and chassis used in this design is the Cat. No. 787 assembly in the Eddystone list.

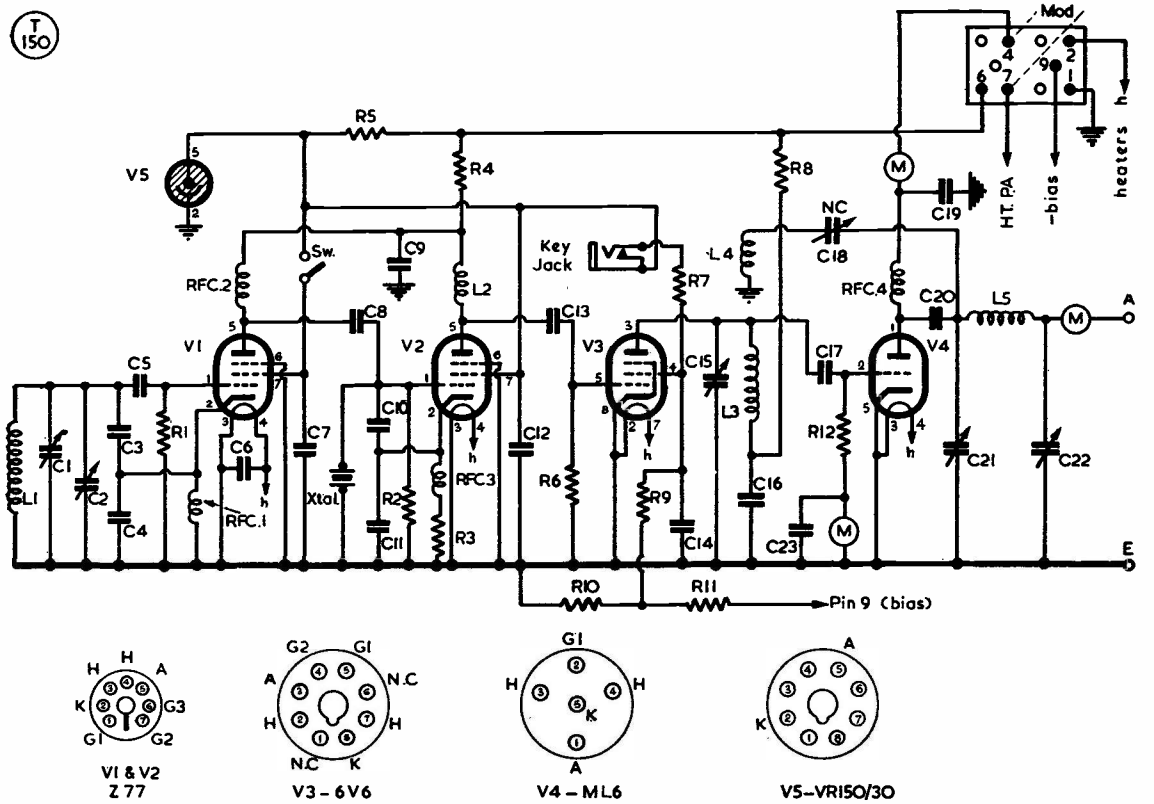


Fig. 1. Circuit of the G5JU Top Band Special described in this article. It has several interesting features. For reasons explained in the text, the PA (V4) is an ML6 triode, neutralised by the arrangement shown as L3, L4, C18; this is because a pi-section PA tank circuit (C20, C21, L5, C22) is used, to enable random-length aerials to be accurately matched. V1, V2, comprise the VFO section and V3 is the driver for the PA. The transmitter can be operated as a 3-stage CO-BA-PA by plugging a 1.8 mc crystal into the grid of V2.

LIST OF PARTS

	Cabinet and Chassis, *Cat. No.* 787	*Eddystone*
1	Full Vision Dial, *Cat. No.* 598	*Eddystone*
3	Knobs and Dials, *Cat. No.* 844	*Eddystone*
1	Coil Former (L5), *Cat. No.* 1090	*Eddystone*
2	Coil Formers (L1 and L2), *Cat. No.* 646	*Eddystone*
1	Coil Former (L3/L4), *Cat. No.* 537	*Eddystone*
3	Variable Condensers (C1, C2, C15), *Cat. No.* 586 140$\mu\mu$F	*Eddystone*
1	Variable Condenser (C21) 250 $\mu\mu$F, *Cat. No.* 817	*Eddystone*
1	Variable Condenser (C22) 3-gang .0005 μF per section receiving type	
2	RF Chokes (RFC1, RFC2), *Cat. No.* 1066	*Eddystone*
1	RF Choke (RFC3), *Cat. No.* 737	*Eddystone*
1	RF Choke (RFC4), *Cat. No.* 776	*Eddystone*
1	Neutralising Condenser (C18), *Cat. No.* 756	*Eddystone*
1	10-pin socket, *Cat. No.* 535	*Eddystone*
	(plug to match is *Cat. No.* 534)	*Eddystone*
1	Flexible Coupler, *Cat. No.* 529	*Eddystone*
1	Metal Bracket, *Cat. No.* 708	*Eddystone*
1	Insulator (Aerial terminal), *Cat. No.* 695	*Eddystone*
2	B7G Valveholders	*McMurdo*
2	Octal Valveholders	*McMurdo*
1	Ceramic British 5-pin Valveholder	*McMurdo*
2	Valves Z77 or 6AM6 or EF91 (V1, V2)	
1	Valve 6V6 or 6V6G (V3)	*Brimar*
1	Valve ML6 (V4)	*Surplus, ex-T.*1154
1	Valve (Stabiliser) VR150-30 (V5)	*Brimar*
1	Meter 5 mA FSD 2in. flush mounting	
1	Meter 50 mA FSD 2in. flush mounting	
1	Meter 0.5 amp. FSD Thermo-couple 2in. flush mounting	
1	Crystal Holder	
1	On-off switch	
1	Insulated Jack	*Igranic*

Table of Values

Fig. 1. Circuit of the 160-metre Transmitter.

C3, C4 = 1300 $\mu\mu$F silvered mica (made up by parallel combination)
C5, C13 = 100 $\mu\mu$F silvered mica
C6, C7, C12, C14, C16, C23 = .002 μF moulded mica 350 volt wkg.
C8, C11 = .0005 μF moulded mica 350 volt wkg.
C9 = Parallel combination of 0.1 μF Paper (TCC CP10N) and .002 μF mica.
C10 = 50 $\mu\mu$F silvered mica
C19 = .002 μF moulded mica, 500 volt wkg.
C20 = .001 μF moulded mica, 1000 volt wkg.
R1, R2, R6 = 47,000 ohms $\frac{1}{2}$ watt
R3 = 100 ohms $\frac{1}{2}$ watt
R4, R8 = 5,000 ohms 3 watt (*see text*)
R5 = 10,000 ohms 10 watt wirewound (*see text*)
R7 = 1,000 ohms $\frac{1}{2}$ watt
R9, R10 = 27,000 ohms $\frac{1}{2}$ watt
R11 = 100,000 ohms $\frac{1}{2}$ watt
R12 = 10,000 ohms 1 watt

for 160-metre working, and there are many different patterns available. The chassis should not be relied on for making the earth returns of these (or other) variable condensers and direct paths of copper wire or strip should be provided

in each case back to a point close to the associated valveholder.

To obtain good mechanical alignment, the slow motion dial should first be fitted to the panel and then the VFO tuning condenser C2, mounted on a metal bracket, matched up to the spindle of the dial through the medium of a flexible coupler.

The neutralising condenser should be located where it can be easily adjusted and does not foul other components—the under-chassis view makes this point clear.

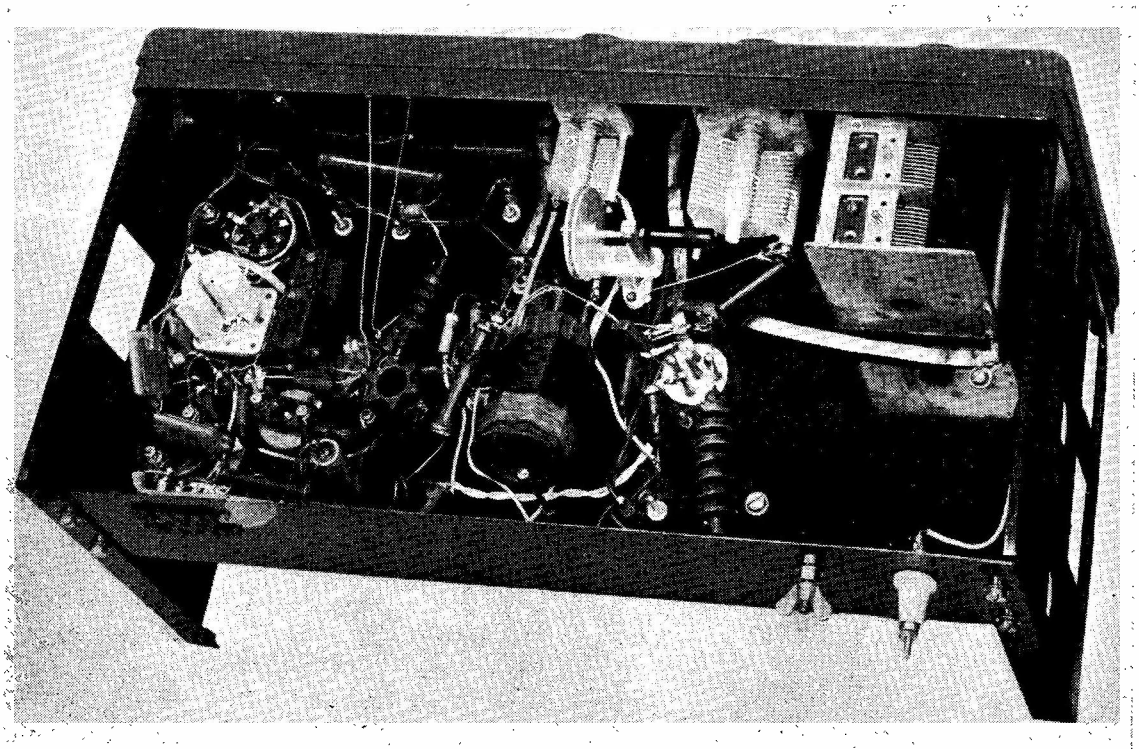
Coils

The VFO coil L1 is wound with 45 turns of 34 SWG enamelled wire on a 1 in. diameter former. The winding is spread out by allowing a small random spacing between turns, the reason for this being mainly that it enables the inductance to be adjusted subsequently by pushing the turns closer together. The former is mounted horizontally at one end only by means of a long brass 6 BA bolt (length 2 ins. or more) which permits fixing the former well clear of the metal chassis.

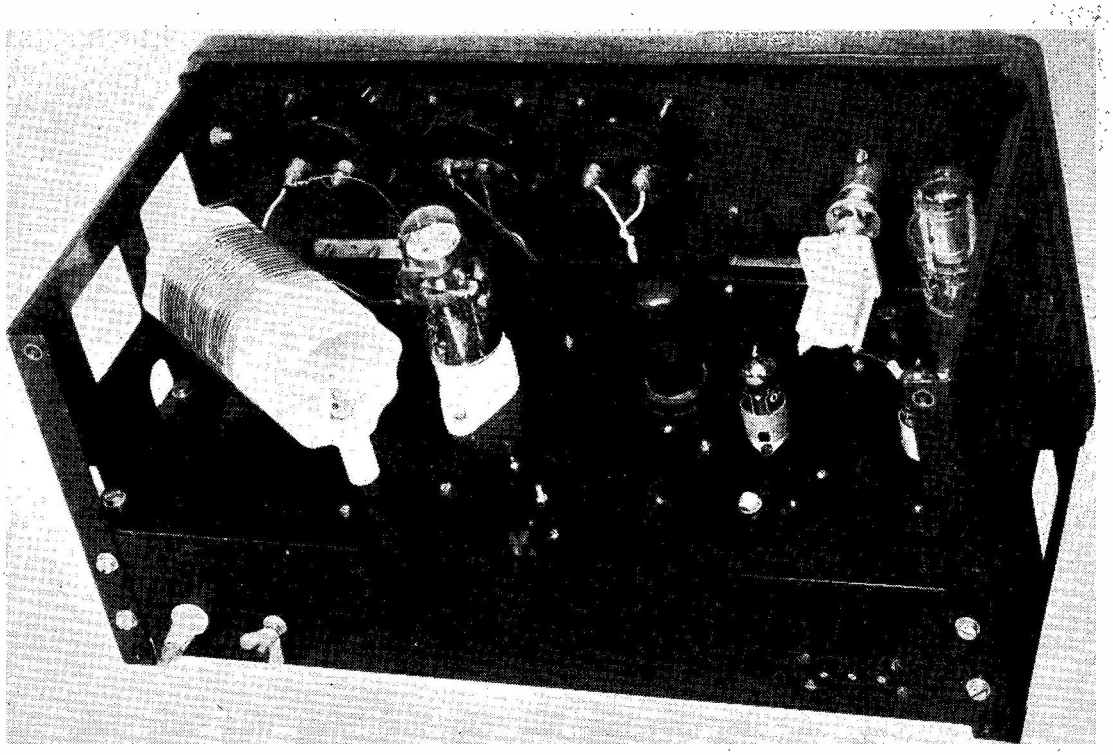
L2, in the anode circuit of V2, has 120 turns of 34 SWG enamelled wire close wound on another similar former. In this case, it is mounted vertically through the hole which already exists at one end of the moulding.

Next comes the 6V6 anode coil L3 and the neutralising winding L4 which has to be coupled to it. These are wound on a six-pin former $1\frac{1}{2}$ ins. in diameter, using the pins as terminating points for the ends of the wire. L3 has 42 turns, 28 SWG enamelled wire, and L4 sixty turns of a thinner wire—34 to 38 SWG. A certain amount of pile winding will be necessary to get this coil into the available space. The direction of winding of both coils must be the same, to give the phase reversal necessary for neutralisation. The inners of both windings are " earthy " and the outers " hot."

The L3, L4 former is mounted nearly horizontal and fairly clear of metalwork by drilling a 6BA hole in the thick part of the bakelite at the top of the former and again using a long bolt or piece of brass screwed rod. The pins should be arranged to come in a position where short direct leads can be made



Under-chassis layout of the 160-metre transmitter designed by G5JU, with the PA output tuning condenser C22 at upper right; this consists of a standard BC type 3-gang 500 $\mu\mu$F receiving condenser (having the widest possible gap) with the three sections wired in parallel because a large capacity is normally required here on the 1.8 mc band. The neutralising condenser for the ML6 PA stage is formed by the pair of discs visible near the upper centre of the photograph; it is a standard Eddystone item, as given in the parts list. The VFO band-setting condenser C1 is at the extreme left. The coil former at centre of the under-chassis assembly carries the L3, L4, windings (see text). L2 is immediately to the left of this and L1, the VFO coil, is the horizontal winding near C1.



Inside the cabinet of the Top Band Special, showing the layout above chassis. The PA stage is on the left and — for reasons explained in the text — the PA valve is an ML6 triode, a somewhat unusual type in this context but nevertheless readily obtainable and very suitable for RF work as a neutralised amplifier. Visible on the right, near the stabiliser valve, is the VFO tuning condenser C2.

to the appropriate points.

Whilst perhaps looking a little odd, the position of the PA coil L5 on top of the chassis is such as to place the winding as far away as possible from the surrounding metal and so prevent the " Q " being adversely affected.

Thirty-six turns of 18 gauge enamelled wire are wound on the $2\frac{1}{2}$ in. diameter ceramic former, allowing two turns to rest in each groove except for the few final turns at the anode end.

Resistor Values

As mentioned earlier, some resistor values may require changing if a higher than specified HT voltage is applied to the earlier stages. The values given in the list for R4, R5 and R8 are suitable if the voltage does not exceed 250. If an increase to 300 or 350 volts is made, R4 should be 7000 ohms ; R5 12,500 to 15,000 ohms ; and R8 7000 ohms.

It may be noted here that R5 (which is made up of two resistors in series for convenience) is mounted well over towards the panel to assist dissipation of the heat developed and to keep it away from the oscillator coil.

Setting Up

To begin with, HT should be applied only to the VFO stage (anode and screen) and the signal picked up on a receiver possessing a calibrated medium-wave coverage. With the tuning condenser C2 at maximum, C1 is adjusted until the signal is heard on exactly 900 kc. The amount of bandspread is then found by gradually reducing C2 to minimum following the signal on the receiver, the aim being to bring the signal to 1000 kc at the minimum position of C2. If the coverage is too small, as it probably will be to start with, the turns of L1 are closed up at the earthy end, and the process repeated. To get the degree of bandspread just right will take some little time but it is well worth while to make use of the whole dial swing. Where a GDO is available, this initial adjustment of the VFO coverage can be accomplished without energising the circuit.

The intermediate stages should function without particular attention, other of course than tuning C15 to the operating frequency, and neutralisation of the final stage is the next step.

Now HT is applied only to this stage and preferably a reduced value of 150 or 200 volts, whilst the negative bias is adjusted to a point where the valve takes a standing (stable) current of between 15 and 20 mA. C22 is set to maximum capacity and C15 to near maximum. On swinging C21, almost certainly the anode current will show variation and a small grid current will also be observed. Starting from maximum capacity, the neutralising condenser is reduced step by step until absolute stability is obtained. A further check should then be made by rotating C15 also.

Operation

Tuning is carried out in the normal way The VFO is set to the desired frequency and, with the crystal/VFO switch down, C15 is adjusted for maximum grid current, and C21 tuned for minimum dip—the dip should be to a *very low* value and barely readable. During this time, C22 will be at maximum and, with the aerial and earth attached, the final stage is loaded up by decreasing C22 and re-tuning C21 each time to minimum anode current, until some 30/35 mA is indicated. If the aerial is of the quarter-wave variety, C22 will be near maximum capacity and the thermo-couple meter will register a substantial current. On the other hand, with a longer aerial, less capacity will be required at C22 and the aerial current will be small but a neon lamp held to the aerial terminal will glow.

At all times, the dip observable when rotating C21 should be considerable and the out-of-resonance plate current should take the needle hard over—naturally this state of affairs must be only momentary or the valve anode will soon show distress.

Keying is clear cut, the note of excellent quality and no spacer wave is emitted. Provided top-grade components have been used in the VFO stage, drift should be entirely absent and the drive should remain sensibly constant throughout the band, with only slight re-tuning of C15.

For occasional spot frequency work, a crystal with a fundamental frequency inside the 1·8 mc band is inserted in the holder and the crystal/VFO switch placed in the "off" position. No tuning of the stage is required and operation is exactly as before. The crystal should be removed on returning to VFO operation or it will take control.

Modulation

The socket is wired for a twin cable to be taken to the output of the modulator from pins 4 and 7 but the individual constructor may wish to connect up the modulator in a different way. The impedance presented to the modulator is roughly 10,000 ohms and an advantage of the triode PA stage is that it will not be too critical of a slight mismatch. The modulation transformer winding should preferably be cut out of circuit when using telegraphy.

MAGAZINE CLUB CONTEST

This takes place in four 4-hour periods over the week-ends November 19-20 and 26-27, 1500-1900 GMT each day. Club stations can be identified by the fact that they will call "CQ MCC" (*Magazine* Club Contest), and they will be wanting to make single-point contacts with non-Club stations, as well as with other Clubs for the full three points. All 160-metre CW operators interested in fast contest working are invited to participate—noting, however, that the "MCC" call should not be used by any but *Club* stations. Rules for the event, the tenth in the series, appeared on p.441 of the October issue of SHORT WAVE MAGAZINE.

PUBLICATION and DISTRIBUTION

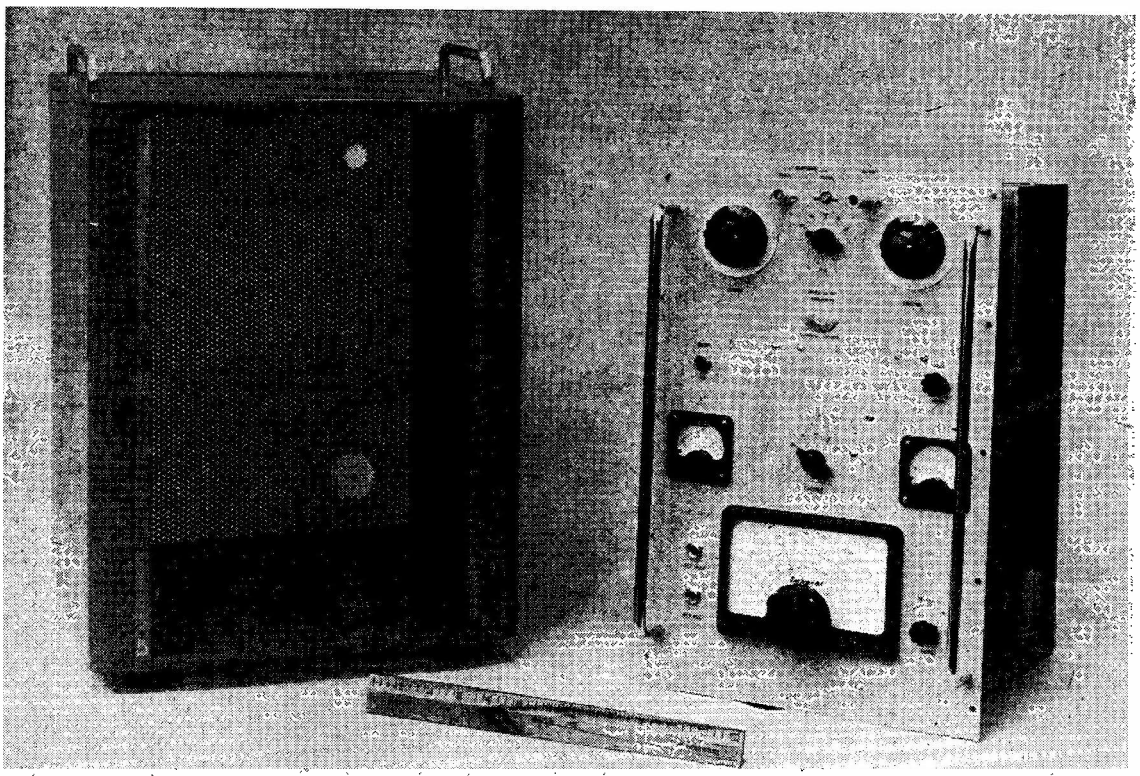
We publish SHORT WAVE MAGAZINE on the "Friday after the first Wednesday" each month, and all despatches are made on the Thursday. Direct subscribers in the U.K. should receive their copies by post on the Friday of publication, and the *Magazine* ought to be available on bookstalls in most parts of the country not later than the Monday. Nevertheless, we receive frequent complaints of late delivery, or inability to buy SHORT WAVE MAGAZINE from a local newsagent.

Direct subscribers should check that the envelope in which their copy is delivered is post-marked Thursday, and if it is not received on the Friday, take the matter up with their *local postmaster*. If the copy is received late, and the cover is dated later than Thursday, it should be returned to *us* for investigation.

Bookstall buyers who cannot get a copy by the Monday are asked to inform the newsagent concerned that all orders are cleared on the Thursday and, if there is any difficulty, he can order either direct on us or through his usual wholesaler. Ample supplies are always available, yet we are often told that newsagents say, "Sorry, unobtainable." This is never the case with the current issue, and we would particularly ask readers, by so informing their newsagent, to help us by ensuring that an order goes in.

A certain number of readers who cannot readily obtain SHORT WAVE MAGAZINE locally send direct to us, on the *Wednesday before* publication each month, a P.O. for 2s. 2d., to ensure delivery by post on the Friday. We are prepared to accept these orders where there is any local difficulty or delay.

Our next publication date is Friday, December 9—this is the day on which all direct subscribers in the U.K. should get their copy. Bookstall readers should find the *Magazine* on sale locally either on Saturday, 10th, or Monday, 12th. If not, please take action as stated above.



The LG.300 Mk. II band-switched transmitter assembly standing outside its cabinet. As this and the other photographs show, the LG.300 is a well-engineered design, on a rigid chassis, and is very well finished throughout. The panel is a light grey crackle, toning with the darker, smooth grey of the cabinet. Dimensions overall, excluding handles, are 19½-ins. high by 14-ins. wide by 11-ins. deep, and the weight is about 50 lbs. The full 150-watt carrier can be obtained on all bands 3.5 to 28 mc.

Labgear Band-Switching Transmitter

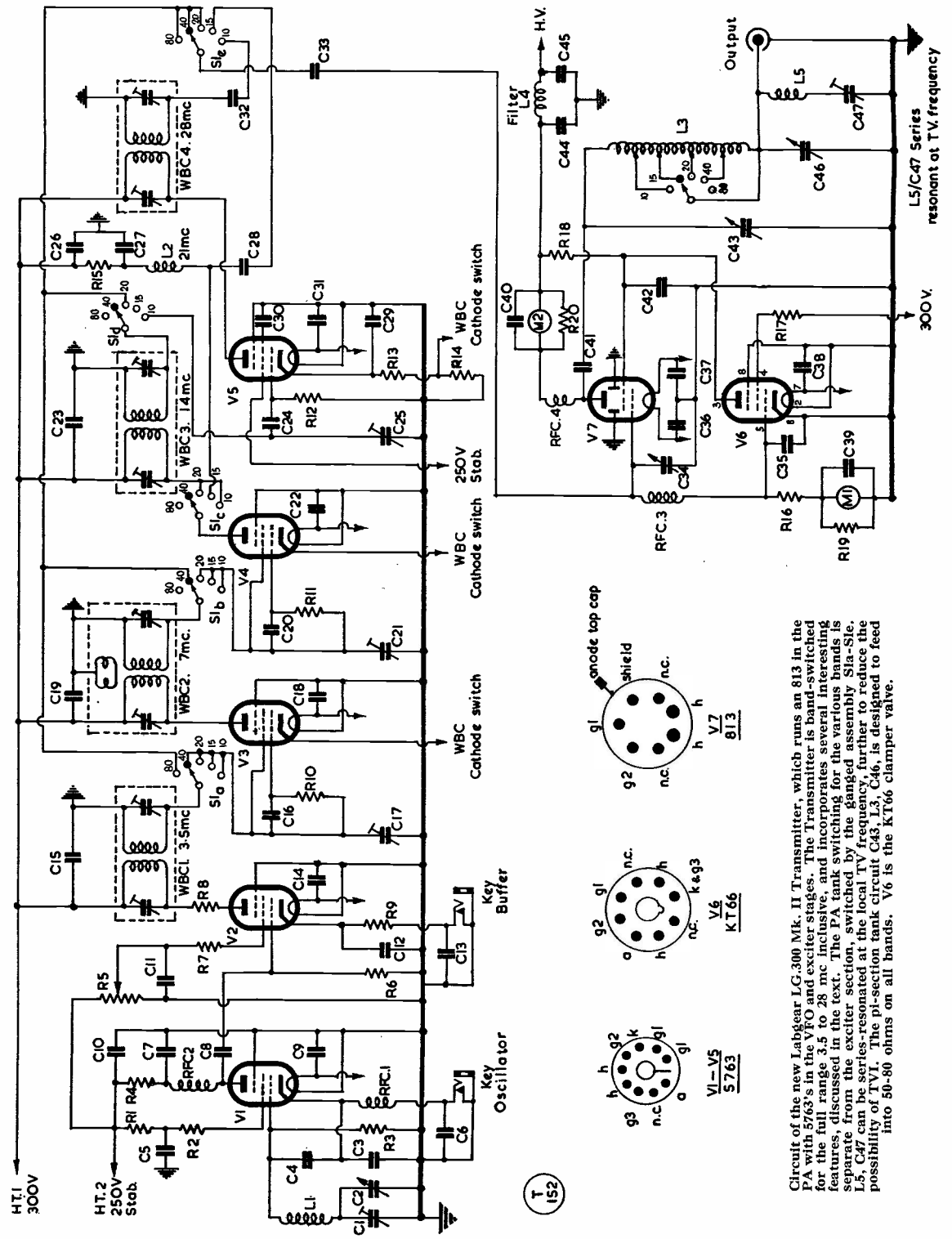
REPORTING ON THE LG.300 Mk.II

THE advent of a new British transmitter, commercially produced and designed exclusively for the amateur bands, is naturally a matter of great interest—even to those who may not at this moment be thinking of buying one.

In this country, the market for factory-built equipment of this sort, something you just switch on and tune up, is relatively restricted. However, it is growing, because in the same way that most British amateurs buy themselves a receiver—knowing they are unlikely to be able to build something good enough to compete under the conditions now obtaining on our bands—so many are coming round to the idea of buying a transmitter which measures up to the requirements of today.

Let it be said straight away that the Labgear LG.300 Mk. II is a good job. It looks nice, it performs well, and it is easy to handle. It is designed by engineers with a clear notion of what the amateur needs and expects, and in operation nothing is stressed or overloaded. The aim of the designers has been to produce a well-engineered VFO-Exciter-PA assembly, for which it is a simple matter for the customer to provide power supplies—and a modulator, if he wishes to use phone. The frequency coverage is five-band, 3·5 to 28 mc inclusive. Mechanically and electrically, the construction of the LG.300 is excellent throughout; it is on a rigid chassis and out of its cabinet the transmitter can be handled without fear of damage.

[over



Circuit of the new Labgear LG.300 Mk. II Transmitter, which runs an 813 in the PA with 5763's in the VFO and exciter stages. The Transmitter is band-switched for the full range 3.5 to 28 mc inclusive, and incorporates several interesting features, discussed in the text. The PA tank switching for the various bands is separate from the exciter section, switched by the ganged assembly S1a-S1e. L5, C47 can be series-resonated at the local TV frequency, further to reduce the possibility of TVI. The pi-section tank circuit C43, L3, C46, is designed to feed into 50-80 ohms on all bands. V6 is the KT66 clamper valve.

Circuit of the LG.300

The general arrangement is shown in the diagram and several of the sections can be identified in the various photographs.

The VFO is constructed as a separate unit, the buffer V2 being incorporated in that part of the Exciter section marked "WBC pack" in one view. Drive control is by the resistor R5 in the screen of V2, and is brought out to the panel. Brimar 5763's are used throughout the VFO-Exciter stages, and it is worth noting that on each band a 5763 as a multiplier is sufficient to drive the 813 PA to full input.

On the PA side, the 813 is really much under-run at 150 watts input. As an RF valve with 2,000v. on the plate, the 813 is rated for around 400 watts input with about 4 watts of grid drive. On a test with a dummy load, it was found that in this transmitter the PA could be pushed to nearly 300 watts DC input on 14 mc—and with 1,500v. HT it was given a soak-run of an hour under these conditions. On the HF bands, adjustment of C34, the peak drive control, with R5, is necessary for full drive into the PA. Once set for a particular band, no further attention is required.

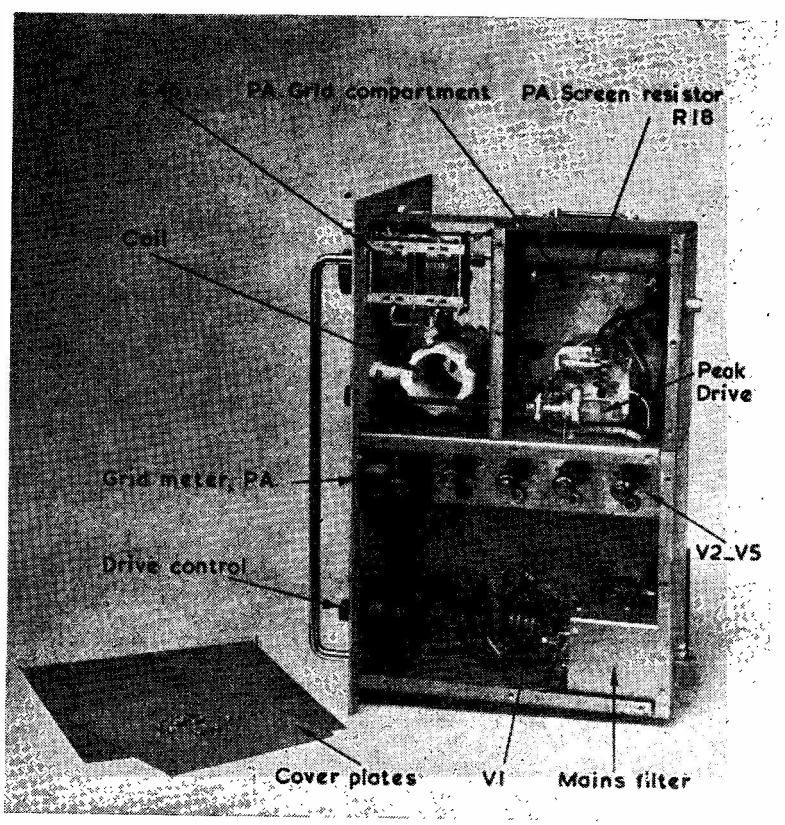
It will be noted from the diagram that clamping of the PA is obtained by a KT66 in the circuit of V6. This fully protects the PA; on a test, with 1,700v. on the 813 and no HT on the Exciter, the PA plate meter reading was about 20 mA.

The PA tank switching is separate from the Exciter band selection. A heavy-duty ceramic-mounted switch taps the coil assembly L3, and the layout is such that the leads involved are only a few inches long; the 10-metre section of this winding is mounted at right angles to the main coil. The pi-network tank circuit matches into 52-80 ohms on all bands and, generally speaking, a separate aerial tuning panel is necessary to enable the aerial to be properly matched and loaded — unless, of course, some 70-ohm current feed system is in use. L5, C47, will be noted in the diagram; this

Table of Values

Circuit of the Labgear LG.300 Mk.II

C1	=	100 $\mu\mu$F, pre-set
C2	=	20 $\mu\mu$F, variable
C3, C4	=	.001 μF, ± 2%
C5, C7, C9, C10, C11, C12, C14, C15,		
C18, C19	=	.01 μF
C6, C13, C22, C26, C29, C30, C31, C35,		
C38, C39	=	.001 μF
C8, C16, C20, C24, C28, C32,		
C33	=	100 $\mu\mu$F
C17, C21,		
C25	=	3-30 $\mu\mu$F, pre-set
C23, C27	=	.005 μF
C34	=	15 $\mu\mu$F, variable
C36, C37, C40, C41,		
C44, C45	=	.002 μF
C42	=	.002 μF, high-volt
C43	=	100 $\mu\mu$F, variable
C46	=	800 $\mu\mu$F, variable
C47	=	50 $\mu\mu$F, trimmer
R1, R10, R11, R12	=	47,000 ohms, ½-w.
R2	=	1,000 ohms, ½-w.
R3	=	100,000 ohms, ½-w.
R4	=	5,000 ohms
R5	=	30,000 ohms, w/w pot'meter
R6	=	18,000 ohms, ½-w
R7, R8	=	47 ohms, ½-w.
R9, R13	=	68 ohms, ½-w.
R14	=	2,500 ohms, w/ wound
R15	=	100 ohms, ½-w.
R16	=	8,000 ohms
R17	=	10,000 ohms, w/ wound
R18	=	30,000 ohms, 100w.
R19	=	Meter shunt, M1.
R20	=	Meter shunt, M2
RFC1, RFC2, RFC3	=	Standard RF chokes
RFC4	=	Labgear E.5032
L1, L2	=	Built in
L3	=	Labgear E.5033
L4, L5	=	Built in
M1	=	0-15 mA, grid
M2	=	0-250 mA, PA plate
V1-V5	=	Brimar 5763
V6	=	Osram KT66
V7	=	813



Side view of the LG.300 Mk. II with cover plates removed and main items identified. The exciter section V2-V5 is completely screened, electrically and mechanically, from all other parts of the circuit. Apart from the PA tank tuning, the only on-the-air adjustment called for is to the grid drive for the 813, which is by panel control.

is adjustable over a range of 40-70 mc and, in conjunction with a simple harmonic checker plugged into the left-hand Pye socket (see front view) can be set for minimum harmonic indication on the local TV channel. This is a most valuable refinement — it was tried for effectiveness against an S.27 receiver (which covers all TV channels and receives most of them) fitted with an S-meter, and it was found possible to attenuate the harmonics in any part of Band I.

Points on the VFO

So far as the user is concerned, the factors that matter in any VFO are its stability, accuracy of adjustment, and ease of swinging and netting. In the LG.300, the VFO dial is calibrated at main points, and there is ample swing over all bands. The test applied to the VFO for accuracy of adjustment was simply to use it as a BFO on DX signals on the 14, 21 and 28 mc bands; its stability on the HF bands was checked over long periods against a BC-221. In both cases, the results were entirely satisfactory. The actual calibration markings of the VFO dial are near-enough for practical purposes; it is not intended to be a band-edge marker and should not be used as such. The VFO trimmer is set for coverage in the factory.

The Exciter Section

The stages V2-V5 in the circuit diagram are factory-set and no adjustment to the trimmers is necessary—indeed, unless there is something radically wrong, the trimmers should not be touched.

On applying power to the low level stages, *i.e.*, no HT on the PA, a grid current reading will appear at any setting of the VFO on any band. This reading can be varied by the "drive-increase" control on the panel (R5 in the circuit) and on the HF bands it can be peaked by the panel control C34, marked "peak drive"; on 3·5 and 7 mc, C34 is quite flat.

With the drive set at about 7 mA on any band, it will be found possible to swing the VFO dial through most of the band with only the slightest variation in the drive mA reading. In other words, each stage in the Exciter is sensibly flat; any variation can be taken up on the controls.

Keying

Two key positions are provided. The note is better when the key is in the upper, marked "key buff," jack and normally this is the best way to key the LG.300 when using a muted or de-sensitised receiver, monitoring on the operating frequency. The beat level from the free-running VFO depends, of course, entirely upon the "degree of coupling" between transmitter and receiver and also the extent to which the latter is muted during transmission. But the VFO on the LG.300 being totally screened, there is very little RF leakage and under the test conditions the muting normally used on several different receivers was adequate. For full BK working, however, it is necessary to key in the oscillator jack. The note then tends to be a bit "soft," whereas in the buffer position, it is clean and sharp.

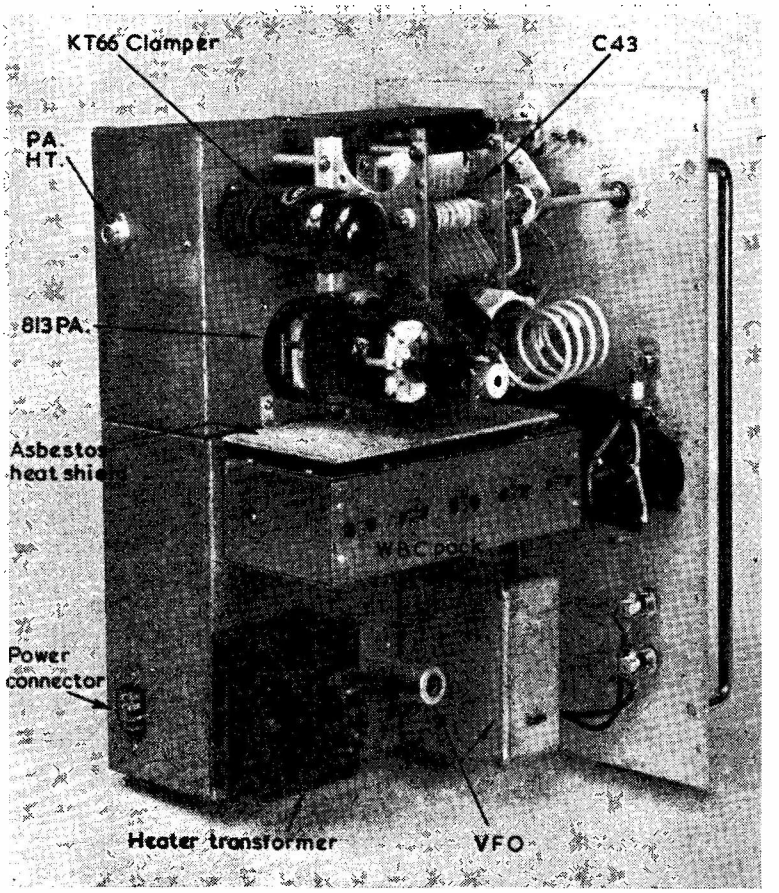
Modulation

The makers, in their instruction pamphlet, discuss high level (full plate-screen) modulation. This is, naturally, the easiest to apply—provided the audio power is available—because it is simply a matter of putting the secondary of the modulation transformer in series with the PA HT lead, having adjusted the impedances to match, in the usual way. For this, a Woden UM2 would be a very suitable transformer to use. High-level modulation can be obtained by a pair of TZ40's, DA41's or DA42's. For those wanting a speech-amplifier sub-modulator design, the G.E.C.'s new Osram-912 can be used as the audio driver unit for the high-level stage.

Recommended PA setting for high-level modulation of the LG.300 is 1,000v. at 150 mA, though some deviation from this is permissible. The modulator should be capable of giving 75 watts of audio at the secondary of the modulation transformer, though audio outputs down to 50 watts or so will give reasonable results. For good quality phone with full modulating power available, the drive setting for the 813 needs to be about 10 mA. As the makers point out, low drive results in low *harmonic* output, so that the lowest drive to give a satisfactory result should always be used.

For the owner who is mainly a CW operator and has only a casual interest in phone, the fact that the PA is an 813 with a KT66 clamper suggests that a less expensive modulation system could be used. For those who know what they are about there are two possible ways of doing this in the LG.300. The first is straight screen modulation of the 813, by taking out the screen HT lead; this is got at quite easily. The second possibility is by applying modulation to the KT66 ("Clamp modulation"), though this is not so easy and would involve more interference with the circuitry.

It should be noted that the makers do *not* discuss either of these methods of modulation, nor have we actually tried them on this transmitter. But both methods are clearly feasible, and it also happens that in another of our transmitters, having a PA stage somewhat similar to that of the LG.300 and also using an 813, adequate phone can be obtained by screen control. The advantage is that full modulation is possible with but a few watts of audio—though, of course, at lower RF output efficiency, since the standing screen voltage must be considerably reduced for good quality.



Another side view of the Labgear LG.300 Mk. II, showing general layout. The WBC pack is factory-set and no adjustment should be required in this section, which gives sensibly "flat drive" on all bands. The VFO circuitry is totally enclosed and the keying jacks, either "Osc" or "Buffer," are on the panel, on the right in this view. All leads associated with RF are fully screened, right up to the terminal. The PA band switch is above the coil assembly, behind C43 in this photograph.

The TVI Factor

In some respects, this is the most important consideration of all in the design of the LG.300. Straight away, one must make the point that while in certain locations the LG.300 will give entirely TVI-free operation, in others it may not. The problems of TVI are extremely complex and no two cases are the same. This means that to say the LG.300, or any other transmitter, is TVI-proof would be as misleading as to say that it is not.

So far as the LG.300 is concerned, all possible TVI-proofing has been built into it. It is fully screened. All leads associated with RF are themselves screened, right up to the terminal point. As already mentioned, the rejector circuit L5,C47, is incorporated, and is on the screened side of the cabinet. All input leads are filtered for TVI. Short of suppressing any RF output at all, everything possible has been done to keep the RF in our prescribed bands. More than this is not a practicable proposition and, in any case, need not be attempted. For interference with TV generally is now on a much greater scale and comes from many more sources than any that could be laid at the door of a licensed amateur using a transmitter like the LG.300.

If the operator's own TV receiver is one of those archaic designs with its IF's in an amateur band, then obviously the LG.300 cannot be operated in close proximity to it on that particular band. The same applies to a near neighbour's TV receiver with the same sort of IF's, and even perhaps to one similar half-a-mile away. In such a case a rejector circuit or high-pass filter in the TV receiver's own aerial lead may effect a cure—on the other hand, it might not. Likewise, the perfect and complete suppression of all harmonics is a near-impossibility—even the BBC cannot do it.

What it comes to is that it should be possible to operate the LG.300 TVI-free in areas of reasonably high TV signal level, provided there are no neighbouring TV receivers with IF's in or near the amateur bands—such cases are then a matter for the Post Office. It should also be possible to work TVI-free in areas of low TV signal level if the TV receivers within range are themselves fitted with high-pass filters and

have adequate front end gain. The combination of possibilities between these two *desiderata* are almost limitless! But if the owner of an LG.300 has a clear idea of the nature of the problems involved in TVI, then he can start to find a solution in offending cases secure in the knowledge that his transmitter is as near faultless as it reasonably can be.

The makers themselves do not claim that the LG.300 is completely TVI-proof—they would be very foolish if they did. What they do claim, with entire justification, is that the LG.300 ensures "the maximum possible efficiency together with an absolute minimum of spurious emissions." The instruction pamphlet with the transmitter deals quite fully with TVI problems and suggests that, in cases of particular difficulty, the addition of the Labgear Low-Pass Filter, as an external unit in series with the coax'd output from the transmitter, should be used.

Some General Points

The external power supply requirements for the LG.300 are: 300v. at about 200 mA; 250v. at 30mA, stabilised; and 1000-1500v. at 200 mA. A mains connection is also necessary, for the heater transformer. A full set of plugs and sockets for the transmitter is supplied; it is only a matter of making the necessary lead connections.

Fitted handles at the front and on top of the cabinet allow the transmitter to be handled easily. The cabinet stands on rubber feet and the ventilation is adequate. Radiated heat is greatest in that part of the transmitter marked "PA Grid Compartment" in one of the photographs. This is mainly from the heavy-duty screen resistor R18, while the 813 itself normally runs warm on filament power alone. As seen, a heat shield is fitted below the PA to insulate the Exciter pack from radiated heat.

The only constructional points that we can fairly criticise are minor ones. The knob on the Exciter band switch is not sufficiently secure; this is a high-torque assembly and requires a better knob, fitted so that the set screw bites on the flat of the shaft. Another small point is that the control on C43 (the left hand dial in the front panel view) is a little sticky; this condenser is of Labgear's own make and the bearing tends to be stiff. Also, it might have been worth having a panel on-off switch for the mains supply (which is to heater transformer only on the transmitter itself) though the intention is that all control switching should be external.

The LG.300 supplied to us was a normal production model, delivered in the ordinary way. It is well packed in a protected carton and should suffer no damage in transit.

We have not the slightest doubt that at its nett price of 55 guineas (exclusive only of the 813) this excellent transmitter, backed as it is by the Pye organisation, will find a ready market both in this country and abroad (where its full power capabilities can be used) and that all models sent out will perform as outlined in these notes. We congratulate Labgear on having made a worthy contribution to the line of British-built equipment for the radio amateur.

Clean Keying

CONTACT REPLACEMENT ON A BUG

N. P. SPOONER (G2NS)

IN keeping with the fact that CW is the basic form of Amateur Radio communication, the venerable and descriptive term "brass-pounding" implies exactly what it says: The manipulation of a solid straight key with heavy contacts that meet in a determined manner for the clean making of a keying circuit. In more recent years the semi-automatic key has gained considerable popularity, and when correctly adjusted and handled in the way intended by its inventor (which is for the comfort of saving unnecessary wrist-action and not for incoherent fast-sending frenzies), it is to the receiving end indistinguishable from a straight key. This desirable state of deception is unfortunately not always attained, and when heard lamentably failing in its intention, solid brass-pounding devotees are apt scornfully to remark that "it *sounds* like a bug"!

When not directly due to faulty adjustment, the causes of such tell-tale "scratchiness" are usually four in number, and, if appearing on the dash side, may indicate the presence of a high resistance between the pivot bearing and the dash contacts. A condenser between the fixed dash contact pillar and the key base will usually remove the unwanted effect. On the dot side, dirty contact faces and poor setting-up, preventing the surfaces from meeting evenly, can be cured by careful cleaning and parallel re-alignment. The surfaces rarely pit unless high voltages are passing, but the very sparing use of a fine oil stone will remedy this where necessary.

Stages involved in adapting a single tongue of almost any discarded relay assembly to make a U-contact for the dot side of any semi-automatic key.

Faulty Dot Side

The fourth cause is often a constructional one. With a straight key the contacts are robust and do not give; only hesitation on the part of the operator make their meeting indecisive. With most makes of bug key—Vibroplex, McElroy, Eddystone and others—the production of automatic dots, on the other hand, has necessarily to be effected by a moving dot contact secured to a U-shaped spring. After considerable use this spring may lose some of its tension and thus retard the full meeting of the contact surfaces. It would at first appear that only a new replacement part could cure this, but when a recent example was brought to the writer's notice it occurred to him that the average junk-box ought to provide a more simple and a cheaper substitute. This was found by the removal of one spring from a surplus Type 3000 relay equipped with heavy-duty change-over 3/16-in. diameter contacts. Completely to rejuvenate the bug in question only necessitated the removal of the old U-shaped spring, the bending of the new relay spring and the re-alignment of the two contacts. The sketch shows in three easy stages how rapid and simple the replacement can be.

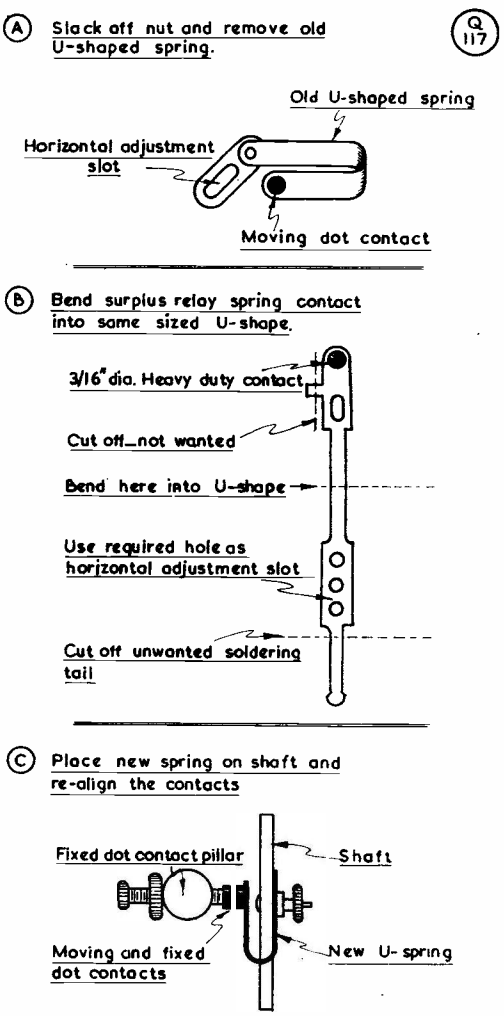


FIGURE 1. CONTACT REPLACEMENT

"SINGLE VALVE TRANSCEIVER"

It should be noted that in Fig. 2 of the circuit on p.356 of our September issue, covering the battery version of this transceiver, the keying jack must be wired in such a way that on "send" it is in series with the junction of R2, R3 and the grid of the valve; as drawn, the battery CO will not key.

"PI-NETWORK TANK CIRCUITS"

In step (4) in the formulæ on p.437 of the October issue, the alternative should have been shown as

$$XC1\sqrt{\frac{R2}{R1}} \quad \textit{not} \quad XC1 = \sqrt{\frac{R2}{R1}}$$

This slight error is regretted, though it is clear from the context that the reciprocal is intended.

★

AMATEUR RADIO EXHIBITION

This is to be held at the Royal Hotel, Woburn Place, London, W.C.1, from Wednesday, November 23, to Saturday, November 26; the Exhibition will be open each day from 11.0 a.m. to 9.0 p.m., admission one shilling. As in previous years, we shall be supporting the Amateur Radio Exhibition and, as usual, look forward to meeting many of our readers on the SHORT WAVE MAGAZINE stand.

AUTUMN "CALL BOOK"

The latest issue of the *Radio Amateur Call Book* is now available from us, price 31s. in the Full Edition of 540 pages, or 15s. in the Abridged Edition—that is, less the 350 pages of American call-sign/addresses. The *Radio Amateur Call Book* is the only authentic directory to the radio amateurs of the world and, being published quarterly, is always up to date; furthermore, it circulates in all countries, so that the procedure signal "QTHR" (My call-sign and address are correct in the Call Book) has real meaning. In the current issue, the G Section occupies some 22 pages of three columns each, and the call-signs listed are down to G3K....

If you are having any difficulty in obtaining SHORT WAVE MAGAZINE regularly and on time, please read the note on p.462 of this issue.

DX COMMENTARY

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

G2HJT

THERE is hardly any need to open up with the usual preamble about conditions. Everyone who has been on the air during the month must be aware of the complete change that has taken place—seemingly on all bands. So now, instead of passing on the usual message of hope for the future (we seem to have been doing that for about four years), we have to report that what we have all been looking forward to has already arrived.

This extremely good spell is obviously too good to last; there will be bad patches and more good spells, each one probably reaching even higher levels than the previous one. So don't be too downcast if you swing round that 21-mc band and find there's nothing there.

Activity has reached a very high level all round. As soon as the word gets about that the DX is rolling in, stations that have long been dormant emerge once more. The QRM begins to increase and then to snowball, until one or two ungrateful types actually wish that conditions weren't *quite* so good! Certainly this has applied to 21 mc; the W's have been absent from that band for so long that we almost forgot what they could do to it. After 1400 GMT it has been pretty hard to find any DX other than W's. from one end of the band to the other, CW or phone. In fact. quite a few operators new to 21 mc have been making hay while this particular sun shines, and are well on the way to their WAS on the band.

The surprising thing is that this resurrection of the HF bands seems to have corresponded with a spell of abnormally good propagation on the Top Band. We used to imagine that the Top Band would be at its best when the HF propagation conditions were at their worst—but it looks as though we might also be in for the best Top-Band season yet.

CALLS HEARD, WORKED and QSL'd

ZL on One-Sixty

ZL3RB (Christchurch) has been keeping faithfully to his skeds, as quoted last month and the previous month, and to date we have the following results to report: On October 2 he worked G3PU (Weymouth); on the 9th he raised EI9J (Dublin); and on October 12 he once more worked G6GM (Holsworthy). This latter QSO was probably the best ever between G and ZL on One-Sixty. G6GM's signals being 559 and ZL3RB's 569. 'RB described it afterwards as being almost like a local QSO. Fine work all round.

Nothing positive has yet been reported concerning the VS6 tests, but the awkward time (for us) at which they have to be run makes them very difficult—more difficult, we should say, than the ZL affairs, in spite of the shorter distance.

G/ZL schedules continue right through until the end of November. ZL3RB is on 1882-1886 kc, but *DO NOT* call him there, as he is listening between 1800 and 1830 kc *only*.

(Late Flash: ZL3GQ worked G6CJ and heard G3SU; ZL1AH worked G6CJ three times; and ZL1AH worked VK4YP cross-band, with the VK on Twenty, getting a 569 report on his Top Band signals.)

GDX, Top Band

The sport of county-chasing has now become almost traditional, and continues to attract plenty of devotees, despite the rival attractions of HF DX. G3FAS (High Wycombe) is up to 80 (69 confirmed), but has recently succumbed to the pull of Twenty.

G2CZU (Bath) awaits a QSL from Brecknock and is up to 55 since 1952 (he made WABC before that date, but was caught out by our fixing a starting time!) A holiday cycling tour of the Mid-

lands produced some good personal contacts.

G3GZB (London, N.22) claims a high place on the ladder with his score of 89/91. He still wants Shetland, Sutherland, Ayr, Armagh, Scillies and Alderney.

G2NJ (Peterborough) tells us that G5PP/P has been on from Hunts., Cambs. and Oxon., and thinks it would be interesting to know how many counties that energetic portable *has* visited.

The DX on 21 mc

With openings, at various times, to all parts of the world, the DX that has been worked on this band has depended mainly upon *where* the activity has been at any particular time. By this we mean that on many days during the past month you could easily have worked VR2, VR6, KX6, ZC5 or what-have-you — assuming only that the chap at the other end was conscious at the time! As we have already mentioned, the blanket of W's from midday onwards has been pretty thick. Before this develops, however, the band is usually good for VK, ZL, and any Far Eastern or Pacific stations that may be on. South Africa and South America, as always, contrive to make themselves heard at practically any time.

G5BZ (Croydon) says 14 metres has been so excellent that he has hardly bothered even to listen on the other bands—and is afraid that thereby he may have missed something choice. On CW he raised heaps of stuff, including among the new ones FM7, UB5, VS1, VP7 and ZD1. Phone brought in HR, LZ, VQ3 and ZD1. "Got-aways" were ET3, VP8, VR2 and KL7. G5BZ is looking forward to some more activity on the other bands, and has put up a 270-ft. long wire, which should help.

GW3AHN (Cardiff) maintains his place at the top of the 21 mc Ladder with his new score of 133 worked. From his considerable experience of 21 mc over the last four years, he suggests that October has always been the best month of the year for conditions, but, as he says, QRM has recently been worse than on 14 mc. The best of his CW contacts were

W1DTG, Stafford, Conn., is a 10-metre man, whose phone should be well heard over here when the band is open.

KG6NAB, KH6BCU, KL7's, VE6, VP8AI, 8AQ and 8BD, VK9DB, ZP9AY and 3A2BH. Phone was even more rewarding, with KC6CG, KA2MH, KR6CR, CR9AH, DU7SV, TG9AD, VP8's, VS1 and 6 and VK9. Along with all these were "numerous VK's, ZL's, W6's and so on."

G3DO (Sutton Coldfield) has been active on phone, and has added VP8AQ, VS6CL, KL7MOC, ZL1GJ and HR3HH to his list.

G2YS (Filey) came on the band for the VK/ZL contest, with satisfactory results, and then raised FM7WD, W6's, W7, WØ and YO5LC. G3IGW (Halifax) thought the openings to U.S.A. were "amazing," and worked many of the rarer States, as well as GM, HZ, VP8AI for new ones.

G3FPQ (Bordon), after three years of only sporadic activity, has come back with 60 watts to an 807, and has already raised 100 countries with it on 21 mc. On phone he lists AP2L, CR9AH, FB8BP, HR1JP, KC6CG, TI5RA, VK9DB, VP2GG and 7NK, VS1FK, ZD1SW, ZS9G and XE1PY. Others not listed included VP8's, HC, HH, HK, YN, ZS3 and "so on"! (Yes, we *did* say 60 watts to an 807). On September 10 during the LABRE Phone Contest, 'FPQ raised all W call areas in 2½ hours on 21 mc. We suspect that he must have rather a good aerial; he mentions that for 14 mc he uses a "plumber's delight ZL Special," with both elements gamma-matched, but doesn't say what does the work on 21 mc.

Good DX known to have been worked by various G's who have not reported in person includes PZ1RM, VU2RX, ZD4AE, FQ8AG, VK9DB and KC6CG—all on phone. Others known to be on the band, and workable if you can sort them out, are ZP5GM and 6CR, VP8AQ and 8BF (all CW) and AP2L, EA8AX, CR9AH, ZE2JK and ZD9AC (all phone).

News from Overseas

4X4CJ (Tel-Aviv) says he is back in harness after a long

absence, and runs skeds as follows: 21010 kc, daily, 1500-1555 and 1700-1755 GMT; 28010 kc, 1600-1655 and 1800-1855 GMT. He is also on 3.5 mc daily, except Saturdays, at 0415-0445 GMT, between 3505 and 3520 kc, and will be pleased to arrange for cross-band working, 3.5/1.8 mc. He is using a QRP rig with 25 watts to a 6L6 and a 138-ft. "VS1AA Windom," but still manages to get the DX. Slight grievance aired by 4X4CJ: "I am often confronted by the sad fact that when giving one a T7 or T8c report, he or she hastens to finish the QSO, being probably mad at me or such-like. In most cases, where a T7 report is given, no QSL arrives, but it does not bother me. Ours is a scientific hobby and we try our best to attain a certain degree of perfection, so let us be honest and admit a poor note we know we have, or report a poor note when we hear one." (To which we add a heartfelt "Hear, hear.")

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	97	97
G5JM	97	97
GM3EFS	94	94
G3HIS	94	94
GM3OM	93	95
GI6YW	93	93
G3JEL	92	94
G3HIW	92	93
G5LH	92	92
G3JEQ	92	92
G6VC	92	92
G3EUK	90	93
G3CO	89	92
G3GZB	89	91
G2AYG	83	84
G3JHH	79	81
G3BRL	79	80
G3GGS	76	79
G3GYR	74	76
G3JKO	73	85
G3DO	72	72
G3FAS	69	80
G3KEP	69	74
G3JBK	67	71
G3HZM	67	69
GM3DOD	66	70
G2CGL	63	70
G3JAM	62	70
G3GGN	61	79
G3JJG	61	68
G2HKU	61	62
G3DGN	60	64
G2CZU	54	55
G3FNV	50	68
G8CO	50	65
GM3JZK	42	48
EI8J	38	48

SU1DD is now about to become G3HDD again after some six months' activity with the former call. He has QSL'd all contacts when requested, but anyone still short should write G3HDD with details. He regrets that there wasn't time for much activity on 28 mc, which was getting good, with signals arriving from W, PY, CX, ZS, ZE, VK, VQ4 and Europe. Some of the W's were recently S9-plus out there, and it was strange to note that when 28 mc was wide open, 21 mc often seemed to be below par.

W6AM (Long Beach) puts his 14 mc score up to 255 with ZD3A and ZD8AA on CW! On the phone side he now rates 207, thanks to EA9AR and LB8YB. When W6AM transfers his activities to 21 and 28 mc we see nothing that can stop him from hitting the top of the Five-Band table!

Quote: "If you are around your shack at 11 a.m. on Sundays, why not leave your receiver on 7060 kc? There is always at least one of our members who wants some information and you may be able to help." Where? Why, the Malayan Amateurs' *Newsletter*, organ of the very active VS2 Transmitters' Society. This publication is always full of interesting sidelights on radio life in Malaya, and is one of the best privately-published efforts of the kind that we have ever come across.

Multi-Band Working

Incidentally, the improvement in all-band conditions and the interest in all-band operation prompts one to remark that this should bring in more claims for our Five-Band DX Table. In particular, we would like to see entries from those who have just begun all-band activity—and there is no need to be ashamed of a low score, either. The fact is that only a minority of amateurs are able to work effectively on more than about three bands, let alone five, so that to be able to show a score at all is an achievement. (You cannot enter the Table unless you can show countries worked on the bands 3.5 to 28 mc, inclusive.)

The points total is arrived at, of course, by the sum of the different countries worked on each of the five bands. The right-hand column shows the total of countries without regard to bands, *i.e.*, each country counted once only. In any individual case, the points total, which determines position in the Table, will always be higher than the countries total; it is possible to have a high countries total, and yet be lowish in the Table if those countries have been worked mainly on one or two bands only. In the current Table, a good example of this is W8KIA, who, obviously, has worked most of his DX on 14 mc. On the other hand, stations like G5BZ and, further down the Table, G2YS, show balanced activity on all five bands. So what we would like to see now are some new call-signs coming in on the lower rungs.

Ten Metres

We knew that 28 mc was opening up nicely for DX, but you could have knocked us down with a feather when we found the whole band, both phone and CW, cram-full of W's (including Ø's, 6's and 7's!) On one or two days recently it has sounded just as it did in 1947-48. This particular sunspot cycle seems to be climbing more rapidly than the average would indicate.

G3IDG (London, S.W.12), who has been patiently watching Ten all through its dead period, logged 27 countries between October 2 and 9. Then on October 12 he worked W1LVH for his very first QSO with the States on *any* band! His signals (10 watts and indoor dipole) were 569; the W's (250 watts and beam), 579. G3IDG also worked HZ1HZ, who, prior to the W, was his best DX on any

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	G3FPQ	351	48	48	134	100	21	153
G6QB	612	52	108	222	95	135	236	G8KU	347	23	52	161	36	75	171
G5BZ	593	63	113	231	120	66	236	W6AM	336	13	32	255	32	4	255
G3FXB	523	67	121	184	101	50	193	G8VG	284	36	77	124	21	26	141
W8KIA	522	54	138	247	4	79	247	ZB1KQ	284	6	34	118	64	62	139
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
G3DO	477	24	46	203	97	107	224	G3IGW	178	35	50	62	29	2	82
G2BJY	466	48	78	141	83	116	181	G2DHV	172	19	25	110	6	12	113
G2YS	415	60	79	146	84	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
G2BW	368	24	57	144	100	43	165	G3IDG	39	11	10	6	1	11	23

band. If you can do it with 10 watts and an indoor dipole *now*, there ought to be some hope for transistor DX around 1958!

GW3AHN transferred his attentions from 21 to 28 mc, and found the East-West opening in full swing, with W's roaring in, sometimes as late as 2100 GMT. He worked all districts except 6 and 7, and also raised (on phone) KP4ACI, LU7QB and YV5EC. TG9JW was a Gotaway. HZ1HZ was peaking S8 on CW one afternoon, and Far East stations were also heard, but nothing yet from VK or ZL.

G3IGW was another who raised HZ1HZ on CW, and he says "at long last the 'average ham' is getting a long-awaited chance to put himself in the picture."

G3FPQ made some brief appearances on the band, which he says is opening *regularly* to Africa and South America as well as occasionally on the East/West path. Some of the prefixes worked on phone were CR6, CX, OQ5, VE, VQ2, VQ4, W, ZD4, ZE and ZS.

Twenty-Metre Doings

There's no doubt that the thrilling happenings on the two HF bands have put Twenty right out of the limelight. Conditions there are extremely good, but the European QRM persists and many of the erstwhile devotees have now deserted it for 21 and 28 mc.

G3FAS, on the other hand, has deserted the Top Band, his normal stamping-ground, for Twenty. He has only been using 15 watts to a dipole 20 feet high, and his best DX to date has been JA6HK, with plenty of W's and VE's. A new rig is on the way and he will shortly be letting 150 watts loose.

G3IGW collected ET3LF, VQ3CF, VQ6LQ and ZS8L on CW, with 3A2BE on phone. G3GGS (Preston) found new ones in the shape of VK9RM, ZD2NWW, MP4QAL/B, CO, KA and, at last, W7 and VE8. OY2H was also rolled in, but DU7SV and ZC5CT persisted in getting away.

Unusually nice ones heard, or known to be active on the band, include this mouth-watering list: FK8AL, KX6NA, ZS8L, FB8BD, FD4BD, XW8AB, VQ8CB, FW8AB, C3WV, CR5NC, KAØIJ, KJ6BG, AC3SQ, YJ1DL and HC8GI. If you can find them, you can work them—if no one else gets them first! So all you have to do is (*a*) to find them, and (*b*) to be the first one to do so. Easy, isn't it?

Contest Results

While you are recovering from the effects of the 1955 Worldwide DX Contest, you may care to study the results of the 1954 effort, so far as U.K. stations were concerned. With good conditions and increased activity, it may well be that the results will take *two* years to work out in future, instead of only one! (*See table below.*)

In the CW, *Multi*-Operator Section, G2BVN headed the All-Band. 3.5, 7 and 21 mc categories, with G2BOZ leading the 14 mc entry. These were the only stations from the U.K. to appear in either CW or Phone (Multi-Operator) sections of the Contest. The Worldwide winner of the CW (Single Operator) event was, once again, 4X4BX with the almost

CW, Single Operator:

ALL BANDS

G6PD	140,220	GI3IVJ	14,973
G4CP	101,592	GM3DPK	52,500
G3FXB	80,358	GW3HJR	47,768

1.8 mc

G2AJB	4	GW3HJR	4

3.5 mc

G3HWF	6,045	GI3IVJ	396
G6PD	4,662	GM3DPK	1,334
G3FXB	2,108	GW3HJR	931

7 mc

G2LU	12,012	GI3IVJ	943
G8KP	9,246	GM3DPK	3,944
G4CP	6,837	GW3HJR	3,040

14 mc

G2LB	70,200	GI3IVJ	798
G6PD	25,536	GM3DPK	12,815
G4CP	18,260	GW3HJR	11,250

21 mc

G2BW	9,352	GI3IVJ	756
G3DCU	8,360	GM3DPK	169
G6PD	4,600	GW3HJR	504

Phone, Single Operator:

ALL BANDS

G3AWZ	117,900	GI3IVJ	1,322
G3HSN	60,952	GM2DBX	8,772
G3FXB	34,220		

3.5 mc

G3AWZ	2,520	GI3IVJ	3
G3HSN	2,436	GM2DBX	168
G3FXB	345		

7 mc

G3HSN	608	GI3IVJ	12
G3AWZ	600	GM2DBX	135
G3FXB	592		

14 mc

G3HSN	18,720	GI3IVJ	357
G3FXB	6,936	GM2DZB	31,955
G3AFM	4,107	GW3FPH	1,752

21 mc

G3FXB	3,366	GI3IVJ	121
G3HSN	1,170	GM2DBX	352
G3DOG	1,128		

28 mc

G3AWZ	10		

incredible score of 597,065, closely chased by 4X4RE with 497,896. Highest score in the U.S.A. was turned in by W4KFC with 308,812.

Other high scores throughout the world were DL1AU (310,128), FA8DA (177,828), OE5JK (173,336), OQ5GU (151,900), OK1MB (268,191), KH6IJ (178,932), VQ4RF (157,312), PAØUN (140,748), ZL1BY (172,312), EA9AP (138,575). Others around or above the 125,000 mark were OZ7BG, KP4JE, YO3RF, YV5AB and KV4AA.

We quote these scores so that you can decide where you would like to go and live!

Trans-Atlantic Tests, 1955-56

As previously stated, there are no fixed dates or times for this year's Top Band tests, which will be running every Sunday morning from December to March.

Frequencies are important: American stations will be listening for Europeans between 1830 and 1870 kc. **DO NOT** ever call them in their own bands, which are as follows:

Tex., Okla., Kansas, Minn., Iowa, Ark., La. and East, including KP4 and KV4	1800-1825 kc 1875-1900 kc
N. Dak., S. Dak., Neb. Colo., N. Mex. and West, including KH6	1900-1925 kc 1975-2000 kc

This gives U.K. (and Europe) the 1825-1875 kc area for our operations (1830-1870 for safety), and it is in this section of the band, exclusively, that the DX will be listening for us.

Peak times for activity will be 0500-0800 GMT. Results should be reported monthly, in time for the dead-line as stated at the end of this feature each month. Do not send weekly logs unless it is more convenient to do so.

DX Gossip

The following items of scandal come from a widespread network of spies and informers, including in particular the North and South Calif. DX Clubs, the West Gulf DX Club and KV4AA's extensive grape-vine. They have mostly been verified by our own readers or by stray remarks and occurrences heard over the air.

Apparently anyone in Trucial Oman from now on will operate with an MP4T... call-sign. MP4TAA has been heard—said to be in Sharjah . . . ACØAA now said to be in Manchuria, of all places . . . Various reports to hand that VS2DQ (now in England) plans operation from ZC3 (Christmas Island). Funny, but he was right here in our shack not more than an hour ago, and *his* version was somewhat different!

If you hear a VEØ calling or being called, don't be fright . . . VEØN is allocated to amateur stations on Canadian naval vessels, and VEØM for similar use on merchant ships . . . The Kermadec Islands, roughly 600 miles north of ZL, have been awarded the status of a "separate country" by the Powers-That-Grant-These-Things. It doesn't need deep thought to arrive at the conclusion that some enterprising and adventurous ZL's will soon be planning a DX-pedition there. In fact, we read already that ZL2GX and a ZL1 hope to be going as soon as January 1956.

For those still short of Togoland, it is said that FD4BD is usually on 14025 kc or thereabouts between 2100 and 2300 GMT — *and* he QSL's . . . VP2VB/P (the *Yasme*) is expected to arrive in the vicinity of FO8-land somewhere around December 1st. Right now there is a possibility of FB8BR showing up on the Comoro Islands . . . One report says that YA1AM is genuinely in Afghanistan, while another states definitely that there is no such station; take your choice . . . A phenomenal number of USSR stations are being worked by W's, who seem to have evolved a technique for extracting an RST on the sly, leaving the other man able to pretend that he doesn't know who he worked! Even UH8, UI8 and UN1 have been wheedled in this way.

XW8AB in Laos says he will stay active for as long as he can stand the terrible climate and the primitive conditions; says other hams have no idea whatever of the difficulties of keeping a station on the air out there.

AR1EW says his QTH is Box 351, Damascus, Syria . . . FW8AB reported to be audible on rare occasions, around 14020 kc, chirpy CW. Another report says he operates only between 0430 and 0530 GMT, which may explain the "rare occasions" . . . ZS9BD is described as the only ZS9 now active, and he is on Twenty phone exclusively . . . FB8XX (Kerguelen) has been working W6's, but doesn't seem to have made himself felt elsewhere.

VQ8CB is usually to be found on 14072, -085 or -100 on Saturday afternoons, 1500-1600 GMT . . . KJ6FAB (14065) is a new one from Johnston Island . . . EAØAB has shown up again (14050 kc), but only running 10 watts. This might be an advantage to Europeans who want to work him.

HKØAI (San Andres Island) had his licence cancelled by the Ministry of Communication in Bagota; he was the only HKØ . . . CR10AN is not good,

21 mc MARATHON

(Starting July 1, 1952)

STATION	COUNTRIES
GW3AHN	133
VQ4RF	126
VQ4RF (Phone)	125
G5BZ	120
G4ZU	115
G4ZU (Phone)	110
DL7AA	109
G3HCU (Phone)	107
GW3AHN (Phone)	106
G3FXB	101
G3FPQ	100
G3TR (Phone)	98
G3DO	97
G6QB	95
G2YS	84
G2BJY	83
ZS2AT	80
G2VD	80
GM2DBX	78
GM2DBX (Phone)	73
G3CMH	71
ZB1KQ	64
5A2CA (Phone)	60

but there are rumours that a genuine CR10 is opening up on Timor some time . . . AC3SQ and AC5PT still run a weekly sked. Sundays on 14110 kc, 1400 GMT. AC3SQ has also been heard on 14170 kc, 1145 GMT . . . Thailand is now on the list again, and W's are allowed to work HS stations—if they can find any.

3A2BH has been very active from Monaco during October, on 7, 14 and 21 mc if not other bands . . . There has been no activity from Andorra since PX1EX packed up, though PX1YR is there and genuine—*see* story p.479 on PX1EX.

Log-Keeping

High-pressure contest operators often find the going too fast for the log-keeping to be easy, but that is often because they don't go about it the right way. G3JAM (Woodford Green) has made a "time and motion study" of the process, and comes up with a very sensible suggestion. As he says, if you call CQ, the first thing you are in a position to log is the RST of the station calling you. To this you can probably add the serial number; then his call-sign comes along; next you can add the incoming report and serial number, and finally, jot down the time.

This is not the conventional order of columns in a log, but certainly is the common-sense one for quick and snappy contest operating.

If you are in for the thing in a big way, you can use a small tear-out duplicate book for the job, whipping off the top copies and sticking them on the shack wall, using self-adhesive tags put there beforehand for the purpose. The exact state of the score will be confronting you and the calls of stations already worked will stare you in the face. Any further ideas on this subject?

Miscellany

SWL D. L. Waggott writes from Melbourne with a long and interesting list of calls-heard on Twenty phone, including such nice ones (for *us*) as FK8AC, VK1ZM, 1DC and 9RH, VR2BZ and the like. He tells us that ZL3RB has been heard commenting on having worked W's on 28 mc. apart from his G contacts on 1.8 mc, at the other end of the scale!

GW3INV is at Wrexham, Denbs., and has an S.640 as main receiver; the transmitter, lower right behind him, is on 80 metres, above which is its modulator, complete with oscilloscope. The aerial tuning panel is on top of the modulator and other equipment visible is for two metres. On Eighty, GW3INV uses an indoor 66-foot aerial.

The former GM3JZK is now G3JZK at Cambridge, where he has no room for Top Band activity, his aerial being a picture-rail affair with one end draped out of the window, commanding a fine view of all the ignition QRM outside; he deserves a better fate, and we hope to hear of something more in the clear.

Among the very few mentions of *Eighty*, we have a note from G3IGW saying that he has worked OY7ML and VE1ZZ on CW up there. G3FPQ has also been airing it, and has worked KP4KD, W's and VE's. To him also falls the distinction of being the only correspondent to mention *Forty* this month! On that band he has worked EA9AP, KP4JE, KZ5MN and some PY's.

G2NS (Southbourne) tells us that if anyone wants Delaware for his WAS, W3VTT of Wilmington, Del., will be pleased to arrange skeds on 7, 14 or 21 mc He runs 250 watts to a long wire.

It Could Happen Here?

In *The DX'er* (Northern Calif. DX Club) we read of a band of local residents filing a permanent injunction to prevent W6YMD erecting a telephone pole and rotary beam, despite permits from the Los Angeles Building and Safety Dept. All sorts of issues are mentioned—abating a nuisance, property devaluation, *prevention* of TVI, violation of deed restrictions allegedly prohibiting structures of this type . . . the Lot! An extensive appeal for financial help for W6YMD is being made, the feeling being that if he doesn't fight this case and win it, there may be lots of trouble in store for the California beamsters.

That's the ration for this month, and we are looking forward to another lively one, with even more activity, more DX and more news to report. So don't hide your light under a bushel, but send news of your doings to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, by **first post on Friday, November 18.** For the following month the deadline will be *Wednesday, December 14*—will all interested please note because it falls very soon after our December publication date. We must be early because of the Christmas mail pressure.

Until next month, then, we wish you even Better Hunting, More DX, 73 and BCNU.

MEETING OF THE MOBILES

OXFORD —
SUNDAY, OCTOBER 9, 1955

The first Mobile Rally to be held in this country took place near Oxford on the mild, sunny afternoon of Sunday, October 9 — the *venue* being the "Perch Inn," Binsey, a pleasant spot on the Thames just to the west of the city.

Various suggestions about holding such a rally have been put forward in the past, but it was due to the initiative of the Oxford & District Amateur Radio Society that something was actually done about organising one. Arrangements were in the hands of G3GJX, who is himself a keen /M operator, with the assistance of G3GCS (hon. secretary, O.D.A.R.S.), G3HYZ and G8PX.

The number of cars checked in fitted for mobile was no less than 23, many of them from considerable distances—the Midlands, East Anglia, Southern England and the West Country. Bands covered were 160, 80 and 2 metres, with the majority on Top Band.

Some Equipment Notes

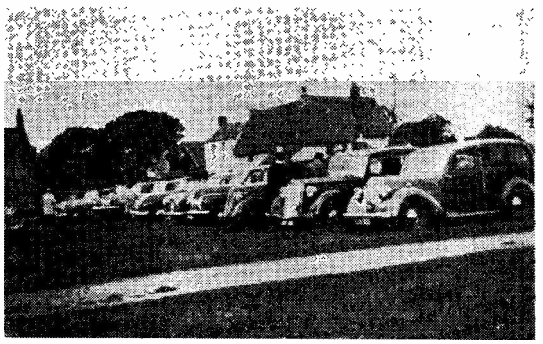
It is, in fact, remarkable how centre-loaded whips about 8 feet long can be made to radiate well on 160 metres, and what ranges can be worked with a few watts input—under daylight conditions, 30 miles or so is usual, and distances of 60 miles and more are not uncommon. After dark, DX QRM and the high noise level on 1.8 mc make things more difficult, and it is a peculiarity of /M working on the Top Band that better results are obtained in daylight. The popular installation for One-Sixty is the N.Z. ZC1 Mk. II equipment, which can be pressed into service without a great deal of modification.

At the Rally, there were a number of other well-designed and fitted installations reflecting the ingenuity of their owners, and using (for the LF bands) anything from a QV04-7 to an 807 as PA, with modified MCR-1 or BC-454 as receiver. Power was usually from a genemotor run from the car battery.

The two-metre installations of G2HCG/M, G3XC/M, G5KW/M and G6AG/M were of particular interest. It would probably be agreed that in a mobile *concours d'elegance*, G2HCG in his magnificent Jaguar, with well-engineered equipment and a smart dipole fitting, would take the prize. But G6AG's gear is equally good and beautifully fitted below the instrument panel in his Consul. In both cases, receiver and transmitter are combined in one small box, and there can be very few commercial equipments that bear comparison with either of these designs in terms of size with efficiency.

For effectiveness on One-Sixty, G5CP/M in a Vanguard is probably outstanding on that band—he is on regularly, and has made a great many mobile contacts, some of them at GDX ranges. The American representative was W3WAM, who showed one of the latest kit sets for building up a mobile band-switched transmitter, together with a number of items of American manufacture specially designed for amateur mobile operation. G5CV/M is on 80 metres and also has a portable all-transistor 80m. transmitter, with its own rod aerial, which can be carried about easily and used for talking back to the car.

Rendezvous on the Bicester-Oxford road. G4FO/M, G3IUF/M and G3WW/M. Also in the photograph are G3BK and G3GGJ.



Some of the cars, all /M equipped, at the Oxford Mobile Rally on Sunday, October 9. The final muster was 23 cars, bands operated being 160, 80 and 2 metres.

While most of the /M cars were fitted with plain or loaded whips, either centre or base, for LF band operation, the VHF clan showed more variation—from the 4-element Yagi waving about on the roof of G5KW/M's Austin Countryman to the transportable beam used by G6AG when operating from a "fixed" site; this is specially designed for quick erection, with snap fittings on the boom for the elements, and a portable mast assembly consisting of tube sections long enough just to fit in the boot; when running, however, a horizontal dipole is used, mounted on the near side of the car.

During the early part of the afternoon, G3HYZ, in his motor cruiser on the river, was actually /MM on the 160-metre band; later he was able to moor up near the "Perch" and come ashore to join the Rally.

Talking Them In

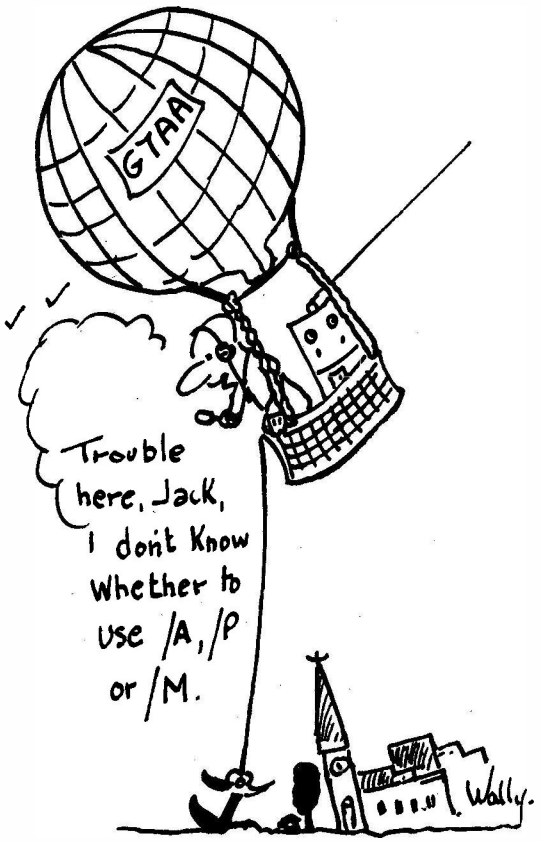
It not being easy to find the site for the Rally, it was arranged that a talking-in station should be early on the air—the meeting being set for 2.30 p.m.

Well known Old Timer G5CP of Chesterfield, Derbyshire, has a Vanguard fitted with /M gear for the Top Band. The loading coil for the aerial can be clearly seen. G5CP/M was a very good signal on the run to Oxford for the Rally.

G3GJX/M on Top Band started working approaching mobiles before 2.0 p.m. and got them turned into the long lane leading down to the rally ground; without this assistance, it would have been very difficult for some of the visitors who did not know the district to find it. Similarly, G8PX took care of the two-metre stations.

Later in the afternoon, while G6AG/M on two metres was working G2ATK in Birmingham from the ground, G2HCG/M came up and asked for direction. After some difficulty, he was located and brought in with the aid of a map, by G6FO on G6AG/M—but

G5CV is an exponent of /M working on 80 metres; the loading coil on his whip can be seen over his right shoulder. G5CV also has an all-transistor portable transmitter on 3.5 mc, which he was demonstrating when this was taken.



Nobody actually turned up like this at the Oxford Rally.

not before G2HCG had been "round the houses" a bit!

Tea had been arranged at the "Perch," after which the raffle was drawn and G8PX showed some of his extremely well-constructed VHF equipment. By 6.0 p.m. most of the drivers with long journeys to do had left—with pleasant memories of a most interesting afternoon and a Good Do. A few of the local stalwarts remained "on duty" until the bar opened at 7.0 p.m.

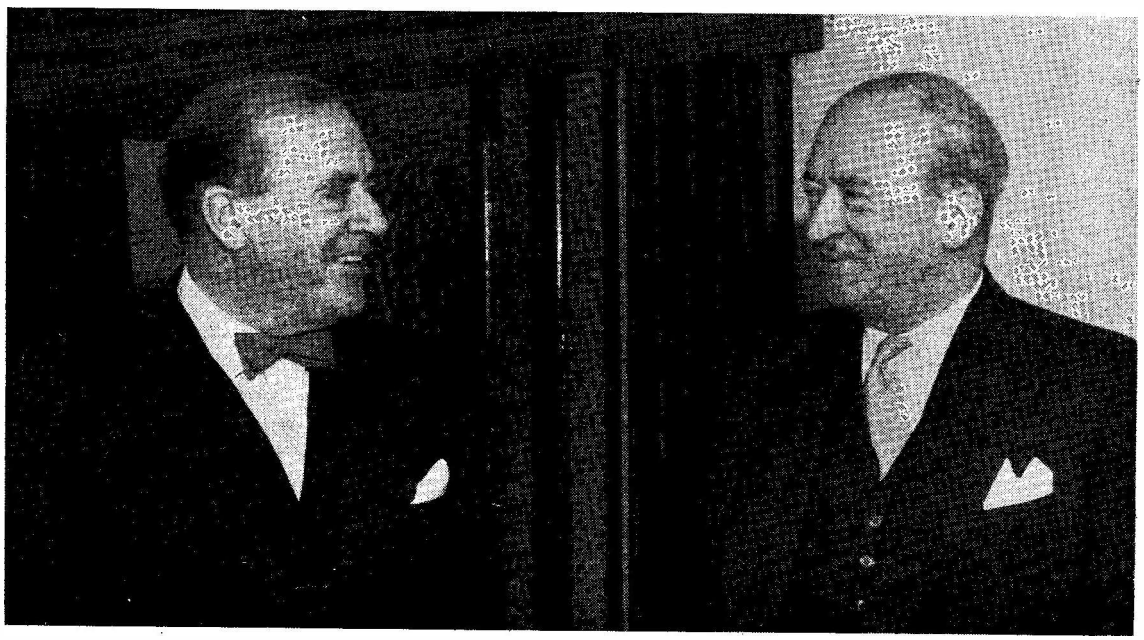
Mobiles Present

There can be no question that this enterprising effort was a great success, and these brief notes cannot do justice to all there was to see nor to everyone present. The actual mobiles, *i.e.*, those with fitted cars, checked in were: G2HCG, G2LW, G2VB, G2YV, G3FWZ, G3FZB, G3FZL, G3GJX (*organiser*), G3HCK, G3HYZ ("MM"), G3IIR, G3IPR, G3ISZ, G3IUF, G3IVP, G3WW, G3XC, G4IB, G4FO, G5CP, G5CV, G5KW, G6AG and W3WAM.

Each of these brought several passengers—either family, friends or second operators—and there were some non-mobile visitors, so that the number of call-signs present came to nearly 50 and the total atten-

dance to about 75. Naturally, with hardly half this number expected a week beforehand, the tea organisation at the "Perch" was strained rather severely—nevertheless, everybody got a good cup and something to eat, so there were no complaints on that score.

Finally, your correspondent may hint that, inspired by the Oxford effort, the Northampton Club has something in mind for the early Spring, on the same lines.



PIONEERS OF EARLY BROADCASTING

The accompanying photograph, taken only a few weeks ago, is of particular interest because it depicts two of those who can truly claim to have been pioneers in the early days of broadcasting. On the left is Capt. P. P. Eckersley, sometime chief engineer of the BBC and the first holder of that appointment, and on the right is Mr. H. de A. Donisthorpe, now a senior executive of the General Electric Company, Ltd. "P.P.E." will be well remembered by many Old Timers as the presiding, and irrepressible, genius of 2MT, Writtle, the first regular public broadcasting station in this country; he was at once chief engineer, announcer and programme organiser.

Mr. Donisthorpe, who at one time held the pre-1914 amateur call DKX, was in the Royal Engineers during the 1914-18 war and in 1917 started a local "broadcasting" service for the troops in the Worcester training area! This could probably be claimed as the very first broadcasting station in the world, though its audience was restricted to those who had R.E. signals equipment and its range was no more than a few miles. However that may be, it was undoubtedly the forerunner of what came to be known during Hitler's war as the "Forces Networks." Mr. Donisthorpe is still as active as ever in the world of radio and is one of the best-known personalities in the industry. He has held many important appointments in its councils, and just now is vice-president of the Radio Industries Club, on the council of the Electrical Industries Benevolent Association and a member of the committee of the Electrical Industries Club.

"UHF ANTENNAS, CONVERTERS & TUNERS"

This is the title of an American publication which, while not being specifically amateur in scope, will yet be of value to all who are interested in UHF/VHF receiving techniques. The book deals with the problems encountered in American TV and VHF reception. There are some useful constructional designs, and quite full details of a number of American commercial UHF/VHF receivers and converters. The price of *UHF Antennas, Converters and Tuners*, which is a Sams "Photofact" publication of 130 pages, is 12s. 3d. post free, and it can be obtained from our Publications Dept., from stock.

BBC ENGINEERING APPOINTMENT

The BBC announces the appointment of Mr. W. A. Roberts, A.M.I.E.E., as Regional Engineer, Midland Region, in succession to Mr. J. A. Cooper, B.Sc., A.M.I.E.E., who is retiring from full-time duty after 32 years' service with the Corporation.

STORY of PX1EX, ANDORRA

"A raid by French amateurs on Andorra" is the title of an interesting story in the October issue of *Radio-REF*, telling of the activities of PX1EX earlier this year. The operators were F3IB, F3TJ, F8EO, F8EX and F9UK; the first CQ went out at 1925 GMT on August 7, and thereafter a total of about 650 contacts was made on 3.5, 7 and 14 mc until the close-down at 1600 GMT on August 13. Two metres was tried, but no VHF contact was possible—indeed, nothing was heard, as conditions were very poor at the time, besides which the site was somewhat screened for VHF; moreover, operation of the VHF equipment held up activity on the more "profitable" communication bands. In the six days' working, under mediocre conditions generally, 60 countries were worked in six continents, the totals being 358 Europeans and 282 stations classified as DX, of which 220 were in W/VE, worked mainly on 14 mc.

PX1EX suffered the difficulty experienced by all wanted DX stations—that of severe QRM caused by the press of stations wishing to make contact; in fact, for this reason a number of QSO's could not be logged with certainty. The best conditions were experienced during the night of August 12-13, when W and VE stations were being worked at the rate of 40-45 an hour, on Twenty.

In order to get PX1EX on the air at all, and because on this occasion it was desired to have everything "parfaitement régulier et officiel," it was necessary to get the permission and the co-operation of the French diplomatic representative, the prefect of the region bordering on Andorra, the Customs, and the security authorities. The business of getting the right permits was, in fact, quite a formidable one. As the station was actually a tented camp, power supply was from batteries charged by a petrol-electric set, and a considerable amount of equipment and gear had to be transported to make the venture possible.

F8EX, who contributes the article on PX1EX to *Radio-REF*, says that the success of the station was due to the fact that all five operators pulled their full weight, taking turn and turn on watch, and it was always the object of each to give as many contacts as he could. Additionally, each member of the expedition had a specific administrative task. For instance, F8EX made all the arrangements with the officials concerned; F8EO provided the receivers; F9UK was responsible for the transmitters; and F3IB for the installation of the station, assisted by F3TJ, who also undertook the heavy responsibility of handling the QSL's.

We are sure that readers would wish to join us in congratulating the PX1EX party on the success of their enterprise, conducted throughout in the best traditions of Amateur Radio. For the record, here is a note of the periods of authenticated amateur operation from Andorra: June 23-27, 1951—7B4QF; July 3-23, 1951—PX1A (with Spanish operators): August 26-29, 1951—PX1AA (operated by DL4IA); February, 1952—PX1YR officially licensed and the only genuine amateur station permanently in Andorra; August 7-13—PX1EX, operated by the French team already named, and officially licensed for the expedition.

OBITUARY

We very much regret to have to record the death of Reginald Bowers, G3CXD, of Newcastle, Staffs., who was killed in a motor accident on Chester High Road on August 24 last. He had spent 30 years in the service of the Post Office Engineering Dept., and at his untimely death, at the age of 50, he was Assistant Engineer, Stoke-on-Trent. G3CXD was licensed in 1947 and was associated in Amateur Radio with the late G2VG, also of Stoke-on-Trent. G3CXD will be remembered as a keen VHF operator. He leaves a widow and two daughters, to whom we offer our sincere sympathy.

If you are having any difficulty in obtaining SHORT WAVE MAGAZINE regularly and on time, please read the note on p.462 of this issue.

ARRL's "MOBILE MANUAL"

This is a new publication of over 300 pages, covering receivers, transmitters, aerial systems and power supply units for operating mobile—pronounced "*mo*bill" in American, "mo*byle*" in English, and "mo*beel*" in some countries.

The *Mobile Manual for Radio Amateurs* is the latest in the long list of good books issued by the American Radio Relay League. It is therefore unimpeachable technically and is, of course, written from the strictly amateur view-point. Actually, the articles consist mainly of reprints from *QST* on the subject of mobile operation, and the field is well covered.

There are descriptions of converters for the HF bands designed to work into a BC car-radio receiver; two-metre mobile converters and receivers; articles on noise limitation and circuitry, including a note on the problem of tyre and wheel static (it is established that a lot of noise comes from *front* wheels because the grease in their bearings acts as a partial insulator); power supply units, modulators and mobile transmitters for all amateur bands.

In the aerial section there are tables for the dimensions of whip aerials and winding data for loading coils, a discussion on capacity hats, and methods of mounting various types of mobile aerial—in fact, some 60 pages are devoted to aerials for mobile operation, covering design, construction and installation. Control systems and cabling are also dealt with, and there is a useful article on vibrator power supplies.

The ARRL *Mobile Manual* is produced in standard *QST* style and format, and is now available (from stock), price 21s. 6d. post free, of the Publications Department, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

Battery Transmitter on 70 Centimetres

INTERESTING EXPERIMENTAL CIRCUIT

THE circuit shown here is of experimental interest because it uses sub-miniature *battery* valves and produces measurable RF output on the 70 cm band. Developed by the Industrial Technical Services Dept. of Mullard, Ltd., it was shown in built-up form, and working, on their stand at the S.B.A.C. Show at Farnborough in September.

From the radio amateur point of view, it could obviously form the basis of a design for the transmitter section of a 70 cm transceiver or local-talking link. Mullards emphasise that, so far as they are concerned, the object was to evolve a circuit and ascertain operating conditions to serve as a guide for the finalised design of a 470 mc transmitter unit.

Valve Sequence

A DL70 as an ECO/doubler produces output at 26·1 mc, the tank in the anode being tuned to the second harmonic from the oscillator side on 13·05 mc, for which the screen of the DL70 is used as anode. Because of the shielding effect of the earthed beam-plates of the DL70, coupling between input and output circuits is mainly by the electron stream; slug tuned coils are used.

In the next stage, another DL70 functions as a frequency tripler to 78·3 mc, the tank being a coil wound on a P.T.F.E. former tuned by a 3-20 $\mu\mu$F miniature air-spaced condenser.

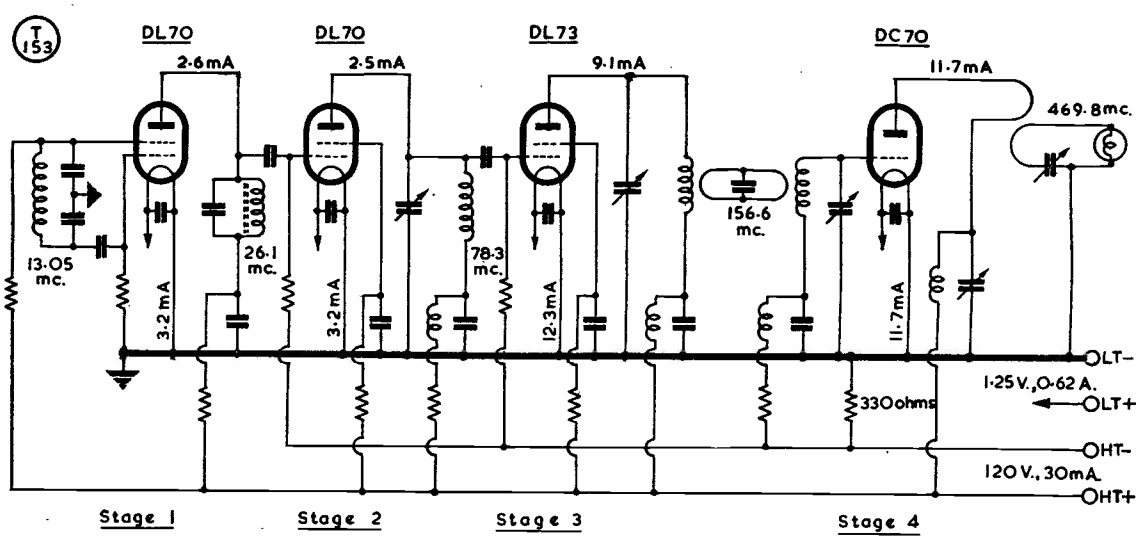
The third stage is a DL73, this operating as a frequency doubler to 156·6 mc, with tank circuit construction similar to that in the second stage. For output at 470 mc, a DC70 in the fourth stage triples again; the method of coupling for this stage shown in the circuit diagram was found to be better than any form of capacity coupling. The 470 mc tank circuit consists of a copper strip series-tuned by a 2-8 $\mu\mu$F air-spaced trimmer.

Voltages used and currents measured in each part of the circuit are as shown in the diagram. It will be noted that a resistor of 330 ohms is connected to give about −10 v. of protective bias on the grids of the last three valves. The HT actually appearing at the anodes is: Stage 1, 71v.; Stage 2, 93v.; and Stages 3 and 4, 110v.

As mentioned in the first paragraph, the circuit as shown here was built up as a *working* model. When switched on, a glow duly appeared in a miniature bulb indicator fitted near the output tank.

These notes are reproduced, with acknowledgments to Mullard, Ltd., because the practical ideas put forward by this design will be of interest to all VHF operators, many of whom have not yet approached the problem of true miniaturisation on 430 mc nor investigated the possibilities of battery transceivers on our 70 cm band.

A.J.D.



Essential circuit of the Mullard experimental 70-centimetre transmitter, using sub-miniature battery valves throughout. A working model of this transmitter was demonstrated on the Mullard stand in the exhibition section at the recent S.B.A.C. air display at Farnborough. In a finalised version, Stage 1 would be a CO, and probably a DL70 could be made to combine Stages 1 and 2.

VHF BANDS

A. J. DEVON

Spells of Good Conditions—

Activity and Results—

The Tables and Station Reports—

Announcing: The U.K. Two-Band *and the* All-European VHF Contests, 1956—

SINCE our last appearance, conditions have varied somewhat as the weather, without any particularly bright spells—though most reports mention good GDX working during September 18-20, on September 29 and over the week-end October 8-9. It has been noticeable how the changes from cold to milder weather and back again—at least three times during the period—have affected conditions.

In previous years, the importance of regular schedule activity during the winter months has been stressed. One takes leave to make the same point again. Of course, there is a lot of established local activity on VHF irrespective of the weather, and quite a number of useful schedules are maintained. Any evening round about 1900, G2HCG (Northampton) can be heard working G3FAN (Ryde, I. of Wight), and not many evenings pass when, later on, G6NB cannot be found putting out "CQ 2" on the auto CW sender—and very often raising a Frenchman or a PA.

It will be noticed from this month's report that several correspondents admit to regular activity and ask for contacts during particular periods. Nearly all those who write in this time have something to say about activity—either that it is better, low, getting worse, or affected by CTV. It rather depends in what part of the country the operator concerned lives! But from where your A.J.D. sits to listen and write this piece, it certainly looks as if the main centre of VHF activity has moved from the London area into the North-West; this is in terms of operations over the air. For all we know, there is a lot of back-room work going on down south, perhaps on 25 centimetres. If so, we hope in due course to hear about it!

Activity Report and Tables

The calls-heard/worked section appears again this month, and we start the new Annual Counties Table with an encouraging entry; in regard to this latter, an apology is due to three or four correspondents whose entries (intended for last month's Table) were inadvertently taken up with the detritus of the October "VHF Bands." In other words, instead of being filed as stated, they were accidentally, well—ditched, in the tidying-up process after getting the October issue to press. One can only ask indulgence for something which has never happened before, and hope that those concerned will be good enough to put their entries in again. (*Another week's leave stopped.—Ed.*)

In spite of the much reduced level of GDX activity, a fair number of movements are recorded in all the Tables. We hope that more of the newer stations on the two-metre band will enter Annual Counties, and keep us informed of progress month by month. Several of those in the Table this time have undertaken to do so. No QSL cards are required—these are wanted only for VHFCC claims—and until the totals are much greater than they have been in previous years, there should be no doubt or difficulty about counties.

This month, three correspondents ask us for an authentic county list, and two others raise once again the question of the status of cities and large towns ranking as "counties" for local government purposes. The answer is as before: In the interests of all concerned, we recognise only geographical counties, as listed in any standard work of reference, *e.g.*, *Whitaker's Almanack*, which guides your A.J.D. in these matters. While we could of course print a list of U.K. counties, we suggest that for the moment there are enough to work on without it being really necessary, *i.e.*, until several operators show totals of more than 75 or so. Colleague L.H.T. is also interested in this, because he has needle-matches going on at the upper end of his Top Band counties ladder, where totals of 90 and more are shown by several stations.

G/GI "First"

At last, this can be wrapped up and put in the record. G3BW (Whitehaven, Cumb.) has been good enough to give us what he calls the "real truth." It is that GI2HML (not 'FHN) worked G3DA for the G/GI first contact, on June 29, 1949.

G3BW also makes a number of other points—he would like to see SHORT WAVE MAGAZINE back in the VHF contest-organising business (others also have raised this point, and see later); the way G3BW puts is "Let's get away from the barometer tapping, and all be on for a contest without worrying about conditions." He would also like schedules with stations in Suffolk (G3IEX?) and Cornwall (we know that G2BAT and G3AGA down there are pretty regular performers) and he would likewise be glad to hear from any Continentals who may have received his signals—he has yet to hear one himself. It is a curious fact that G3BW, who has such a good VHF operating record, has never been able to get out of the U.K. He puts this down to the immediate screening effect of Scawfell Pike, which must have, for him, a considerable scattering effect. GW counties wanted by G3BW are Carms., Glam., Pembs. and Mon.; his frequency is 144.252 mc, and from now on G3BW (who has been somewhat inactive due to extensive rebuilding) will be on *every* evening late, and during TV if conditions warrant it.

[over

Next comment is from another northerner, G2OI (Eccles) who has had to be more or less out of it for the last 18 months because "the surgeons were indulging in cutting-up orgies." Happily, he is now back on the air, and puts in claims to bring him up to date in the Tables; also, he asks us to mention that he makes a 70-cm test *every* evening, 2300-2330, with the beam south, and calling on a frequency of 433.194 mc. G3GPT (nr. Preston) claims for the new Annual Counties Table, and mentions EI9C (Dublin) worked as a newcomer to the two-metre band. PE1PL is still able to hear G3GPT daily at noon, which is a remarkable tribute to both stations, and G3GPT thinks that PE1PL may also have heard G3BW on one occasion. As is, of course, well known, PE1PL is a "commercial amateur" station, a factor in the Philips research organisation at Eindhoven, and not only has a high-gain multi-element beam, but also uses exceptionally high power. PE1PL can be found on 144.00 mc during normal working hours from Monday to Friday and on Saturday mornings. The station has kept, or is keeping, day-time schedules with several G's and has given many others a Continental contact—and PE1PL always QSL's.

G3JWQ (Ripley, Derbys.) reports as a newcomer, having started on two metres as recently as September 14; his contacts so far already qualify him for 22C in the Annual. He uses the new G6UH-type converter as described in the May-June issues of SHORT WAVE MAGAZINE, into either an HRO or HQ-120; his transmitter is an ex-RAF T.1143 with about 8w. in the TT11 PA, and the beam is a 6-ele flat-top. Though intending to carry on with this transmitter for the time being, G3JWQ has in mind the addition of an 829 PA stage. G3DKF (Coventry) is now spreading his signals around with a new "6-over-6 Slot," and is getting encouraging results. G8VN (Rugby) sends his usual interesting report, and is one of those who says the level of activity "appears to be increasing, with several new calls heard regularly." But the G6TA/G8VN Sunday morning schedule has been failing lately, with nothing heard since September

TWO-METRE ACTIVITY REPORT

(Lists of stations heard and worked are requested for this section, set out in the form shown below, with callsigns in alphabetical and numerical order).

G2BRR, Wootton Bassett, Wilts.

WORKED: F9CQ, G2BAT, 2BVW, 3AYL, 3EES, 3FAN, 3FKO/P, 3HWJ, 3IRA, 3KHA, 3WS, 3XC/P, 3YZ/P, 4AP, 6JK/P, 6NB, 6ZP, 8DM, GC3EBK.

HEARD: G2AHP, 2AIW, 2FSM, 2FWW, 2GG, 2HIF/P, 2IT, 2XV, 3ABA/P, 3AOO, 3AUS, 3AZT, 3BJQ, 3CZS, 3DDI, 3DGI, 3DLU, 3ERD/P, 3FIH, 3GCA, 3GHB, 3GHO, 3GMM/P, 3GOP/P, 3GWB/P, 3GYQ, 3HFS, 3HIQ, 3HZF, 3IIT, 3ION/P, 3JJH, 3JR, 3JZN, 3KEB/A, 3KET (?), 3VI, 3XC, 3XC/M, 3YH, 4GR, 4HP, 5BM, 5HK, 5LN, 5LO, 5RD, 5TZ, 5YV, 6AG, 6CM, 6OX, 6TA, 6WF, 6XM, 6YP, 8AL, 8IL, 8NB, 8NM, 8PX, GD3UB, GW2ACW, 8UH. (*July* 15 *to October* 11).

G3IEX, Woodbridge, Suffolk.

WORKED: G2BDP, 2CZS, 2FJR, 2HCG, 2YB, 3ANB, 3BJQ, 3HSM, 3HWJ, 3IIT, 3IJB, 3INU, 3JGY, 3JNI, 3JR, 3JXN, 3VI, 4OT, 5BM, 6OU, PAØFB, PE1PL.

HEARD: EI2W, G2AOK, 2AHP, 2BVW, 3CKQ, 3DLU, 3DMU, 3DO, 3FAN, 3GPE, 3ION, 3JKT, 3JQN, 3KEQ, 4GR, 5AM, 5KW, 5YV, 6LI, 6LL, 6NB, 6VX, 8AL, 8LN, 8KW. (*September* 15 *to October* 13).

G3JWQ, Ripley, Derbys.

WORKED: G2BVW, 2CGY, 2CVD, 2FJR, 2FNW, 2HCG, 3APY, 3BJQ, 3CCH, 3CKQ, 3DGI, 3DKF, 3DMU, 3DO, 3DVK, 3EGE, 3EPW, 3FR, 3FUA, 3FUL, 3FUW, 3FQS, 3FTN, 3FW, 3GFW, 3GHU, 3GMN/P, 3GSO, 3GVF, 3HAZ, 3HWJ, 3IIT, 3IJB, 3IRA, 3IUD, 3IVF, 3IWJ, 3JXN, 3JZG, 3JZN, 3NT, 3WS, 4JJ/A, 5AU, 5CP, 5KW, 5LN, 5ML, 5VN/A, 5YV, 6AJ, 6CW, 6KK, 6NB, 6OU, 6PJ, 6XM, 8AL, 8MW, 8VN, GW3GWA. (*September* 14 *to October* 14).

SWL Farrance, Bristol, 4.

HEARD: G2ADZ, 2ATK, 2BRR, 2BVW, 3AUS, 3DLU, 3EPW, 3FAN, 3FIH, 3FKO/M, 3FMI, 3GMN/M, 3GNJ, 3GPT, 3HTY, 3IOO, 3IUD, 3IWJ, 3JZG, 3JZN, 3KHA, 3YH, 4GR, 5BM, 5JU, 5ML, 5YV, 6AG, 6OZ, 6XM, 6XX, 6ZP, 8BP, 8IL, GW8UH. (*September* 11 *to October* 11).

SWL Burman, Richmond, Surrey.

HEARD: G2AHP, 2AIW, 2HCG, 2HDY, 3DF, 3EYV, 3FQS, 3HWJ, 3IIT, 3IKW, 3IUL, 3JR, 3JXN, 3KEQ, 5DS, 5KW, 5LN, 6AG, 6OX, 6TA, 8AL, 8KW, 8PX, 8RW.

G8VN, Rugby, Warks.

WORKED: G2AIW, 2ATK, 2FNW, 3ARX, 3AZT, 3CKQ, 3DKF, 3EJO, 3GHU, 3GNJ, 3GPT, 3HXS, 3IOO, 3ITF, 3IUD, 3JWQ, 3JXN, 3JZG, 3JZN, 3KBI, 3KEQ, 3WS, 3YZ/P, 5AM, 5JU, 5ML, 6TA, 6XX, 8AL, 8UQ/P.

HEARD: G2AK, 2BVW, 2COP, 2CZS, 2DRA, 2DVD, 2FJR, 2HGR, 2NY, 2RD, 3ASC, 3BJQ, 3BW, 3CCH, 3DF, 3DO, 3DVK, 3EPW, 3FAN, 3FMO, 3FUW, 3GHO, 3GVF, 3HBE, 3HTY, 3HWJ, 3IRA, 3IVF, 3JZW, 3KEE, 4JJ/A, 4PS, 5BD, 5VN/A, 5YV, 6AG, 6OZ, 6RH, 6YU, 6XM, 6ZP, 8VZ, GW3GWA. (*September* 18 *to October* 15).

SWL Lee, Bridgend, Glam.

HEARD: G2ADZ, 2AIW, 2YB, 2DSP, 2DVD, 3AUS, 3CGE, 3DLU, 3FAN, 3FIH, 3GNJ, 3GOP, 3GPT, 3GVF, 3ITF, 3IWJ, 3JGJ, 3JZN, 3KEQ, 3KEY, 3KHA, 3YH, 4GR, 5BC, 5BM, 5ML, 6AG, 6NB, 6OZ, 6WF, 8AL, 8IL, GW3EJM, 5BI, 8SU, 8UH.

G8DA, Exeter, Devon.

WORKED: G2ADZ, 3FIH, 3KHA, 3MU, 5BM, GC2FZC, 3EBK.

HEARD: F9CQ, G2ABD, 2BAT, 2BMZ, 2DVD, 2FJR, 2HCG, 2HDZ, 2XV, 2YB, 3AUS, 3AVF, 3CGE, 3CLW, 3DLU, 3DO/P, 3FAN, 3FMO, 3GHO, 3GOP, 3GVF, 3HXS, 3ION, 3ITF, 3JGJ, 3KEQ, 3WS, 3XC, 4GR, 5KW, 5OB, 5QA, 5TZ, 5US, 6AG, 6NB, 6OZ, 6TA, 8AL, 8DM, 8IL, 8PX, 8VR, GW2ACW, 3EJM, 5BI, 8UH. (*August* 28 *to October* 11).

G3KHA, Bristol, 4.

WORKED: G2ADZ, 2AHP, 2BRR, 2DVD, 2RD, 2YB, 2YC, 3ANB, 3AUS, 3FIH, 3FQS, 3HWJ, 3ITF, 3KEQ, 3WS, 3WW, 3YH, 5BM, 6OZ, 8AL, 8DA, 8UQ/P (Wendover), GW5BI.

HEARD: G2AIW, 2BMZ, 2BVW, 2FJR, 2UJ, 2XV, 3BA, 3BNC, 3DGI, 3DLU, 3EES, 3EGV, 3FAN, 3FD, 3GNJ, 3GOP, 3GPT, 3GVF, 3HXS, 3IIT, 3IJB, 3IRA, 3IRS, 3ITW/A, 3XC, 4PS, 5BC, 5DS, 5KW, 5LN, 5RD, 5US, 5YV, 6AG, 6AG/M, 6NB, 6OX, 6RH, 6TA, 6XX, 8IL, 8JK (?), 8KW, 8PX, 8RW, GW2ACW, 8UH. (*September* 19 *to October* 15).

G3DKF, Coventry, Warks.

WORKED: G2ADZ, 2ATK, 2ATK/M, 2BVW, 2CVD, 2DSP, 2DVD, 2FJR, 2FNW, 2HCG, 2YB, 3AUS, 3AZT, 3BJQ, 3CKQ, 3COD, 3CUZ, 3DF, 3DGI, 3DMU, 3DO, 3DO/P, 3EJO, 3EGV/A, 3EPW, 3FUL, 3FUW, 3GHU, 3GMU/P, 3GNJ, 3GPT, 3GSO, 3GVF, 3HBE, 3HWE, 3HZK, 3IIT, 3IRA, 3IVF, 3JR, 3JWQ, 3JXN, 3JZN, 3WS, 5BD, 5LN, 5ML, 5ML/P, 5ML/M, 5YV, 6AG, 6OU, 6TA, 6XM, 6XX, 6YU, 6ZP, 8AL, 8IL, 8VN, 8VR, GW3GWA. (*September* 19 *to October* 13).

G3DO/P, Torquay, Devon.

WORKED: F9CQ, G2ADZ, 2BMZ, 2HCG, 3AUS, 3AVF, 3FQS, 3GAO, 3GHO, 3GOP, 3GOP/P (Dorchester), 3GPT, 3ION/P (Winchester), 3MU, 3XC/P (Plymouth), 5KW/P (Kent), 6AG, 6OU, 8DA, 8IL, 8MZ/M, GC2FZC, 3EBK, GW2ACW, 8SU. (*August* 23 *to September* 5).

G3DO/P, Nr. Chipping Norton, Oxfordshire.

WORKED: G2AHY, 3DKF, 3EJO, 3ENY, 3HAZ, 3IRA, 3JZG, 6SN, 6ZP. (*October* 2 *only*).

G3DO, Sutton Coldfield, Warwicks.

WORKED: G2AHY, 2DDD, 2DSP, 2DVD, 2FNW, 2RD, 3AUS, 3DGI, 3DJX, 3DKF, 3FUA, 3GFW, 3GHU, 3GSO, 3GVF, 3HAZ, 3HBE, 3HWJ, 3ITF, 3JGY, 3JWQ, 3KEQ, 3WS, 3WW, 4PS, 5LN, 5ML, 5US, 6AG, 6NB, 6SN, 6TA, 8IL. (*September* 6 *to October* 3).

G3ITF, Basingstoke, Hants.

WORKED: G2AHP, 2AIW, 2BVW, 2QY, 2YB, 2YC, 3ANB, 3AUS, 3BHJ/A, 3CBU, 3CKQ, 3DLU, 3DO, 3EGV, 3EJA, 3FIH, 3GJJ, 3GVF, 3IVF, 3JFR, 3JUG, 3KHA, 4PS, 4PS/M, 5HN, 5KW, 5TP, 6AG/M, 6AG, 6NB, 6OH, 6OU, 6VX/P, 8AL, 8IL, 8VN, 8VR, 8VR/P.

HEARD: G2ATK, 2BRR, 2DVD, 2FJR, 3EPW, 3HXS, 3IIT, 3IOO, 3WW, 5BM, 5JU, 5TZ, 6XM, 6XX, 8BP, 8DM, GW2ACW, 8UH. (*September* 1 *to October* 10).

SWL Drybrough, Coventry, Warks.

HEARD: G2CZS, 2DJM, 2DVD, 2FJR, 2NY, 2YB, 3ANB, 3ASR, 3BLP, 3DLU, 3EGI, 3EGV/A, 3EPW, 3FAN, 3FIH, 3FMI, 3GMN/P, 3GMX, 3GNJ, 3GPT, 3GVF, 3HWJ, 3HXS, 3IIT, 3IJB, 3IRA, 3IUD, 3IWJ, 3JZN, 3KEQ, 3WS, 3WW, 5BM, 5LN, 5YV, 6NB, 6OU, 6OX, 6TA, 6XM, 6XX, 8AL, 8IL, 8VR, GW5BI, 8UH. (*September* 18 *to October* 15).

SWL Cox, London, S.W.18.

HEARD: G2ABD, 2AHP, 2ATK, 2BVW, 2DVD, 2HCG, 2HDY, 2HDZ, 2RD, 2YB, 3BBR, 3CAS, 3DF, 3EYV, 3FAN, 3FD, 3FQS, 3GHI, 3GKF, 3GWE, 3HWJ, 3IAM, 3IKW, 3IPV, 3IUL, 3IVF, 3JR, 3JXN, 3KEQ, 3MI, 4CW, 4JR, 5DS, 5KW/M, 5LN, 5MF, 5YV, 6AG/M, 6JI, 6MB, 6OH, 6OX, 6TA, 6YP, 8RW, PAØFB, ØIKS.

G3JXN, London, N.6.

WORKED: F3LQ, G2AHP, 2AIW, 2ATD, 2ATK/M, 2BDP, 2BMS, 2FJR, 2UJ, 2WJ, 2YB, 3ANB, 3BFP/A, 3BRX, 3CLW, 3DKF, 3EOH, 3EPW, 3FAN, 3FIB, 3FPV, 3GNR/P, 3GWE, 3GXG, 3IEX, 3IIT, 3IKW, 3ITU, 3JDN, 3JR, 3JWQ, 3JZQ, 3WW, 5BC, 5BD, 5DS, 5KW, 5UM, 6JJ, 6LL, 6NB, 6WU, 6ZP, 8AL, 8PX, 8UQ, 8UQ/P, 8VN, PAØFB, PE1PL. *HEARD:* G2ATK, 2BVW, 2DSP, 2XV, 3ARX, 3AUS, 3BCB, 3DMU, 3DJX, 3FIH, 3FUL, 3GHO, 3GNJ, 3JEP, 3JNI, 3JZG, 3KBL, 4JJ/A, 4OT, 5YV, 8IL, 8TB, 8VR, GW8UH. ON4BZ, 4HN, 4TW. (*September* 19 *to October* 12).

25; under the best conditions they were S8/S6 to one another, with G8VN down to S2-3 under poor conditions; this was with the indoor beam, still in regular use at G8VN. He just won't be parted from it! Anyway, it has brought him in 23C for the new Table.

The SWL Clip

SWL Lee (Bridgend, Glam.) reports again, with a good calls-heard list; most of the northern stations were logged on October 11, with G3GPT the strongest signal. SWL Drybrough (Coventry) just catches the dead-line and says that with him September 19 and October 9 were the outstanding dates, when "GDX was as good as any this summer," though it is fair to explain that his later results are with an improved beam. For amusement, SWL Drybrough is working on a scheme for rating his results in terms of stations heard at different distances; this shows Sunday and Monday to be the best days for finding stations on the air, and Wednesday worst. His conclusions are arrived at by averaging results since mid-January, so may be regarded as quite a reliable guide to what is happening. It is also worth noting that on his analysis Tuesday is a better day than Saturday, for activity.

SWL Farrance (Bristol, 4) says he writes "just to let you know there is another listener on Two"—which he has been doing for 12 months or more—and sends a calls-heard list. He says he has quite forgotten the "ridiculous clatter on the HF bands"! Having passed his R.A.E. and by now (we hope) his Morse test, SWL Farrance should soon be with us on the two-metre air. SWL Burman (Richmond, Sy.) writes as a newcomer who hopes to get better results as he gains more experience, and is interesting himself in the construction of a G5RZ kettle for 25 cm. SWL Cox, who listens in London, S.W.18, makes a significant remark—to the effect that his impression is that everybody is either watching CTV or waiting for somebody else to call CQ! As we implied earlier, things *are* rather quiet round London these days!

More Station Reports

G3IEX has got well under way for Suffolk, and is at 15C in the Annual; he finds PE1PL a consistently strong signal and works him on lunch-time sessions; incidentally, for those who are wanting Suffolk, G3IEX is on either 144.78 or 145.27 mc. G3WS (Chelmsford) puts in claims and asks for a county check-list, and G3CKQ (Rugby) says there are now five active stations in that district, G3AZT and G5SV having joined the Rugby group. To hear, let alone work, a Rugby station, G3EGV had, says G3CKQ, to go /A at Dunchurch, just up the road! This reminds us of a theory advanced by G5AM not long ago: That the proximity of the vast aerial forest of Rugby Radio (GBR, and all his satellites right up the HF bands) might well have "an effect" on two-metre operation in the district. It well might. However, G3CKQ reports that he struck some evenings of very good conditions during the period, and scored with G2ADZ for his best GDX worked.

G3KHA (Bristol, 4) says he will be on every Sunday morning 0830-0900 on 145.512 mc, headed on London, which is his best direction. He hopes that even if the London stations don't want to QSO, they may find his signal useful as a check on conditions!

An old friend reappears in G2CIW, now of Cambridge, who for the last four years has been CN2AP, Tangier, with only locals worked on Two out there. He has a QQVO6-40 in the PA, a 6-ele Yagi, and modified cascode, 6BQ7A-12AT7, converter into an AR77, and is now building for 70 cm. But Jack says he hasn't as much time for it as he used to have. Anyway, we are glad to know he is home again under his old call.

Most Stations Worked

G5DS (Surbiton, Sy.) is now at the impressive total of 654 different stations worked on two metres—for the benefit of newcomers, let it be said that he has been on the band since it opened seven years ago, and has always been regular in his attendance!

G3IRA (Swindon) worked most of his 14 new counties on October 9, and had an outstanding contact later that evening—with GM2FHH (Aberdeen); the transmitter at G3IRA now runs 100w. to a pair of 8012's. G3DO (Sutton Coldfield) says he should have been shown at 32C in Annual Counties final placing last month—though he also says it does not matter, your A.J.D. deeply regrets this error. All we can say in mitigation is that the claims are always gone through most carefully, but it is easy to make a slip when dealing with the mass of detail involved in the preparation of this feature, and . . . (*all right, you've said enough.—Ed.*) G3HWJ (Surbiton, Sy.) gets his foot on the bottom rung of "Countries," and moves in the other Tables, too; he suggests that frequencies should be quoted more often, so that wanted stations can be located. We give them whenever mentioned by correspondents — but we know what he means, and perhaps during the winter season there may be time to get out lists of the more active stations in each county, with their frequencies. This is not a promise, however, as it is one of those simple looking jobs which would actually entail an enormous amount of work, besides the difficulty of getting reliable information.

G3JXN (London, N.6) suggests that CTV may be one reason for "The astounding drop in the level of activity"—if this is so, we cannot think why! However, G3JXN still keeps adding to his totals, and remarks that last year it took him 7 months to get 14C for the Annual, whereas this year it has only taken three weeks; he found GDX good during mid-October, working a number of new ones in difficult directions; on the 12th, when the Continentals were getting into the London area, he raised F3LQ and PAØFB, besides

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	G2OI (402), G3DMU
59	G2FJR (427), G3EHY, G4SA
58	G8OU
57	G8SB
56	G3WW, G5DS (654)
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	G3BJQ, G3BK, G8DA
43	G2AHP (500), G3BA, G3COJ, G3HWJ, G4RO, G5DF
42	G2DVD, G3BNC, G3DLU*, G3FIH, GM3EGW (146)
41	G2FQP, G3DO, G3HBW, G3WS (255), G6CI (184)
40	G2DD, G3CGQ, G8KL
39	G2IQ, G3GBO (434), G3VM, G8IL (325)
38	G2FCL (234), G3APY, G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, G3DVK (175), 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	G3CKQ (118), G3FRY, G3GOP (208), G3GVF (129), G3IRA, G5NF, GM3DIQ, GW8UH
29	G3AGS, G3AKU, 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, G3JXN (191), G5SK, G6PJ
24	G3FD, G3FXG, G3FXR
23	G3CWW (260), G3YH, G5PY
22	G3AGR (135), G3ASG (150), G3BPM, G3HIL, G3JHM (113), G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWJ, G6XY
20	G3EYV, G3HSD, G3IOE, GC2FZC
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G2BRR G3EGG
16	G2AHY, G3FRE
15	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

hearing ON4BZ and other ON's. G3JXN says that, after all, he finds the ability to work phone a definite advantage! All he can manage aloft is a 4-ele Yagi for, though his landlady is very tolerant, G3JXN is in digs. (Home QTH, Leicester, a county he has still to work, even when at home—G2BVW is alleged to QRT too early!). Finally, it is the opinion of G3JXN that to garner enough cards for VHFCC, it is necessary actually to work about 300 stations—so you know what he thinks about the QSL situation!

Extraordinary Happening

On the afternoon of October 9, Vernon was sitting quietly tuning round the band at G5MR (Hythe, Kent), when he suddenly heard GI3GXP at S5, with QSB. A call was fruitless, but a check by post confirmed that it was indeed GI3GXP who had been calling CQ at 1535 on the 9th. What makes this so remarkable is that no EI or GI (even EI2W when conditions have been really good) has ever before been received at G5MR; at the time GI3GXP was logged no other indentifiable station could be heard on the band; GI3GXP says that conditions were not particularly good at his end; and he only uses 10w. with a 5-ele Yagi.

Well, as we now know, October 9 *was* a good day over most of the country but even at that, the reception at G5MR of a station over 360 miles away in his very worst direction does seem extraordinary. Vernon says "Any theories, pse?" The only suggestion we can make is that it might have been aircraft reflection; there is also the possibility of meteor scatter, as discussed in our September issue.

G2BRR (Wootton Bassett), with the help only of his XYL, has struggled up a 6-over-6 Slot and finds G6XM an S9 signal, and during the period thought activity very encouraging. GW3INV reports from Wrexham, Denbs., that he is using a G2IQ converter into an S.640, with a 4-ele indoor Yagi; the transmitter is 5763-5763-5763-832 running 18w. G3YH (Bristol) has not been very active, but goes up in the All-Time and, after a long silence, we also hear again from G2AHP (Perivale).

All sorts of adventures have befallen him. The score of receivers "heard on" got up to 39 TV and 69 BC, and a little chit came from the GPO about it! This involved TVI-proofing by changing the multiplier sequence to 12/18-36-72-144 mc and G2AHP now awaits a GPO test to remove any final doubts—he is clear on all the TV receivers he knows of, including his own, and has in fact been on again working GDX like G4GR and G5YV. So let us hope Frank is not going to have any more of that sort of trouble.

Portable Trip

G3ITF (Basingstoke) with G3JFR did a sort of pilgrim's progress through the less usual counties at the end of July, signing

G3JFR/P, GW3ITF/P and GW3JFR/P. The best location found was Halkin Mountain, Nr. Mold (Flints.) and the worst was where they stopped in Hunts. In Staffs., they had the amusing experience of a farmer coming up to say he hoped his TV receiver would not interfere with them—well, it might have done! G3ITF says that the trip brought forth nothing spectacular but they thoroughly enjoyed it all the same.

G3TA (Iver Heath, Bucks.) writes to pass on news that VQ4EV (ex-G3GBO. and well remembered) hopes to be home again in Denham for about three months' leave from the beginning of December, before returning to Kenya again for another tour of three years. As VQ4EV, he has now worked all the eight VQ4's active on two metres, with VQ4AA/P at 97 miles as best DX. And when VQ4EV gets home to the new car, he will be G3GBO/M on Two. Don would like to hear of anyone able to part with a BC-455 to modify for the purpose. He will be on the air as G3GBO as soon as he gets back, of course!

EI2W (Dublin) gives the frequencies of the active EI's as:

G3JFR, with G3ITF, went touring /P on Two Metres during the last week in July, visiting Hunts., Rutland, Staffs., Flintshire, Hereford and Glos. Here is G3JFR operating from a site in Rutland.

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1955

Starting Figure, 14

From Home QTH only

Worked	Station
27	G3GPT
23	G8VN
22	G3JWQ
20	G3BJQ, G3CKQ, G3HWJ, G5DS
19	G3JXN
18	G3DO, G3WS
17	G3ITF
16	G3BW
15	G3IEX, G3KHA
14	G3IRA

This Annual Counties Worked Table opened on September 1st, 1955 and will run for the 12 months to August 31st, 1956. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. The first list sent should give stations worked for the counties claimed; thereafter, additional claims need show only counties worked as they accrue. QSL cards are not required for entry in this Table.

EI2W, 144.14; EI4E, 145.15; EI4R, 145.8; EI5Y, 144.19; and EI9C, 144.3 mc. EI8A is getting ready. EI4E (Killarney), who is said to have the most difficult VHF location in Ireland, was awarded the Millan trophy at a lunch held recently in Dublin, in recognition of his results on two metres.

"Basingstoke Wooden Spoon"

This rare trophy, "suitably inscribed" (the first one of which has already been claimed by G8UQ/P) is offered to any VHF operator who can work all eight Basingstoke stations in three consecutive days! The proposers of the motion are: G3CBU, G3GJJ, G3GVF, G3ITF, G3JFR, G3JUG, G6OU and G8VR. Of course, we can all see the idea of *this!* Never mind; if it helps to increase activity, it will be a Good Thing, and why shouldn't we have a little fun.

VHFCC Elections

The claim from G3DVK (Rawmarsh, Yorks.) is interesting in several ways. Though he has been active on Two for the last four years, it is the first time he has written in; he has used an indoor beam all the time; and he has succeeded not only in working 175S in 37C, but 9 countries as well, with EI, GI and GW still to come. By reason of being able to show the cards G3DVK gains his VHFCC, with our congratulations; his Certificate is No. 187. Since making the claim, an all-metal 5-over-5 with Q-bar matching has been put up, and we should be hearing more of G3DVK.

Certificate No. 188 goes to W. H. Tanser, G3BJQ, Rugby, Warks., who, in his 100 cards, shows one from G8WL for a QSO on the old 5-metre band. Of the remainder, it is worth noting that most are from G3-3's.

Contest Arrangements

Having done a good deal of thinking about it—inspired, to be truthful, by a steady trickle of

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 G3GPT, G3IOO, G5DS, G6XX
12	G2HIF, G2XV, G3WW, G6LI, G6RH
11	G2AJ, G3ABA, G4RO, G4SA, G5UD
10	EI2W, G2FQP, G3BK, G3BNC, G3EHY, G3FAN, G3GHI, G3GSE, G3HAZ, G3WS, G5MA, G8IC, GM3EGW, GW5MQ
9	G2AHP, G2DVD, G3DVK, G3FIJ, G3IUD, G5MR, G6XM, PAØFB
8	G2CZS, G2DDD, G2XC, G3GBO, G3HCU, G3HWJ, G3VM, G5BM, G5BY, G5ML, G8SB, GC3EBK.

suggestions that we ought to—it has been decided that once again SHORT WAVE MAGAZINE should organise full-blooded VHF contests.

This, then, is by way of being a preliminary notice that during the week-end March 10-11 next we shall have a two-band affair, 144 and 430 mc, open to all U.K. stations and any Europeans who care to participate. And that, in July next year, for the week-ends 14-15 and 21-22, we shall put on an all-European VHF Contest, for which details will be circulated to every known authority on the Continent.

Now, it may well be that "some certain authorities" may choose to ignore our arrangements and refuse to give them proper publicity, on IARU grounds. We shall not mind that in the least, for the good reason that if the bands are open there will be plenty of activity and anyone interested will soon grasp what is happening, while if conditions are not good, and the EDX is just not available, it won't matter anyway.

The month of July is specially booked for this all-European event because our researches over the years — *see* p.370, September "VHF Bands"—have shown that it is during July that the best conditions can be *expected* on both VHF bands (there is no guarantee that they will materialise), while March has often been a good month, too.

This July all-European affair will be a real undertaking, for which thorough plans are being made and in respect of which we may find it desirable to call in a small panel of experienced VHF operators to assist in preparations and adjudication. That might not be necessary—in any case, we would want to avoid it if possible, as anyone co-opted would naturally be precluded from entering.

So *book the dates:* March 10-11 for the U.K. Two-Band VHF Contest; July 14-15 and 21-22 for the all-European VHF Contest.

Rules for the March event will appear in this space in January, and in the May issue for the July Contest. And we are open to consider any suggestions you may care to make about the rules when next you write in.

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
26	GW2ADZ
23	G3BKQ
19	G2XV
16	G3IOO, G6NF
15	G4RO, G5YV
12	G2HDZ
10	G2OI, 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

Dead Line——

For the December issue, please let us hear from you by **Wednesday, November 23** (and this does *not* mean handing it in at our Stand at the Amateur Radio Exhibition on the Saturday evening!) addressed A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Till December 9, may Allah guide your steps.

"A SINGLE-SIDEBAND EXCITER"

On p.400 of the October issue, the term "suitable *multiplier stage*" (line 22, right-hand column) is inadmissible; it should read "suitable frequency changer." In the caption to the photograph on p.403, the reference should have been to the twelve *components* comprising the audio phase-shift networks shown in Fig. 2 of the article.

BBC's CRYSTAL PALACE TV STATION

It has been decided, after consultation with the G.P.O., the radio industry and the trade, that the new BBC television station at the Crystal Palace (which is to be opened early in 1956) will employ the same method of transmission of the vision signals as is used at all the post-war BBC television stations, the upper sideband being partially suppressed. In this respect, the new station will differ from the existing station at Alexandra Palace, which transmits both sidebands equally. Crystal Palace will use the same frequencies and polarization as Alexandra Palace.

The change to the vestigial sideband method of transmission will not affect reception on receivers of types now on sale, because they are all designed for it. In some older receivers a slight adjustment may be necessary to achieve the best results. In a few cases, some modification to the receiver may be advisable and there may be some slight loss of detail in the picture.

OVER 4¾ MILLION TELEVISION LICENCES

During August, the number of television licences increased by 60,832. 14,124,587 broadcast receiving licences, including 4,786,415 for television, and 283,473 for sets fitted in cars, were current in Great Britain and Northern Ireland at the end of August, 1955.

Changing to Coax Feed

MAKING A TWO-METRE BALUN

E. WAKE (G5RP)

FOR the last three years the five-over-five two-metre beam at G5RP has been fed with 300-ohm line. The ribbon was replaced by the tubular about two years ago, and while the latter represents a great improvement, it appears almost impossible to make a satisfactory water-proof seal at the top end. Recently it was decided to use 75-ohm coaxial feeder, and as the feed-point of the beam was already accurately matched to 300 ohms, to use the well-known 4: 1 balun at the feed-point, thus matching the two impedances and at the same time providing the necessary balance-to-unbalance transformation.

The balun is made as follows: Cut off a 28-inch length of feeder, and at each end of this piece, and at the end of the feeder itself, strip off 1½ inches of the outer covering, and 1 inch of the braid. Place the three ends together, and wind thin copper wire around

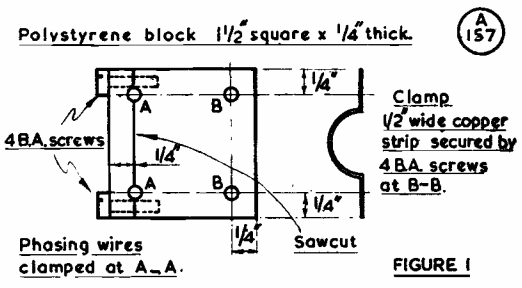


FIGURE 1

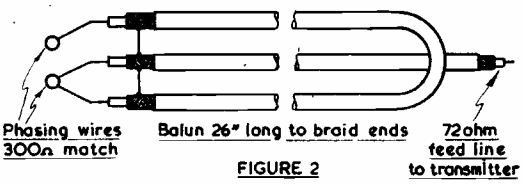


FIGURE 2

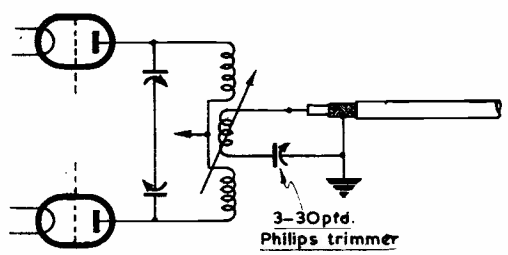
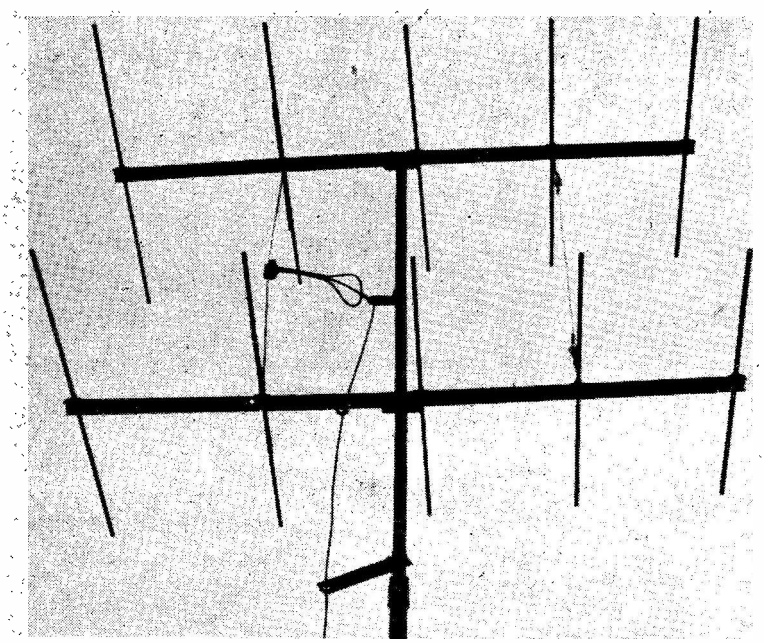


FIGURE 3



The balance-to-unbalance matching transformer ("balun") as described by G5RP, mounted on his own beam. It enables a 300-ohm feed point to be matched into a 75-ohm line.

the exposed ½ inch of braid. This should be lightly tinned with a very hot iron, taking care not to melt the insulation of the cable. Next, make a polystrene block as shown in Fig. 1 (the dimensions may have to be altered to suit the diameter and spacing of the phasing lines in use) and clamp the feeder and balun in position. The block should now be clamped to the phasing wires, and the three cable ends trimmed and connected as shown in Fig. 2. A liberal coating of Bostik will seal the cable ends and help to prevent corrosion of the soldered joints.

No adjustment of the matching was found to be necessary when this feed system was installed, and tests indicate that a very slight

improvement in signal strength has resulted.

At the transmitter end, the output coupling circuit has been modified, as shown in Fig. 3. When the output trimmer has been correctly adjusted, swinging the output link in or out of the tank coil has no effect on the setting of the plate tank condenser for resonance, and any line reactance is satisfactorily balanced out.

RATIO of VK's to POPULATION

It is interesting to find, from the latest issue of the well-produced *Australian Radio Amateur Call Book*, that there are now some 3,230 amateur licences current in Australia. Having regard to the fact that the total population of the whole of Australia (9,200,000) has only recently passed that of Greater London alone (8,300,000), the ratio of amateurs to population in Australia must be the highest in the Commonwealth. In the U.K., with more than five times the total population of Australia, we have only about three times as many licensed G stations.

TV AERIAL CONVENTION

Arising from the experience gained with G9AED on Band III, Belling-Lee, Ltd., are to hold a trade convention in Birmingham at the end of this month. The aim will be to "talk as engineers to engineers," covering all types of VHF aerials, with ample time for questions. It is not intended that this meeting, which is by invitation only, should be a sales push.

ENGINEERS IN THE BBC

Careers for Graduates

An invitation to graduate engineers and physicists to consider a career in the BBC is contained in a booklet produced by the Corporation under the title, *Engineers in the BBC*. It says that the Engineering Division, at the beginning of this year, comprised some 4,500 staff, of whom about 600 are fully qualified engineers and physicists, and about 2,300 are engineers who may not necessarily be fully qualified academically. Each year the BBC offers a number of graduate apprenticeships of two years' duration to engineers and physicists who obtain good honours degrees. It also has opportunities for men with a pass degree, and a special course is being prepared for them.

The courses for Honours Graduates are designed not only to train the young engineer for the BBC, but to give him training that will satisfy the Institution of Electrical Engineers, and thus lead to professional status recognised throughout the profession. The course includes a training period at the Engineering Training Department, Evesham, a period of six months' practical works training in the workshops of a large radio manufacturing concern, and some months in two or more of the specialist departments of the BBC. Normally, graduate apprentices enter at a salary of £620 a year, and after the two-year training course are appointed to a permanent post starting at £725 a year, rising in about five years to £960. The majority get an appointment rising to £1,280 after gaining experience in the junior grade.

In addition, the BBC recruits each year a number of graduates in to the Operations and Maintenance Department, which employs about 2,000 engineers and technicians. Most engineers in this department work side-by-side with the producers and artists who make the programmes. Of this work, the booklet says: "It appeals particularly to the man who, while not possessing the highest academic qualifications, nevertheless wishes to apply his technical training to a job in which this experience can be added to his broader interest in the humanities."

In the whole Engineering Division, every effort to improve technical knowledge is encouraged. Staff earning under £700 a year may claim full reimbursement of the fees for approved technical courses undertaken on their own initiative, provided that the course is successfully completed. Staff earning less than £830 a year get three weeks' annual leave; those earning more get four weeks.

Copies of *Engineers in the BBC*, which is being circulated to universities and technical colleges, can be obtained from the Engineering Establishment Officer, BBC, London, W.1.

PHOTOGRAPHS — HAVE YOU ANY?

We use a good many photographs in each issue of SHORT WAVE MAGAZINE, so that we are always glad to see clear, sharp prints of Amateur Radio interest, for possible publication. Photographs should be identified on the back, lightly in pencil, with descriptive notes separately. Payment is made for all that are used, immediately upon publication.

ERSIN MULTICORE SOLDER IN NEW HOME CONSTRUCTORS' PACK

Multicore Solders Ltd. announce that they have supplemented their 6d. and 5/- retail lines with a new 2/6 pack containing 20ft. of high-quality 60/40 alloy wound on a reel. It is thought that, with the increased interest in the construction of short-wave apparatus, FM tuners and amplifiers by amateurs, a ready market will be found for this pack, which is now being generally distributed. In addition, the new 2/6 Home Constructors' Pack will satisfy the need for a larger and more economical supply of solder for general home soldering purposes.

PYE RADIO IN RUSSIAN TRAWLERS

For the 20 trawlers building at Lowestoft to Russian order, Pye Marine Ltd. have secured the contract for the ships' broadcast equipment. This is an elaborate installation which includes receiver, 75-watt audio amplifier, and 20 speakers of different sizes throughout each vessel, together with a 25-watt loudhailer mounted on the bridge. The equipment operates from the ship's 220-volt DC supply.

AMATEUR RADIO • For The Beginner

PART VIII

AMATEUR BAND FREQUENCY METER

By **A. A. Mawse**

ONE of the more important needs of the transmitting amateur is that of being able to measure frequencies with a reasonable degree of accuracy, apart from the fact that his permit requires him to radiate within the bands. Note that this is an improvement on the legal provision imposed upon an earlier generation of amateurs, who were supposed to be able to measure frequency within a margin of accuracy laid down by the authorities.

The new requirement can be met fairly simply by the use of a crystal controlled band marker oscillator, but at the same time there are many occasions when it becomes desirable to measure specific frequencies with some degree of accuracy and this the band marker alone will not do. It is then necessary to possess oneself of a heterodyne frequency meter.

Numerous articles have appeared in SHORT WAVE MAGAZINE from time to time dealing with frequency measurement, ranging from a simply constructed band marker to a more complex affair along the lines of the (now) very costly but well-known BC221.

As in most things, there is a happy medium, and the construction of a reasonably accurate frequency meter, as will be shown, is neither beyond the scope nor the pocket of the average beginner.

There is, however, amongst many amateurs—and not only beginners, be it said—a Kind of Thing about heterodyne frequency meters, on account of the somewhat confusing array of beat notes that confronts one; hence a few remarks in general on the composition of one of these instruments and the manner in which it works, might help to clear the air where necessary.

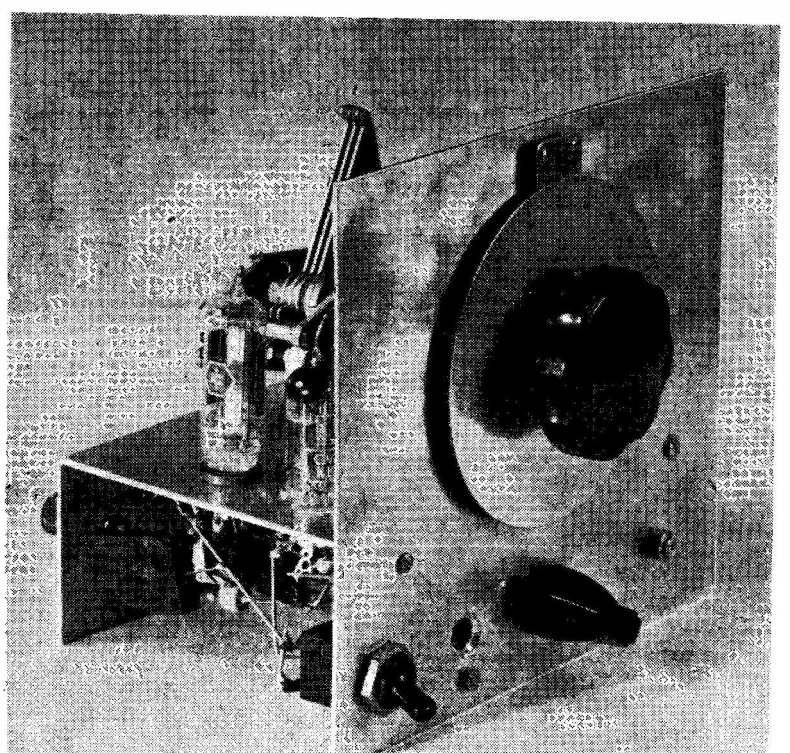
Basic Design

In its basic form the instrument comprises a low frequency crystal oscillator of proven accuracy, generally a 100 kc bar; a tunable oscillator of stable characteristics, designed to cover the lowest frequency at which it is desired to make measurements — usually a range of 1750-2000 kc and not, be it noted, 1800-2000 kc only, because the former minimum is harmonically related to all the HF amateur bands; some means of mixing and rectifying the beats produced between these two oscillators or between their harmonics; and, optionally, a degree of amplification to render the weaker combinations audible in the output headphones.

Heterodyne Principle

A complex number of frequencies are fed into the mixer—the two main frequencies; another comprising the sum of these two, and yet another comprising their difference. It is this last one with which we are mainly concerned.

Consider first the 100 kc crystal oscillator. There will be produced a vast number of harmonics rising



The Amateur Band Frequency Meter described for this month's article in the "Beginner" series. One essential requirement is a mechanically stable tuned circuit, with a good SLF (straight-line-frequency characteristic) variable condenser and positive slow-motion dial; that shown is of Eddystone manufacture, with a vernier scale. The crystal used for the reference frequency is in the valve-type mounting on the left. Constructional details are shown in the under-side view, and the curves obtained with the model as illustrated are given in Fig. 2.

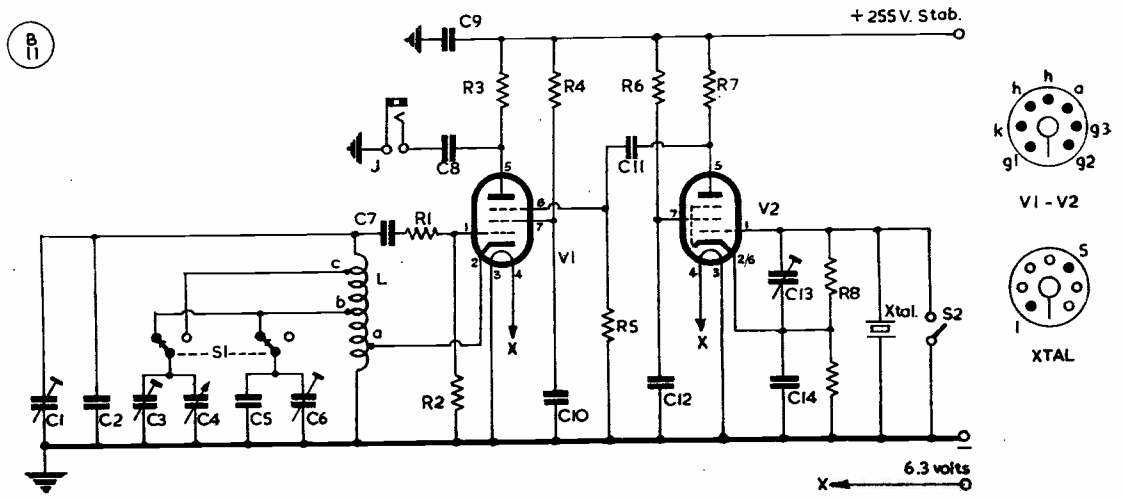


Fig. 1. Circuit of the Amateur Band Frequency Meter, in which V2 is the crystal-controlled oscillator producing beats of known frequency from the 100 kc bar in its grid circuit. V1 is the tunable oscillator, the calibration accuracy of which can be constantly checked by reference to the crystal. By using a tapped coil and the capacity network associated with S1, good frequency coverage can be obtained on all amateur bands on the calibrated condenser C4 — see text and the graph. The plate-shape of this condenser should be SLF, with a really good slow-motion dial. The Amateur Band Frequency Meter is designed to plug into the Power Pack described in the July issue. In this circuit, the switching S1 is in the "MF" position. The unmarked resistor below R8 is R9 in table of values

in steps of 100 kc at a time but diminishing in amplitude until they disappear into inaudibility somewhere in the HF region.

In like manner, the tunable oscillator will produce a fundamental frequency somewhere in the 1750-2000 kc range, depending upon the dial setting, and a similar series of harmonics being exact multiples of the fundamental, also diminishing in amplitude with each higher order.

Consider now the 18th harmonic of the crystal—which will be at 1800 kc. As the tunable oscillator is adjusted to about 1800 kc, a beat note will become audible in the output phones, becoming inaudible at "zero beat" when both frequencies will be exactly at 1800 kc. As the tunable oscillator is adjusted to a higher point another zero beat point will be found at exactly 1900 kc, corresponding to the 19th harmonic of the crystal, And in the same manner again at 2000 kc. and so on. So far so good, but other beats can be heard in between these points and this is where the confusion is apt to arise.

It has already been stated that the tunable oscillator also produces a series of harmonics. If we tune this oscillator to 1750 kc, the second harmonic of this frequency will be 3500 kc which will correspond to the 35th harmonic of the crystal and a beat note will be heard. In similar manner further beats exactly 50 kc apart will be heard over the tuning range, but these will be weaker than the 100 kc points since they are produced by higher order harmonics.

Again the 3rd harmonic of 1766.66 will beat with the 53rd harmonic of the crystal and this series will produce beats every 33.33 kc apart but again still weaker.

The process will be repeated with still further series giving beats 25 kc, 20 kc, 16.66 kc apart, and so on, in steadily decreasing strength wherever the harmonic of the tunable oscillator corresponds exactly to a crystal harmonic. The extent to which these can be detected will depend upon the wave form produced by the oscillators and the degree of amplification which is provided, but if any *one* of a series is audible then *all* of that series should be heard.

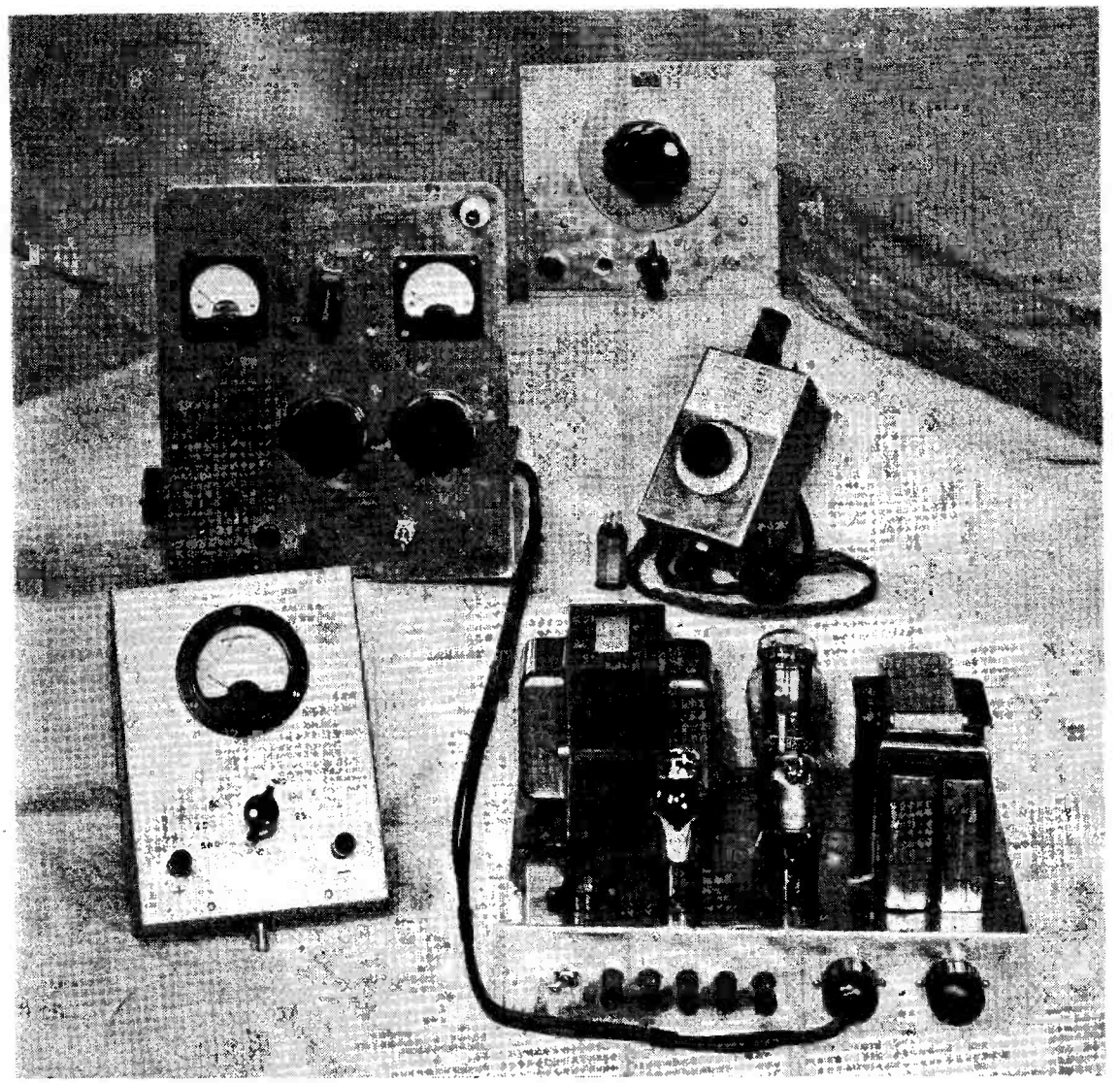
The figures given in Table 1 show, for a tuning range of 1750-2000 kc, the crystal harmonics and the tunable oscillator harmonics involved, the beats produced and the spacing between them. It is to be hoped that with this Table and the above explanation the reader will now have a clearer idea of what happens.

An understanding of this subject will also be of great assistance when endeavouring to sort out any

Table of Values

Amateur Band Frequency Meter

C1, C6, C13	= 75 $\mu\mu$F, pre-set condenser	R5, R8	= 500,000 ohms, ½w.
C2	= 200 $\mu\mu$F, silver mica (*but see text*)	R9	= 10,000 ohms, ½w.
C3	= 25 $\mu\mu$F, pre-set condenser	S1	= DPDT wafer switch
C4	= 100 $\mu\mu$F, SLF variable	S2	= Single pole on-off toggle switch
C5	= 250 $\mu\mu$F, silver mica (*see text*)	J	= Phone jack socket
C7, C11	= 50 $\mu\mu$F, mica	Xtal	= Q7/100 Quartz Crystal Co. 100 kc
C8	= 0.1 μF, paper	V1, V2	= EF91 (6AM6; CV138)
C9, C10, C12	= .01 μF, mica	L	= 35 turns 22 SWG enamelled wire 1¼-in. diameter, 1¾-in. winding length, tapped at 12 and 18 turns from earthy end and 4 turns from top end
C14	= .001 μF, mica		
R1	= 150 ohms, ½w.		
R2	= 120,000 ohms, ½w.		
R3, R7	= 30,000 ohms, ½w.		
R4, R6	= 100,000 ohms, ½w.		



Equipment specially built for the "Beginner" series and described in detail in various issues since April this year. Lower right, Power Pack (July); lower left, Multi-range Test Meter (June); middle left, 160-metre CC Transmitter (September); middle right, Grid Dip Oscillator (August); and above, Amateur Band Frequency Meter (current issue). Constructional designs for further apparatus of direct interest to beginners and those starting on the air again will appear in future issues, in continuation of the series. The next item will be a VFO to operate the Transmitter on 80 and 160 metres.

problem involving TVI or BCI since the same principles may be applied to an entirely different range of frequencies.

Circuit Design

The unit to be described is, perhaps, the Heterodyne Frequency Meter reduced to its simplest proportions, employing but two valves and whilst, of course, not being equal in performance and utility to its multi-valved brothers, it is fully capable of giving a standard of accuracy high enough for all normal requirements. Reference to the circuit diagram Fig. 1 will show that V2 consists of a split-cathode circuit incorporating a Q7/100 100 kc quartz crystal and, as subsequently described, adjustment of C13 enables the crystal to be set very accurately to exactly 100 kc. V1 operates as an electron-coupled variable frequency oscillator with a fundamental frequency range of about 1750 to 2000 kc. When the unit is to be used on the higher frequency bands commencing at 7.0 to 7.3 mc it will be seen that the fundamental swing required is now reduced to a range of only 1750 to 1825 kc, which represents rather a small proportion of the tuning dial. The DPDT switch S1 and its associated circuitry is therefore provided to introduce a degree of band-

spreading. It will be seen that with the switch in the "LF" position the main tuning condenser C4 and its zero-set adjuster C3 are connected across almost the whole of the coil L. When the switch is set to the "MF" position these two condensers are connected across a smaller portion of the coil and therefore have a much reduced effect on the tuning range. At the same time the combination C5 and C6 are brought into circuit to act as additional loading in order to restore the LF end of the fundamental frequency once more to 1750 kc. This band spreading arrangment is so adjusted by means of the two trimmers C1 and C6 that approximately the same tuning range of C4 is required to cover 1750-1825 kc in the MF position as it takes to cover the whole Top Band in the LF position. This means that if the coverage is spread over the whole 100 degrees of dial, a reading taken on Top Band frequencies will give a separation of 2.5 kc per degree of dial. Likewise, a reading taken on the 40-metre band with band-spread in operation will give a separation of 3.0 kc per degree of dial, so that if a vernier is fitted to the dial readings down to within 250 cycles can be taken.

Mixing and Output

The output from the crystal oscillator is taken *via* C11 and injected into V1 by means of the suppressor grid, the DC return to earth being taken through R5. This method has been found entirely satisfactory and makes for circuit simplicity. Output to phones is taken from the anode of V1 through the isolating condenser C8 to the jack socket on the front panel. The switch S2 which is also controlled from the front cuts out the crystal when the latter is not required.

TABLE 1

CRYSTAL HARMONIC	OSCILLATOR HARMONIC	BEATS PRODUCED	BEAT NOTE SPACING
18th-20th	1st	1800 kc 1900 2000	100 kc
35th-40th	2nd	1750 kc 1800 1850 *etc.*	50 kc
53rd-60th	3rd	1766.6 kc 1800 1833.3 *etc.*	33.3 kc
70th-80th	4th	1750 kc 1775 1800 *etc.*	25 kc
88th-100th	5th	1760 kc 1780 1800 *etc.*	20 kc
105th-120th	6th	1750 kc 1766.6 *etc.*	16.66 kc
123rd-140th	7th	1757.14 kc 1771.42 *etc.*	14.28 kc

Note: At some stage the beats produced by the higher order harmonics will be too weak to be audible.

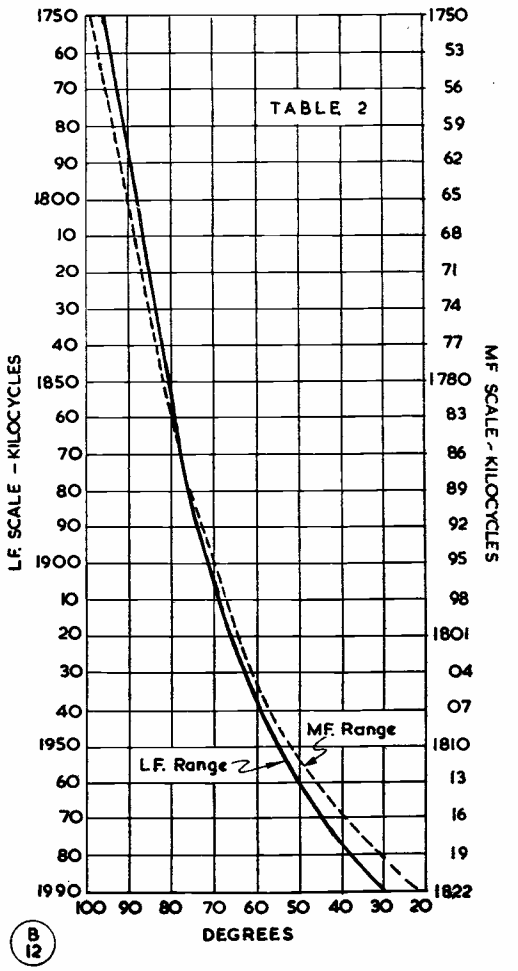
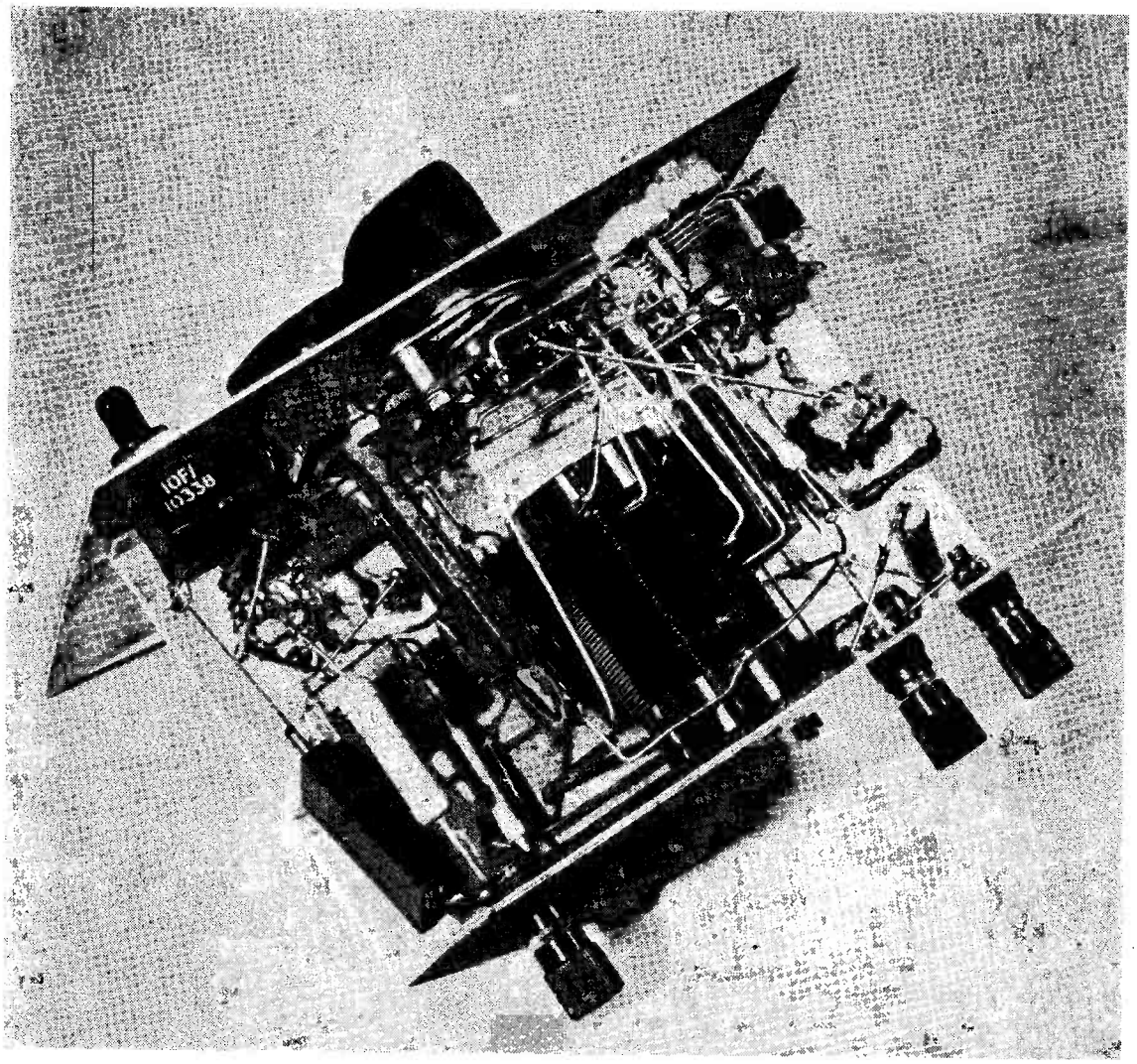


Fig. 2. Curves obtained with the Amateur Band Frequency Meter as described and illustrated here. From a study of the harmonic frequency scale shown diagrammatically in Fig. 3, it will be seen that the "MF range," 1750-1822 kc, covers the greater part of all bands 3.5 to 28 mc. By switching to "LF range" on the Frequency Meter, the overlapping areas of the 160, 80 and 10 metre bands are covered. It will be appreciated that in this design, as in any other frequency meter intended exclusively for the amateur bands, a degree of compromise must be accepted. By using either the "LF" or "MF" scales, accurate beats can be obtained on all bands 1.8 to 28 mc

Crystal Calibration

The accuracy of the whole instrument will depend in the first place on the accuracy of the crystal. There are several ways in which this can be checked. In this country perhaps the easiest is to set up the crystal oscillator in close proximity to a BC set



Under-chassis view of the Amateur Band Frequency Meter, showing layout and disposition of the parts. The construction of the coil is particularly important and good quality components should be used throughout. The switching function is explained in the text.

which is tuned to the BBC Long Wave transmitter radiating on 200 kc, which frequency is controlled to within finer limits than will be required by the average amateur. Most crystals can be changed slightly in frequency if a small capacity is placed across them and reference to the circuit diagram of Fig. 1 will show a small condenser of the pre-set type and of about 75 $\mu\mu$F in this position. This condenser should be adjusted with the two sets running until the beat note heard in the BC speaker is reduced to its lowest level; the crystal will then be adjusted as exactly as possible to 100 kc.

Layout

This is largely a matter for individual choice. The writer's instrument is built on a chassis of 16 gauge aluminium measuring 6½ x 4½ x 2½ inches with a front panel of the same gauge material cut to 6½ x 7 inches. The two circuits are grouped one on either side of the centre which is occupied on top of the chassis by the tuning condenser C4 and below by the coil. The pre-set condenser C3 in parallel with C4 is adjustable from the front panel and is used purely for initial calibration (if necessary) before the instrument is used for measuring purposes.

The two photographs will give a general idea of the disposition of the various components.

All wiring should be rigid with well soldered connections, and the coil must be firmly wound on a suitable former. This consists of 35 turns of 22 SWG enamelled wire, wound under tension on a 1½-inch diameter former over a length of 1¾ inches. Provision must be made for taking off taps at "a" and "b," 12 and 18 turns respectively from the

earthy end, and at "c," 4 turns down from the "hot" end.

The HT drain is very modest. Using the 255 volt stabilized tap from the Beginner's Power Pack (described in the July issue) the tunable oscillator draws approximately 3 mA and the crystal circuit 2.5 mA when S2 is open and very little indeed when closed.

Setting Up

For this purpose the station receiver is brought into play and if this is reasonably well calibrated so much the better. It is assumed that at this stage checks have been made to make sure the V1 section will oscillate over the whole tuning range with S1 in either LF or MF position. Touching the "hot" end of the coil will cause an increase in mA reading if this is the case. If the milliammeter reading is high and remains steady under this test, introduce additional feed-back by increasing the number of cathode turns (tapping point "a") one or more. If, on the other hand, the mA are low and are unsteady under the above test, the probability is that the circuit is "squegging" and this can be cleared up by reducing the cathode turns slightly.

After the unit has been running for ten minutes or so in order to warm up, set all pre-set condensers associated with V1 to half mesh; set C4 to full mesh; close S2 and with the BFO in on the receiver, tune it for a beat in the region of 1750 kc. For this purpose S1 must be in the LF position. Having found this beat, adjust C1 until under the conditions stated the beat comes a little LF of this frequency. If this is not possible within the scope of C1 even by a *slight* adjustment of C3, it will be necessary to substitute C2 by another condenser of a slightly different capacity. Next tune the receiver to approximately 2000 kc and swing C4 towards minimum until the beat is heard again, ideally when there is still 15-20 degrees in hand on the dial—as the condenser approaches minimum the scale tends to become non-linear in character and is best avoided. If this range is not attainable, raise tapping point "c" by one turn or more.

Next retune the receiver to the 1750 position again; re-engage C4 in full mesh; switch S1 to the MF position and again look for the beat. Adjust C6 until this beat comes up at approximately the same receiver setting as for the LF test. Now check that the same minimum position of C4 will cover 1825 kc. If 1750 kc is not obtainable within the range of C6 it will be necessary to modify C5 slightly. If 1825 kc is reached too soon, alter tapping point "b" *down* the coil a turn or so, or conversely, if the range cannot be covered adjust this point *up* the coil a little.

The final settings arrived at by this juggling, which may take a little time but is worth doing properly, should be such that with S1 in the LF position the range 1750-2000 kc is nicely covered by C4, and likewise the range 1750-1825 kc with S1 in the MF position. This concludes the initial or rough calibration stage.

Calibration Curve

Now plug a pair of high resistance headphones into the jack socket; switch in the crystal (S2 open) and listen for *very* strong beats in the phones on the LF range. You should hear three, corresponding to 1800, 1900 and 2000 kc. If in doubt a rough check on the receiver will confirm that all is well. Tune to the LF end of C4 and you should hear a slightly weaker beat corresponding to 1750 kc. Readjust C1 a little if necessary to bring this truly on to the tuning scale. Check through all these readings again, this time *very carefully* tuning to zero-beat at each point and noting down the dial reading on C4. Plot these readings against their corresponding frequencies on squared graph paper and then, using Table 1 and the receiver as a guide, identify intermediate beats that can be heard in the headphones, plotting these points on your graph. The graph or the receiver will show up any errors you make in identification, when it will be necessary to re-check these points. With as many points as possible identified you will then be able to draw in on the graph an accurate calibration curve.

Proceed in exactly the same manner with S1 in the MF position, but only C6 must then be moved for any slight adjustment it is required to make in the tuning range.

The accuracy of the results which can be obtained with this unit will most likely be limited by the size of the calibration chart, which in its final form will appear similar to Table 2. Closer results can be had if a series of overlapping charts are prepared. say, in 50 kc steps for the LF range and 15 kc steps for the MF range—that is, five sheets for each range. but these enlarged versions will call for *very* careful calibration as the margin of allowable error will be correspondingly reduced. Once the meter has been calibrated C1 and C6 must not be touched again. or else re-calibration of the associated range will be called for. Also, once the crystal has been adjusted it is extremely unlikely that any further adjustment of C13 will be needed.

Using the Frequency Meter

Each time the instrument is put into use when a high degree of accuracy is called for it will be advisable to check the calibration. This is done very quickly and easily in the following manner: Warm up both circuits for ten to fifteen minutes beforehand, plug in the headphones and adjust the dial to any known major beat — 1800 kc, for example. on *either* LF or MF setting.

If the beat note heard in the phones is zero, then no further adjustment is necessary—everything is "spot on." If not, adjust C3 slightly until this is the case and calibration is then correct.

It is assumed. in using an intrument of this kind, that the operator has some rough knowledge of the frequency he desires to measure—within 1 mc or so. The Grid Dip Oscillator described in the August issue is the type of instrument to employ for finding your whereabouts, locating the band and so on. Table 3 has been prepared to show the useful frequency bands covered on each range with the appro-

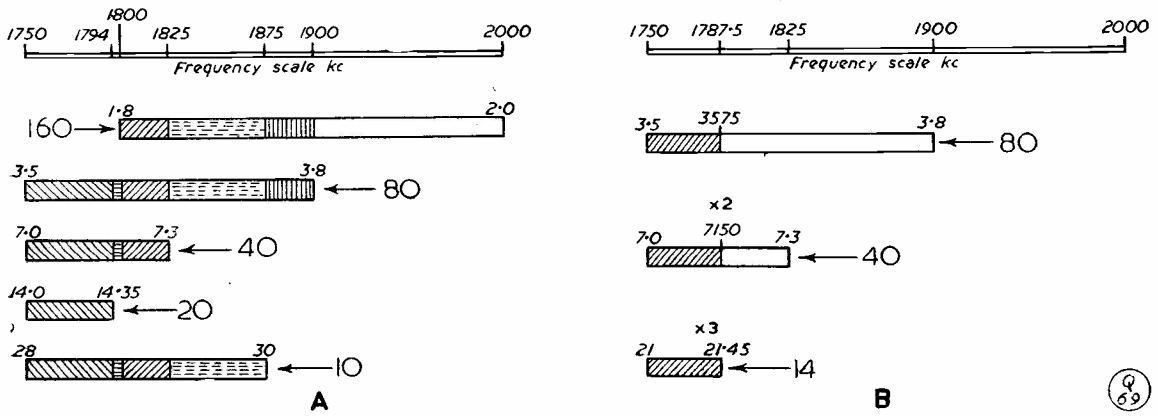


Fig. 3. Showing harmonic relationships through the amateur HF communication bands, with the reference-frequency scale related to the Top Band, which is the fundamental range of the Frequency Meter described in this article. For instance, a dial setting on the Frequency Meter for, say, 1810 kc, produces beats at 3620 kc, 7240 kc and 28960 kc, in the 3.5, 7 and 28 mc bands respectively. In sketch (A) similarly hatched areas are in true harmonic relation; it will be noted that there is no frequency which is harmonically related through all five bands. In (B) is shown the 2-3 harmonic relationship between 3.5, 7 and 21 mc.

priate multiplier figure for each range, assuming fundamental coverages of 1750-2000 and 1750-1825 kc. Here are a few examples of how to use this unit, in conjunction with your own calibration chart and Table 3 at right:

Example 1

To check the frequency of an incoming signal: Cut the crystal, tune the dial until zero beat is obtained with the incoming signal (receiver BFO off); read off the fundamental frequency by reference to the dial reading and the calibration chart and multiply up this figure by the appropriate multiplier in Table 3, corresponding to the band in which you know the signal to be located.

Example 2

To identify the frequency of your own transmitter: Plug in the headphones, cut the crystal and with the unit in reasonable proximity to the transmitter, tune for zero beat, and check off the fundamental frequency as before, multiplying up into the appropriate band.

Example 3

To tune a VFO to a predetermined spot frequency: Adjust the unit to the desired frequency as determined from the calibration chart, plug in the headphones, cut the crystal and with the unit close to the VFO tune the latter until zero beat is obtained.

Example 4

Using the unit as a crystal controlled band edge marker: Set the unit up close to the receiving aerial lead in, open S2 and either tune C4 "out of the way" or short-circuit C4 or C3 plates with a piece of wire. The receiver will pick up harmonics of the 100 kc crystal for a considerable way down the scale, depending upon the degree of coupling obtainable and the amount of RF gain employed on the receiver.

Finally, the unit can be used as a CW monitor for checking the characteristics of your own transmitter by means of the headphones and the unit tuned to your own frequency.

TABLE 3

S1 LF POSITION		S1 MF POSITION	
Frequency Range.	*M*	*Frequency Range.*	*M*
x 1750— 2000	1	x 1750— 1825	1
x 3500— 4000	2	x 3500— 3650	2
5250— 6000	3	5250— 5475	3
x 7000— 8000	4	x 7000— 7300	4
8750—10000	5	8750— 9125	5
etc.		10500—10950	6
		12250—12775	7
		x 14000—14600	8
		15750—16425	9
x Covers amateur frequency allocation in this range.		17500—18250	10
		19250—20075	11
		x 21000—21900	12
		22750—23725	13
M Multiplier, or times instrument fundamental.		24500—25550	14
		26250—27375	15
		x 28000—29200	16

It might just be mentioned for the interest of those who already possess a 1000 kc bar that this could be substituted for the 100 kc sub-standard in the same circuit without modification and that it is still possible to calibrate the tunable oscillator from it, although some of the beats produced are rather awkward ones. There will, however, be fairly easily discernible beats at 1750; 1777.7; 1800; 1833.3; 1857; 1875; 1888.8; 1900 and, of course, a strong one at 2000 kc corresponding to the second harmonic of the crystal.

One final word concerning the circuit and with reference to R1: It was found necessary to introduce this resistor to prevent a degree of squegging when S1 was in the MF position and C4 at minimum capacity. Should there be any tendency to squeg in a reproduction model in spite of this resistor, it is suggested that the value be raised somewhat—say, to 300 ohms, which should provide an effective cure.

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.

EI3BC, R. S. Haslam, 3 Wasdale Grove, Terenure, Dublin. *(Tel.: Dublin 908769).*

EI4BC, A. D. Patterson, Trudder, Newtownmountkennedy, Co. Wicklow.

GB2SM, The Science Museum, South Kensington, London, S.W.7.

G3IIU, Acton, Brentford and Chiswick Radio Club; Hon. Sec., R. G. Hindes, 51 Rusthall Avenue, Bedford Park, Chiswick, London, W.4.

GM3JOA, H. E. Stanway, 196 Morrison Street, Edinburgh, 3.

G3JQJ, G. Moore, *(ex-DL2WM),* 27 Briggs Avenue, Glasshoughton, Castleford, Yorkshire.

GM3JUH, S. Hinks *(ex-MF2AH),* 30 Ross Crescent, Camelon, Falkirk, Stirlingshire.

G3JUL, G. C. Voller, 426 London Road, Isleworth, Middlesex.

GW3JVW, J. D. Davies, 59 High Street, Clydach Vale, Rhondda, Glamorgan, S. Wales.

G3KCU, R. Greenough, 6 Brock Mill Lane, Wigan, Lancs.

G3KJU, G. E. Grimmer, 58 Kirkley Run, Lowestoft, Suffolk.

G3KKR, M. D. Legg, 173 Wellingborough Road, Northampton, Northants.

G3KKZ, P. Champion, 7 Leonard Road, Streatham Vale, London, S.W.16.

G3KLC, J. S. Bennett, The Warden's House, Browne's Hospital, Broad Street, Stamford, Lincs.

G3KLD, R. E. Russell, 43 Ingestre Road, Hall Green, Birmingham, 28.

G3KLH, D. G. Alexander, The Haven, Eynsham, Oxford.

G3KLO, E. P. Barlow *(ex-DL2WB),* 310 Brighton Road, Alvaston, Derby.

G3KLP, J. R. Young, 37 Priestlands Road, Hexham-on-Tyne, Northumberland.

GM3KLW, J. Fraser, 8 Thistle Street, Edinburgh.

G3KLZ, D. G. Enoch, 15 Victor Road, Heaton, Bradford, 9, Yorkshire.

G3KMG, D. H. Plumridge, 3 Rowley Bank, Castleside, Consett, Co. Durham.

G3KMH, W. H. Ferguson, 9 Woodbine Terrace, Hexham, Northumberland.

G3KMJ, G. Carter, 58 Granfield Road, Crosland Moor, Huddersfield, Yorkshire.

G3KMK, W. F. Topham, 200 Longfellow Road, Coventry, Warks.

G3KMQ, R. G. Heslop, 84 Osborne Crescent, Tweedmouth, Berwick-on-Tweed, Northumberland.

GM3KMR, T. Heslop, 41 Parkhead Crescent, Sighthill, Edinburgh, 11.

G3KMW, T. R. Parry, 179 Ridgacre Lane, Quinton, Birmingham, 32.

G3KMX, A. J. Hopkins, 44 Sandy Bank Avenue, Rothwell, nr. Leeds, Yorkshire.

G3KNO, H. G. Cheeseman, 265 Cliffe Road, Strood, nr. Rochester, Kent.

G3KNP, J. W. Porteous, 7 Marmion Road, Scunthorpe, Lincs. *(Tel.: Scunthorpe 4510).*

CHANGE OF ADDRESS

EI4Z, T. O'Donnell, 26 Collins Avenue, Ballymun, Dublin.

G2CNN, P. M. Branton, Red Lion Hotel, Wareham, Dorset.

G2FVD, K. C. F. Caton, 103 Draycott Avenue, Kenton, Harrow, Middlesex.

G3CMH, Yeovil Amateur Radio Club; Hon. Sec., D. L. McLean, 9 Cedar Grove, Yeovil, Somerset. *(Tel.: Yeovil 2174).*

G3DGY, E. H. L. Cooper, Lyndale, Suckling Green Lane, Codsall, Staffs.

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

G3GEA, D. C. Callender, Grad. Brit.I.R.E., 26 Sheepcote, Welwyn Garden City, Herts.

GW3GNT, P. A. C. Wood *(ex-G3GNT),* Beach Cottage, Dinas Dinlle, nr. Caernarvon, Caerns.

G3GUH, M. J. Fitzgerald, 1a Felix Road, Felixstowe, Suffolk.

G3HEA, J. U. Burke, 61 Greyhound Lane, Streatham, London, S.W.16.

G3IBL, F. Clay, The Spinney, Lime Lane, Morley, Derby.

G3IZH, P. F. Hughes, 44 Portland Place, London, W.1.

G3JAX, R. S. Gibson, 17 Orchard Crescent, Edgware, Middlesex.

G3JUA, D. Vaughan, 22 Edge Lane, Thornton, Liverpool, 23.

G3JZK, G. Sassoon, 11 Trumpington Street, Cambridge.

G3KCJ, A. H. Webb, White Lodge, Ferry Road, Hullbridge, Hockley, Essex.

G3KCJ/A, A. H. Webb, 12 Ashleigh Drive, Leigh-on-Sea, Essex.

G3KEU, T. Leighfield, c/o 38 Princes Street, Swindon, Wilts.

GI3KEV, M. C. Hamilton *(ex-G3KEV),* Tullywiggan, Cookstown, Co. Tyrone.

G5AD, A. Adams, 8 Queensway, Wigan, Lancs. *(Tel.: Wigan 45463).*

G5GH, C. R. Emary *(ZC4XA/VS6AX).* 133 Fairlands Avenue, Thornton Heath, Surrey.

G8IC, F. F. Bowling, Field Road, Stainforth, nr. Doncaster, Yorkshire.

CORRECTION

G3EHS, D. Cairns, Woodville, Longden Avenue, Shrewsbury, Shropshire. *(Tel.: Shrewsbury 4984).*

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Dead-line for December Issue : NOVEMBER 18)

VARIOUS slight differences between our Club organisation and that of the United States are spotlighted by an enclosure forwarded with their notes by **Liverpool.** W6ODR is an honorary life member, having been born in Liverpool some 60 years ago, and he sent them details of club life in San Diego, Calif.. In that notable city the San Diego Council of Amateur Radio Organisations recently sponsored the 1955 ARRL (South-Western Division) Convention, a two-day affair held in Balboa Park, the site of two World Expositions.

Tickets were sold to the amount of over £2,000, most of which was ploughed back in door prizes to very nearly the same amount ! Commercial exhibits and demonstrations were featured all day ; contests and mobile events took place ; prizes were awarded for code speed, transmitter hunts and for best mobile installations. Musical honours at the banquet were provided by a ten-piece orchestra, and the evening wound up (at midnight) with the pomp and mystic ritual of the Ancient Order of the Wouff Hong.

The ladies were not forgotten, and events for them included a Charm Course, a Jewellery Display, a Ladies' Luncheon for the YLRL, and several special contests. Among the door prizes were a DX-100 Transmitter, a National NC-125 and Collins 75-A4 receiver, SSB Exciters, Converters, Transmitter kits and a hundred-dollar wrist watch as first ladies' prize.

We mention all this to show you how " the other half " lives, and to indicate what Clubs can do—when there are enough of them, with a sufficiently large number of members. Thanks again to Liverpool and W6ODR for contributing an interesting item, which will make a few mouths water!

West Cornwall now meet at Falmouth Technical Institute on alternate Tuesdays, the next date being November 15. Facilities are available for practical work, and the evenings are run as a mixed amateur radio class, workshop and " get-together," thanks to the Cornwall Education Committee. G2BAT, 3AGA and 3AET are active on Two Metres most evenings, 2100-2300.

South Manchester have a Film Strip on the CRT on November 18, a talk by G6DN on " Are You in the Band ? " on December 2, and a Junk Sale and Ragchew on December 16. **Coventry** meet at the Hertford Arms on November 7 for a supper, and on the 21st Ray Bastin will talk on a Low-Cost Two-Metre Transmitter. On December 5 there is a lecture by G2FTK.

Malvern inform us that they meet on the first Monday of the month at the Foley Arms Hotel, Great Malvern—*see* panel for Secretary's QTH. **Acton, Brentford and Chiswick** hold their meetings every Tuesday, 7 p.m., at the A.E.U. Rooms, 66/68 High Road, Chiswick. **Belfast Co-Op. Radio Society** meet every Tuesday and Saturday, 7.30 p.m., at the Co-operative Hall, Frederick Street, Belfast.

Isle of Man have arranged a programme of monthly talks and films, and a brains trust is being formed to discuss members' difficulties and help to clear them. The new shack will be ready soon, and will be available for Morse practice, building of equipment and operation of the Club Tx. It is also proposed to form VHF and QRP groups within the Society.

Walsall, despite infrequent reports, assure us that they are very much alive and are looking forward to taking part in MCC once more. They meet on the second and fourth Wednesdays, 8 p.m., in the Technical College, Bradford Place, Walsall.

Medway meet fortnightly (days not stated) in the Golden Lion, Brompton. **Southport** meet on Wednesdays and Thursdays at 8 p.m., as well as at week-ends if the weather is good. Their HQ (Southport Sea Cadets) is on the beach half-way between Pleasureland and the Palace Hotel, Birkdale, where all their equipment is operated from 12-volt batteries charged by a wind generator (or petrol when they are becalmed).

Cambridge recently had two talks on Quartz Crystals, and November 4 is booked for a recorded lecture, " Radio over the Years," by Capt. P. P. Eckersley. On December 2 there will be a Junk Sale. All meetings at the Jolly Waterman, Chesterton Road. **Cardiff** had a very successful October meeting, with a talk by ZD4BX and a lively discussion on Aerial Systems. At their December meeting, on December 12, at The British Volunteer, The Hayes, Cardiff, GW2DHM will give a talk on some of the features

THE TENTH MCC

Full rules for MCC were given on p.441 of the October issue. Note the dates : November 19, 20, 26 and 27—between the hours of 1500 and 1900 GMT on each day. No entry forms are necessary. Logs to reach us by Monday, December 5.

A record entry is hoped for.

and circuity of his transmitter.

Derby continues to meet every Wednesday evening, and for the first time they did not "break up" for the summer. They have a flourishing Junior Constructors' section in the sub-basement rooms, and the main meetings are held in Room 4, 119 Green Lane, Derby. The Christmas Social will take place on December 16, and the Grand Christmas Draw on the 21st. Membership stands at 86 fully paid, with 200 on the Club register. November 9, Open Night; November 16, Musical Evening; November 23, Practical Demonstration of Miniature Aerials (G3EZZ); November 30, Film Show.

East Kent meets fortnightly at the Two Brothers, Northgate Street, Canterbury, for films, lectures, sales, "swop nights" and so on. New members, and any readers in the district, will be welcome. **Liverpool** elected their officers at the AGM, including a publicity officer—a new appointment. In the Merseyside D-F Contest their team came second to Wirral. **Plymouth** meet on November 19, 7.30 p.m., at the Tothill Community Centre, St. Judes, Plymouth, and have no particular plans for the winter season except to welcome any newcomers who feel like a ragchew and a cup of tea.

Surrey (Croydon) met on October 11 to discuss SSB, and this meeting was nicely timed to coincide with the arrival of the article on the subject in last month's issue. At the November meeting, G3BCM will be talking on D-F Contests and suitable gear for them. **Sutton and Cheam** meet on November 15 at the Harrow Inn, Cheam Village, for a lecture-demonstration on the Osram 912 amplifier, by a representative of the G.E.C. They, with Mitcham, are running a "Local Derby" Contest during the Top Band Contest on November 12/13, and will also be taking part in MCC.

Wirral have arranged a full winter programme, and one of the special features will be the collective construction of FM tuners, under the technical guidance of G2FNI. The Club will be entering once more for MCC, and continues to meet, as ever, on the first and third Wednesday.

Lothians will be hearing about a 70-cm. DX-pedition to Drummore, by GM6WL, on November 17, and about Model Control (Dr. A. S. Brown) on December 1. On October 29 they visited the BBC station at Westerglen.

Barnsley will be having a talk on Band II FM Reception, by Mr. W. Williams, on November 11, and on November 25 G3FLQ will describe a Superhet Double-Conversion Adaptor. **Slade** will assemble on November 11 for a talk on Applications of Electronics in Industry, and on November 25 for their AGM. Their Club station at Church House is open *every day* for the use of members, and there are instructional classes every Monday, Tuesday and Wednesday evening at 8 p.m. Every fourth Friday (November 18 and December 16) there is an RAE Course.

Scarborough have been labouring mightily, and their members have turned an old workshop into a palatially-appointed Clubroom. An estimated £150-worth of work has been done by the members for the actual expenditure of only £10 and lots of their own time. The Club, and every individual member, benefits accordingly.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

ACTON, BRENTFORD & CHISWICK: R. G. Hindes, G3IGM, 51 Rusthall Avenue, Bedford Park, London, W.4.
BARNSLEY: P. Carbutt, G2AFV, 33 Woodstock Road, Barnsley.
BELFAST CO-OP.: D. Wilson, 189 Cregagh Street, Belfast.
BOURNEMOUTH: J. Ashford, 119 Petersfield Road, Boscombe East, Bournemouth.
CAMBRIDGE: F. A. E. Porter, 38 Montague Road, Cambridge.
CARDIFF: R. Morris, GW3HJR, The Shack, St. Cenydd Road, Caerphilly, Glam.
CLIFTON: C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
COVENTRY: J. H. Whitby, G3HDB, 24 Thornby Avenue, Kenilworth.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
EAST KENT: D. Williams, G3JES, Llandogo, Bridge, near Canterbury.
ISLE OF MAN: M. R. Thompson, GD3JIU, 146 Ballabrooie Drive, Douglas.
LIVERPOOL: A. D. H. Looney, 81 Alstonfield Road, Knotty Ash, Liverpool 14.
LOTHIANS: J. Good, GM3EWL, 24 Mansionhouse Road, Edinburgh 9.
MALVERN: W. N. Walker, Park View, Abbey Road, Malvern.
MEDWAY: H. G. Cheeseman, G3KNO, 265 Cliffe Road, Strood, Rochester.
NEWARK: J. R. Clayton, 160 Wolsey Road, Newark.
NORTH KENT: A. Wills, 42 Anne of Cleves Road, Dartford.
PLYMOUTH: C. Teale, G3JYB, 3 Berrow Park Road, Peverell, Plymouth.
QRP SOCIETY: J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames.
SCARBOROUGH: P. Briscombe, G8KU, Roseacre, Irton, Scarborough.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTH MANCHESTER: M. Barnsley, G3HZM, 17 Score Street, Bradford, Manchester 11.
SOUTHPORT: F. H. P. Cawson, G2ART, 113 Waterloo Road, Southport.
STOKE ON TRENT: A. Rowley, G3JWZ, 37 Leveson Road, Hanford, Stoke-on-Trent.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, Croydon.
SUTTON AND CHEAM: F. J. Harris, G2BOF, 143 Collingwood Road, Sutton.
WALSALL: F. J. Merriman, G2FPR, 123 Wolverhampton Road, Walsall.
WEST CORNWALL: J. N. Watson, 24 St. John's Terrace, Decoran, Truro.
WIRRAL: L. I. Powell, 549 Woodchurch Road, Prenton, Birkenhead.
WORTHING: J. F. Wells, 37 Salvington Gardens, Worthing, Sussex.

NORTH-WEST GET-TOGETHER

We are asked to announce that this, the fourth in the series, will take place at the Bull's Head Hotel, Walkden, nr. Manchester, on the evening of Saturday, December 17. It is an informal affair and takes the form of a hot-pot supper and smoking concert, in the best Lancashire tradition. It is hoped that a member of the GPO's Interference Dept. may be prevailed upon to give a short talk on TVI. Applications for tickets should be made as soon as possible, to G3HNT (*Tel.*: Swinton 2807, *or* 80-metre phone most week-ends) or to G3JNX (*Tel.*: Urmston 6816, *or* by Top Band most evenings). The address for postal applications is: N. L. Tomlinson, G3HNT, 37 Ranelagh Road, Pendlebury, nr. Manchester.

The Grafton Amateur Radio Society set-up at the Islington Handicrafts Exhibition, when they had G3AFT/A in action. G2CJN, secretary of Grafton, is at the extreme right, with G3JLA also seated. On the left is G3AFC (wearing headset), with a walkie-talkie. Others in the group are G3HNB and G3JFM.

Bournemouth meet on November 4 to hear a talk by B. Madeley on Stabilised Power Supplies. Most of their members will be attending the Dorset County Hamfest at Poole on November 13. Regular meetings take place on the first Friday of the month at the Cricketers' Arms, Windham Road, Bournemouth, and membership now includes fourteen licensed amateurs and ten SWL's. Prospective members, as well as visitors to the district, will always be welcomed.

North Kent suggest that it would be a good thing if all Clubs who hold a Top Band contest during the winter months would get together and arrange their events for the same week-end. Although the competition between Club members would continue, a subsidiary inter-Club contest could be taking place at the same time—possibly on the basis of the winning entry from each Club being submitted to a panel of judges.

If the secretaries of any Club wishing to arrange a Top Band contest towards the end of the winter care to write to us and say so, we will publicise the fact and see whether it is not possible to persuade them all to fit into one particular week-end.

Newark announce a full programme for the winter, with a Grand Junk Sale on November 6 and an inter-Club Quiz on December 4. They are entering MCC for the first time this year. Meetings are on the first Sunday of the month, at Northgate House.

The **QRP Society** enters its seventh year of existence this month, and its monthly journal reaches its 70th issue. A new certificate is to be awarded, by the Society's Transistor Group, to SWL's hearing ten or more transistor-operated stations. Next meeting for **Worthing** is on November 14, as usual at Union Place at 8.0 p.m.—*sharp*, says the hon. secretary's notice!

SCIENCE MUSEUM — GB2SM

The amateur station established at the Science Museum is now in operation, signing GB2SM, under the direction of Mr. G. R. M. Garratt, Deputy Keeper, who is himself G5CS and was licensed more than 30 years ago; his assistant is G. C. Voller, G3JUL. The idea of having a working Amateur Radio Station at the Science Museum was because it was suggested to the Museum authorities that it could do much to stimulate serious interest in radionics, especially among the younger generation and the more impressionable students who visit the Museum in such large numbers.

It is already being found that the special call-sign, obtained through the ready co-operation of the GPO, is very helpful in attracting DX. In this sense, GB2SM has the edge on other G stations on the HF communication bands! We hope to publish in an early issue a fully illustrated description of this enterprising venture by the Science Museum. Incidentally, it is open every day, free of charge, and apart from GB2SM, there are a great many extremely interesting exhibits to be seen in the Communications Section; it should be visited by everyone with an interest in radio communication.

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

VHF TECHNICIAN required by the POLICE DEPARTMENT, BRITISH GUIANA, on contract for one tour of 3 years. Salary at the equivalent rate of £1,200 a year with a gratuity at the rate of 22½% of the salary. Free furnished quarters. Free passages. Liberal leave on full salary. Candidates must have had a thorough training in the principles of radio and have had experience in the maintenance of VHF communication equipment (fixed and mobile sets). They must be able to train local personnel to maintain and operate the 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/41236/SQ.

MINISTRY OF TRANSPORT AND CIVIL AVIATION RADIO TECHNICIANS

APPOINTMENTS available for interesting work providing and maintaining aeronautical telecommunications and electronic navigational aids at aerodromes and radio stations in various parts of the U.K. Applications invited from men aged 19 or over who have fundamental knowledge of radio or radar with some practical experience. Training courses provided to give familiarity with types of equipment used. Salary £467 10s. 0d. age 25 rising (subject to a practical test) to £565. Rates lower in Provinces and for those below age 25. Prospects of permanent pensionable posts for those who qualify. Opportunities for promotion to Telecommunications Technical Officer are good for those who obtain O.N.C. in Electrical Engineering or certain C.G. Certs. Max. salaries of Telecommunications Technical Officers: Grade III £695, Grade II £810, Grade I £985. Apply to Ministry of Transport and Civil Aviation (ESB1/RT), Berkeley Square House, London, W.1, or any Employment Exchange quoting Order No. Westminster 6627.

TRADE

QSL'S and LOGS by MINERVA. The best there are.—Samples from Minerva Press, 48 Queen's Road, Brentwood, Essex.

LEARN IT AS YOU DO IT.—We provide practical equipment combined with instruction in Radio, Television, Electricity, Mechanics, Chemistry, Photography, etc.—Write for full details to E.M.I. Institutes, Dept. SW47, London, W.4.

WANTED: TUNING UNITS TN17, TN18, TN19 and R54/APR4 : £50 each offered.—Box 1383, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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

WANTED: BC-610 Hallicrafters, ET-4336 Transmitters and spare parts for same. Best prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6.

SMALL ADVERTISEMENTS, TRADE—*continued*

YOUR SHORT WAVE MAGAZINES BOUND, 12s. 6d. per volume. First-class workmanship.—Underwood, Earls Road, Amesbury, Wilts.

G3CGD QSLs. Samples of fixed or mobile cards on application.—30 St. Luke's Road, Cheltenham. Glos.

READERS' ADVERTISEMENTS

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

EDDYSTONE four element two-metre beam, new, unused, 65/-; RSGB two-metre converter in Philpott's cabinet, £5; 829B, 40/-; bases (two), 5/- each; Vibrator unit, 2v. in 100v. out., 25/-; brand-new meters, moving coil, 0-30 mA (two), 2in. round, 4/- each; 0-50 mA (two), 2½in. round, 5/- each; 10-0-10 mA, 2½in. round, 7/6; L & R indicators for 1155 (two), 7/- each; thermo couple for RF, 0-½ amp. (seven), 2in. square, 5/- each; 0-350 mA (thirty-five), 2in. round, 4/6 each; 0-2½ amp. (six), 2in. round, 5/- each; 0-3½ amp., 2in. round, 5/-.—Sephton, 16 Bloemfontein Avenue, Shepherds Bush, London, W.12.

COLLINS Receiver, 9 valves, 1.5 to 12 mc, internal power pack, fine condition, £9 10s.; MCR1, complete, coils, phones, £3.—Box 1627, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: RSGB Band III TV Converter, as August *Bulletin*, in specified cabinet; aerial tested; FB performance; £9.—44 Hazell Road, Farnham, Surrey.

CR100, good condition, £15; BC-348R, as new, built-in power pack, S-meter and noise limiter, 12; BC-221AK, perfect, £10; two-valve Sig. Gen., new, £3 10s.—40 Parkwood Road, Wimborne, Dorset.

REAL BARGAIN: Portable 0-V-1 SW Bat. Receiver; will cover all bands, fitted set, spread calibrated; very economical; excellent condition; very cheap; s.a.e. for particulars.—Box 1606, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AR88LF with S-meter, perfect condition, £55; BC-221, fitted internal modulation and built-in electronically regulated power supply, £22; new Reslo ribbon mike and chrome table stand, £7; new boxed 866A Rectifiers, 12/6; 813, 42/6. Various other items; state needs; s.a.e. WANTED: Xtals hitting 80, 40, 20, preferably FT241.—27 York Road, Selsdon, Surrey. (*Sanderstead 3219*).

FOR SALE: Class D Wavemeter; Acos MIC/40 Microphone; Crystals 3516 (two), 3518 (six), (Certs), 3584, 7158; Modulator with power supplies, 6SJ7, 6J5, pair 6L6's; all good condition; £13.—G3HQF, 16 Oate Hill, Chippenham, Wilts.

AR77E, in polished wood case, perfect condition, spare set new valves, handbook, modern M/C Microphone; prefer buyer collects; £30. Brand-new valves (five), Type 813, 50/- each; (two) 723A/B, 65/- each; (nine) 12AU7; (two) 6BW6; (three) 5763; (three) R17; (four) 1S5; (four) 1T4; 6/6 each.—Whittaker, 19 Longwood Avenue, Cowplain, Portsmouth.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: 20-metre Rotary Beam Aerial.—G3ALH, Fullerton House, Collingham, Nr. Wetherby, Yorks. (*Phone Collingham Bridge 242*).

SALE: BC-348 Rx; 58 set with Vibrator Pack, etc.; VHF Rx; UM1; components, books; offers; s.a.e. list.—Roberts, 28 Mumbles Road, Swansea.

G3HQU OFFERS: 12 Set converted xtal Mic. perfect, £16 10s.; RSGB 2-metre converter, new, £8; Denco Turret, new, boxed, £7 10s.; 26 Unit, 25/-; ditto for 14 mc, £2; Collins VFO, 55/-; 1155, power pack, S-meter, etc., £14 10s.; Minimitter, 150w., all-band, perfect, £65; Ribbon Mic, new, super job, £8. Valves, components, etc. Please state requirements.—40 James Street, Barrow, Lancs.

AR88LF, with spare set valves, £37 10s.; 45ft. 2in. sectional Duralumin Mast, complete, 75/-; 2-metre converter, 60/-; buyer collects.—137 Sunningvale Avenue, Biggin Hill, Kent. (*Biggin Hill 485*).

S38B, .5-30 mc, 110-230v. Transformer, £15 (o.n.o.).—G3JUZ, AMQ 1 (CB), R.A.F. Finningley, Doncaster.

SALE: Eddystone 640, complete with instruction book; late model; £18, carriage paid. Hambander, excellent condition, 1.7-30 mc in five bands, £12, carriage paid.—Box 1628, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EDDYSTONE 640, nice condition, with matching speaker, £17.—Sumner, 35 Moss Lane, Leyland, Lancs.

SALE: R1224A, £4; Precision 856G Testmeter, less 50 μA movement, 39 ranges, £4; 811 valves, £1 each, plus carriage.—Carlisle, 65E Bridewell Drive, Carrickfergus, Co. Antrim.

HRO, MX, complete with power pack and band-spread coils. Various valves: 813, 805, 866, etc.—G3JOL, Saracens Head Hotel, Daventry.

HRO Senior, rack mounting installation, complete rack and nine coils. Offers? DST100, unmodified, £15; B2, complete, as new; offers? A Mk. III, new, complete, spares; offers? Canadian No. 9 Tx Rx, 813 final, 12v. DC input; offers?—L. Grout, 68 The Drive, Worthing.

FOR SALE: Hambander, 7-valve Receiver; very good condition; £11, including carriage.—G3HRU, 7 Benton Park Drive, Yeadon, Yorks.

1955 NATIONAL NC98, Auto, Handbook, £70; carriage paid, cash with order.—Box 1530, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

METERS: New 2in. square flush, 0-5 mA, 8/6; 0-40/120 mA, 12/6; 0-100 mA (scaled 0-300), 8/6; 0-2.5 amp. T.C., 10/6; 0-5.5 mA T.C., 7/6.—Low, Moulin, Balmoral Road, Blairgowrie.

FOR SALE: Eddystone 840, £22; mint condition, little used; one owner; buyer collects.—Main, 24, Hale Road, Wallasey, Cheshire.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: AR88D, good condition, recently overhauled; price £30.—Apply Gee, 106 Oxford Gardens, London, W.10, or ring *Ladbroke 0241*.

CLEARING OUT surplus gear, very cheap. Bargain parcels, 10/-. Send for lists. Callers welcome.—G3ABG, Morris, 24 Walhouse Street, Cannock, Staffs.

SX 28, perfect condition, £35 (o.n.o.); buyer collects.—Baillie, 147 Croftside Avenue, Glasgow, S.4. (*Merrylee 7542*).

R 1155N, 10 valves, separate *Wireless World* power pack/output stage, excellent equipment, in transit case, £15.—Miller, 48 King's Road, Clacton, Essex.

G3DCJ clearing surplus Rotary and Vibrator packs. Windcharger props, CR100 coil pack, IF's, etc.; Oscilloscope VCR139; B2 TX only; s.a.e. enquiries; offers.—Treeve Moor, Sennen, Penzance.

COLLINS 32V2 Tx and 75A1 Rx in perfect condition; manuals; offers? Also 1147A Rx, £30. —G6ZW, Loxwood, Meads, Eastbourne.

R 109, £3; Radiovision Converter, 10 and 20-metre, £3; 1500v. power pack, £3. REQUIRE: Top Band rig.—G3COI, 65 Hurst Street, Birmingham.

BC-624, BC-625, all valves, control rack, crackle case, as new, £6 10s. Another, less 832's, £5. Prefer buyer collect; s.a.e. enquiries.—Lawn, 20 Croft Road, Godalming, Surrey.

URGENTLY REQUIRED: Class-D Wavemeter, in good condition. Your price paid.—G3KLX, Richey, 22 The Fridays, East Dean, Eastbourne, Sussex.

PHONE Transmitter, QRO, all bands, required; also Class-D Wavemeter.—62 Hednesford Street, Cannock, Staffs.

CR100, phones, manual, 1955 *Radio Amateur Call Book*; recently professionally lined; excellent working condition; £20 (no offers).—Coates, Sea-Fields, New-Quay, Cards. (*Tel. 388*).

COMPLETE 150-watt Transmitting Station, £55; Marconi Transmitter, 1.8 mc to 14.3 mc; ex-American Army Receiver, 1.5 mc to 30 mc; 2 RF's, 3 IF's, etc.; Mic. D104; Calibrator from 19 set.—G3BEF, 9 Old Park Ridings, N.21. (*LAB. 2981*).

EDDYSTONE-TYPE 556 Receiver; 6-volt battery: £30.—52 Hyde Road, Paignton, Devon.

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SMALL ADVERTISEMENTS, READERS—*continued*

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