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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Inspiration

While the art of Amateur Radio develops and changes with the times — above all else, we must have progress in techniques — the essential pattern of radio amateur activity remains the same. As has been said here before, the basic conception, the reason for the existence, of Amateur Radio is that of being able to communicate at will with one's fellows " either across the parish or across the world." It is that, in nearly every case, which inspired the original application for a licence — to be able to go on the air and talk (using that word in the sense of either CW or phone) is what most of us want to do, and why we ever thought of becoming radio amateurs at all. Communication is, always has been, and always will be, the dominant factor in all Amateur Radio activity.

Once this first urge has been satisfied to greater or less degree, the individual nearly always tends to branch off in some direction of specialised interest. It might be pure experiment, or an unending series of constructional efforts, or band specialisation, or the collection of DX trophies, or VHF endeavour — or some other of the wide variety of possible lines of activity which together go to make up the whole fascinating field of interest open to the radio amateur.

But the important fact is that the great majority of amateurs always come back, sooner or later, to having spells of pure communication activity — very often no more than making QSO's just for the sake of having contacts. They give all sorts of reasons for this: " Just keeping my hand in," " Making sure the gear still works," " Happened to hear so-and-so on the band, so thought I'd give him a shout," or " Suddenly felt I'd like to work some DX again "— the original inspiration has never left them. And that, really, is all there is to it!

Austin Forbes G6FO.

WORLD-WIDE COMMUNICATION

DESIGN FOR A HIGH-PERFORMANCE COMMUNICATIONS RECEIVER

USING MODIFIED TV TURRET-TUNER—COVERING ALL AMATEUR BANDS—CASCODE RF STAGE—DOUBLE CONVERSION —CRYSTAL SELECTIVITY AND SIDEBAND SELECTION

D. E. PASFIELD (G5NH)

This is a design for the more experienced constructor and embodies several interesting features. Our contributor has hit upon the idea of modifying a standard 12-channel TV turret tuner to accommodate the coils for the various amateur bands, thus obtaining—without any constructional complication—a tuning assembly which mechanically and electrically is of very high efficiency. This turret is adapted to provide a front-end tuner incorporating a cascode RF stage and mixer-oscillator, feeding into an IF/AF amplifier unit using modern techniques and circuitry. The IF's chosen are 1·6 mc and 465 kc, with a four-position crystal gate and a crystal-controlled second oscillator giving sideband selection. The general design can be adapted in various ways to individual requirements, and is intended to suggest possibilities rather than be copied in detail. While a particular make of TV turret tuner is mentioned, any good multi-channel tuner giving up to six or eight switch positions—as from a discarded TV receiver of the older pattern—could equally well be used.—Editor.

THE receiver here described is capable of a very high performance on the amateur bands from 160 to 2 metres. Its salient features are: Double conversion for image freedom; turret tuned RF assembly for mechanical stability and good efficiency on the higher frequencies; crystal controlled second mixer switchable for upper and lower sidebands; switched lattice-filter and crystal-controlled Q-multiplier; valve voltmeter S-meter; use of frame-grid valves; low cost for the amateur constructor; additions can always be made in accordance with modern improvements.

It was thought originally to incorporate a mechanical filter but the cost of this would have been more than half the complete receiver, so this was abandoned!

The complete RF front-end is designed around a Cyldon (or similar commercial) TV turret-tuner which has excellent self-wiping contacts; it is doubtful if any other form of construction could make the coil and switch leads shorter, while the design of commercial TV tuners is such that a neat and rigid front-end construction is ensured. Fig. 1 shows the general circuit arrangement in block form, and Fig. 2 is the front-end detail.

As the turret-tuner has twelve positions, coils can be wound for all the amateur bands, also for TV Channels 1-5 (for TVI checks) and an IF band for 2 and 4 metres, for use with the appropriate converters.

The RF stage is an ECC84 cascode amplifier followed by an ECF804 frame-grid mixer/oscillator, giving IF of 1685 kc. Oscillation injection is *via* C10 in the cathode of the mixer section of the ECF804, V2, Fig. 2.

Second conversion (V1 in Fig. 3) is to 465 kc and crystal controlled, using an ECH81 at 2150 kc and 1220 kc, switched for upper and lower sideband, followed by three stages of IF at 465 kc.

The crystal frequencies need not be exact and will depend on surplus crystals available, but it is essential that the final choice is such that the *difference* between them is exactly equal to the 2nd IF channel of 465 kc —otherwise an IF frequency shift will take place on switching. Most crystals can be corrected with a small capacity in parallel if the difference is not too great. The 465 kc IF stages use two EF183 frame-grid valves (V2, V3, Fig. 3) and one EF85 (V4), the former having very good AVC characteristics due to their high slope.

A half-lattice filter is incorporated in the first stage after the second mixer, giving bandwidths in the order of 300 cycles, 3 kc, 5 kc and "broad"; these are controlled by switch S1A with the appropriate crystals.

An IF gain R15 is provided to obtain maximum performance. Too much will make the receiver noisy, whilst too little will make it appear insensitive.

An EB91 (6AL5) is used at V6 as second detector and AVC; this is also applied to the ECC84 RF amplifier (V1 in Fig. 2) and the first and second IF stages, and is slightly delayed. The last IF stage V4 is *not* controlled as this minimises noise effect. Due to the smaller than normal decoupling condensers the AVC is quite rapid in response. V5 is the Q-Multiplier stage. The noise-limiter at V7 is a shunt-fed type.

The S-meter, V10 stage, is driven from the AVC line, and is a valve-voltmeter arrangement with balance (R50) and sensitivity (R55) controls provided.

On the audio side, the LF amplifier V8 is an ECC83, of which one half is used as a normal feed to the output stage, whilst the other half is separately fed straight from the noise-limiter output V7 (*via* an attenuation network, R39, R40) to provide a signal source for a tape recorder; this will be unaffected by the LF gain control R38 and will be a very faithful image of the signal as received.

A phone jack (not shown in Fig. 3) is provided between the anode of the ECC83 V8 and the output valve, and this is arranged to short the grid of the output valve to earth when in use.

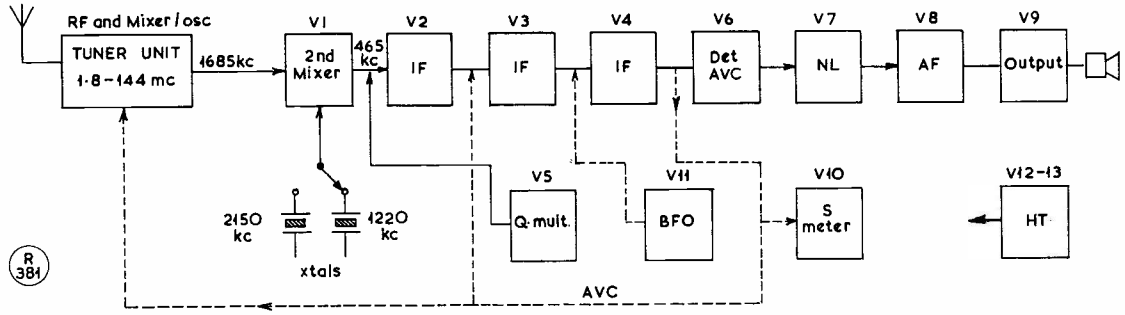


Fig. 1. Block schematic to show general circuit arrangement of the receiver designed and described by G5NH. The tunable front end is constructed on a modified TV-type turret tuner of standard commercial manufacture, this section embodying a cascode RF stage and the oscillator/mixer to 1.6 mc. Second conversion is to 465 kc and this also enables standard parts to be used throughout the IF/AF amplifier section. The oscillator to 465 kc is crystal controlled, switched crystals enabling either sideband to be selected. The design also incorporates the usual refinements, and these include a filter system giving four selectivity positions down to 300 c.p.s.

Table of Values

Fig. 2. Turret Front-End Section of G5NH Receiver

C1, C2, C3, C4, C5, C7, C8, C11 = .01 μF, disc cer.
C6 = 100 μμF, cer.
C9 = 30 μμF, s/m
C10 = .001 μF, cer. NSF
Ca, Cb, Cc = 3-gang, 20 μμF per section
Cx = *see text*
R1, R2 = 100 ohms, ½w.
R3, R12 = 47,000 ohms, ½w.
R4, R8, R10, R11 = 1,000 ohms, ½w.
R5, R7 = 100,000 ohms, ½w.
R6 = 1 megohm, ½w.
R9 = 33,000 ohms, ½w.
R13 = 2,000 ohms, w/wound
T1 = 1.6 mc IF xformer, miniature
V1 = ECC84
V2 = ECF804 (ECF82, *see text*)
L1, L2, L3, L4 = *see* Coil Table

The output valve V9 is an EL84 with negative feed-back applied through R46, which gives a zero hum-level, as well as good quality.

The receiver is built on a 16g. aluminium chassis 14 ins. wide by 10 ins. by 3 ins. deep. No exact measurements are given, but the general layout is shown in block form in Fig. 4. This may vary slightly, depending on the type of turret and the IF transformers used. Since the turret itself is very rugged and contains the oscillator section, high-order rigidity is not necessary on the main chassis and the gauge suggested is enough. [over p.628

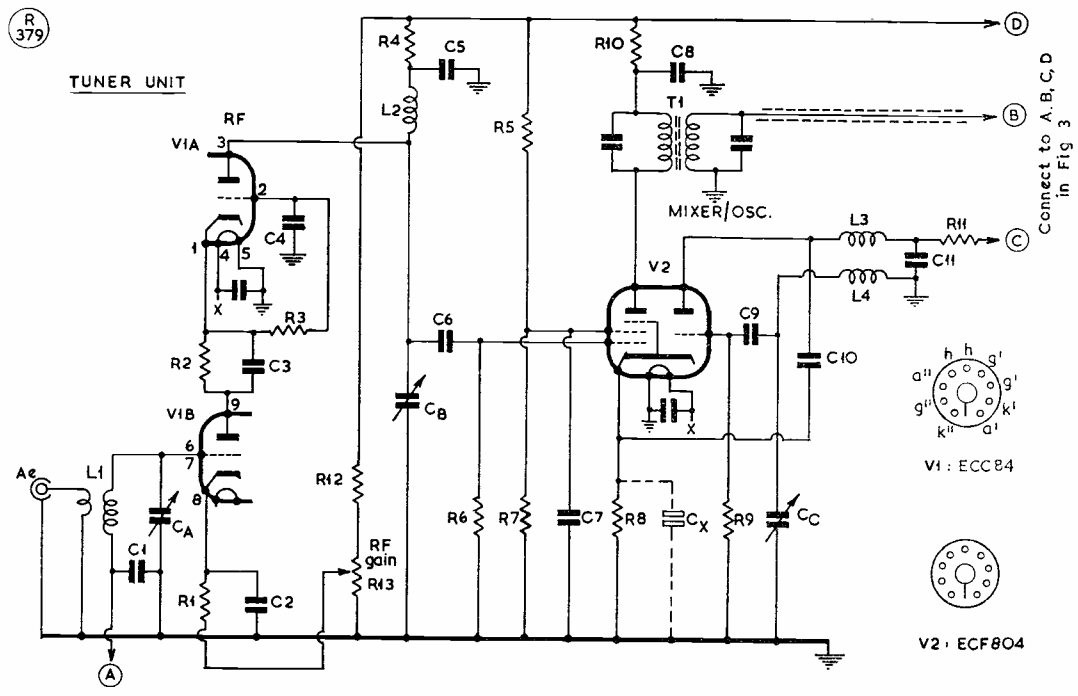
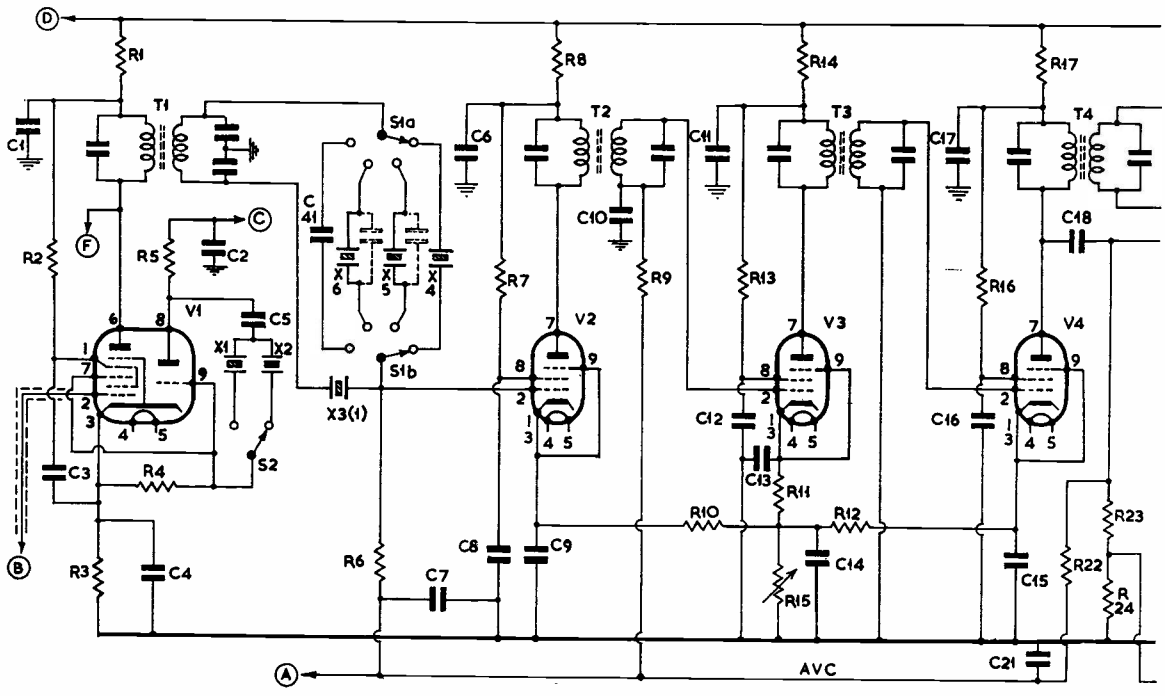
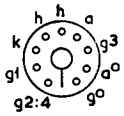
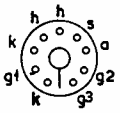


Fig. 2. The front-end of the G5NH receiver, with full circuit details. The coils L1-L4 inclusive are carried on a 12-channel TV-type turret tuner, which not only enables a wide frequency range to be covered, but ensures mechanical rigidity with good electrical layout. While the frame-grid type ECF804 is recommended for V2, the oscillator/mixer stage, the more standard ECF82 could be substituted with satisfactory results. The RF stage is in cascode, giving a much improved performance on the HF bands. The coil values for a wide range of frequencies are given in the table, p.630. Heater by-pass condensers "X" are as fitted in turret.

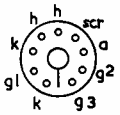




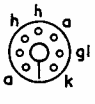
V1—ECH81



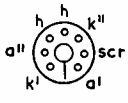
V2: V3—EF183



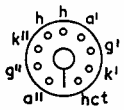
V4 - EF85



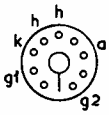
V5-6C4



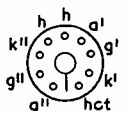
V6: V7-EB91



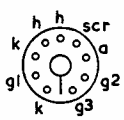
V8- ECC83



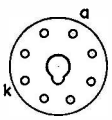
V9-EL84



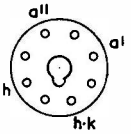
V10-ECC82



V11-EF80



V12-VR150



V13-GZ32

Table of Values

Fig. 3. The IF/AF Section of the G5NH Receiver

C1, C2, C3, C4, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C21, C22, C26, C28, C31, C33, C34, C38, C42 = .01 μF, disc cer., 350v.

C5, C20 = .001 μF, cer. 500v.

C23, C24, C35, C36 = 100 μμF, s/m 500v.

C18 = 20 μμF, s/m 500 v.

C19 = 500 μμF, s/m 500v.

C25, C30 = 0.1 μF, tub. 350v.

C27 = 0.125 μF, tub. 350v.

C29 = 8 μF, 450v. elect.

C32 = 50 μF, 450v. elect.

C36 = On BFO coil

C37 = 20 μμF, BFO pitch

C39, C40 = 16 + 32 μF, 500v. elect.

C41 = 25 μμF, s/m

R1, R8, R14, R17 = 2,200 ohms

R2, R7, R13, R16 = 39,000 ohms

R3, R10, R11, R12 = 200 ohms

R4 = 33,000 ohms

R6, R9, R32, R42, R43 = 100,000 ohms

R5, R19, R44 = 22,000 ohms, 1w.

R15, R36 = 5,000 ohm, w/wound

R18, R28, R35, R37, R57 = 56,000 ohms

R20, R25, R41, R45 = 1,500 ohms

R21 = 2,000 ohm w/wound pot. with switch

R22, R26, R29, R39, R48 = 470,000 ohms

R23 = 1 megohm

R24, R30, R31, R33 = 220,000 ohms

R27 = 20,000 ohms, 2w.

R34 = 1,000 ohms

R38 = 500,000 ohm pot. with DP on/off

R40 = 47,000 ohms

R46, R52, R52, R53 = 10,000 ohms

R47 = 2,000 ohms, 1w.

R49 = 150 ohm, w/wound, 5w.

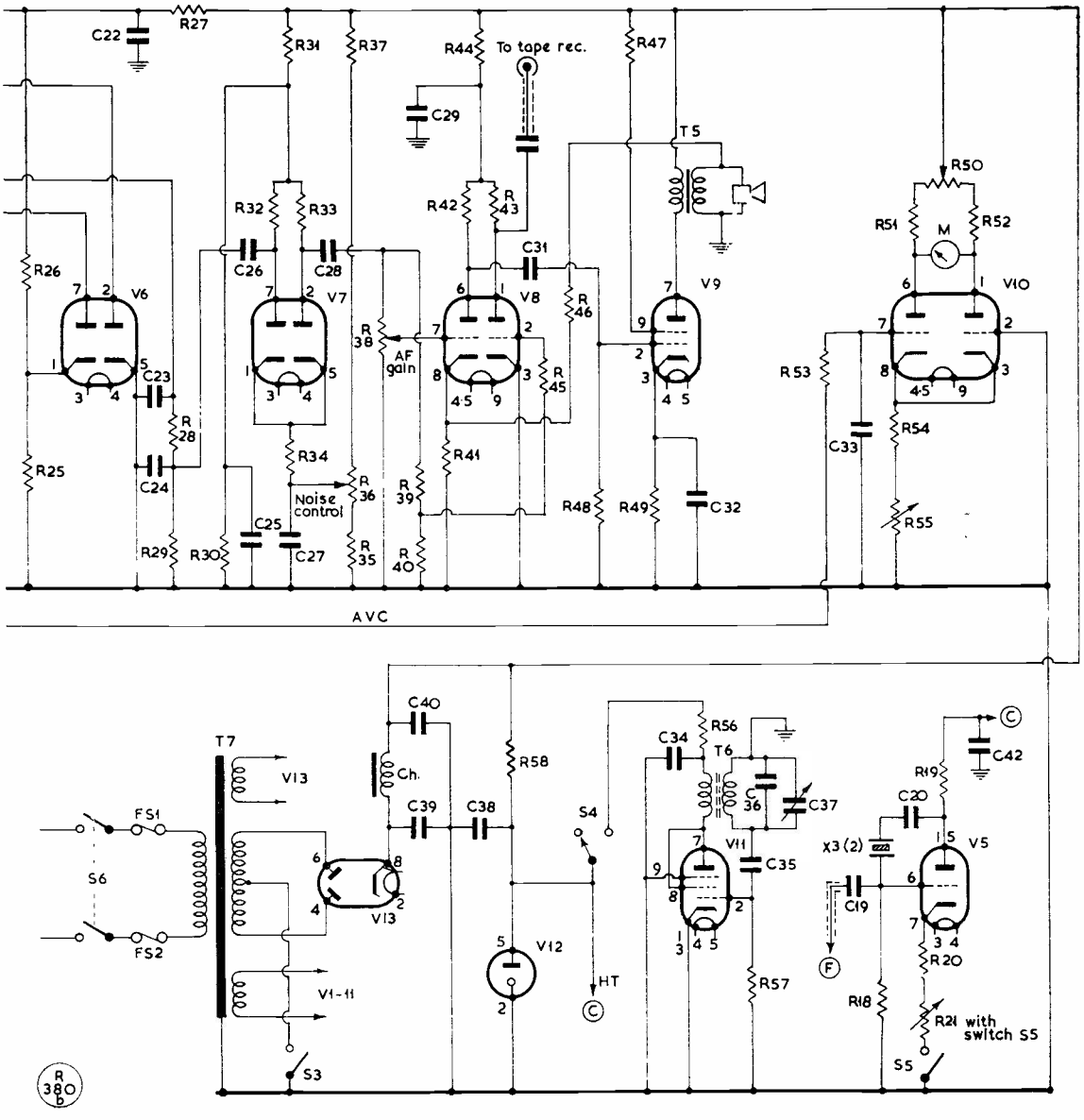


Fig. 3. Circuit of the IF/AF amplifier section of the G5NH double-conversion receiver discussed in the text. This should be read with the block diagram at Fig. 1. Standard miniature IF transformers are used and the crystals in the filter section between V1 and V2 can be surplus types, adjusted to the required frequencies, as explained in the text. The S-meter circuit is a valve voltmeter arrangement, driven from the AVC line, and gives very sensitive indication. The circuit round V8 enables a tape recorder output to be obtained without unbalancing the audio side. Some general constructional details are given in the article, and a suggested panel-chassis layout is shown at Fig. 4, p.628.

R50 = 10,000 ohm pot.
R54 = 1,200 ohms, 1w.
R55 = 500 ohm pot.
R56 = 5,000 ohms, 1w.
R58 = 3,000 ohm, w/wound, 5w.
T1, T2, T3, T4 = 465 kc IF xformers
T5 = 3/5,000 ohm matching xformer
T6 = BFO coil assembly
T7 = 300v. 100 mA, 6.3v. 5A, 5v. 2A.
Ch = 20-Hy 100 mA
S1 = 4-way DP, ceramic, selectivity
S2 = 2-way SP, ceramic, sideband select
S3 = Send-receive
S4 = BFO on-off
Meter = 0-1 mA, S-pt.
F1 = Fuses
X1 = 2150 kc xtal
X2 = 1220 kc xtal
X3 (1), X3 (2) = 465.15 kc xtals
X4 = 465.29 kc xtal
X5 = 467.8 kc xtal
X6 = 470.0 kc xtal
V1 = ECH81
V2, V3 = EF183
V4 = EF85
V5 = 6C4
V6, V7 = 6AL5
V8 = ECC83
V9 = EL84
V10 = ECC82
V11 = EF80
V12 = VR150/15
V13 = GZ32, or similar

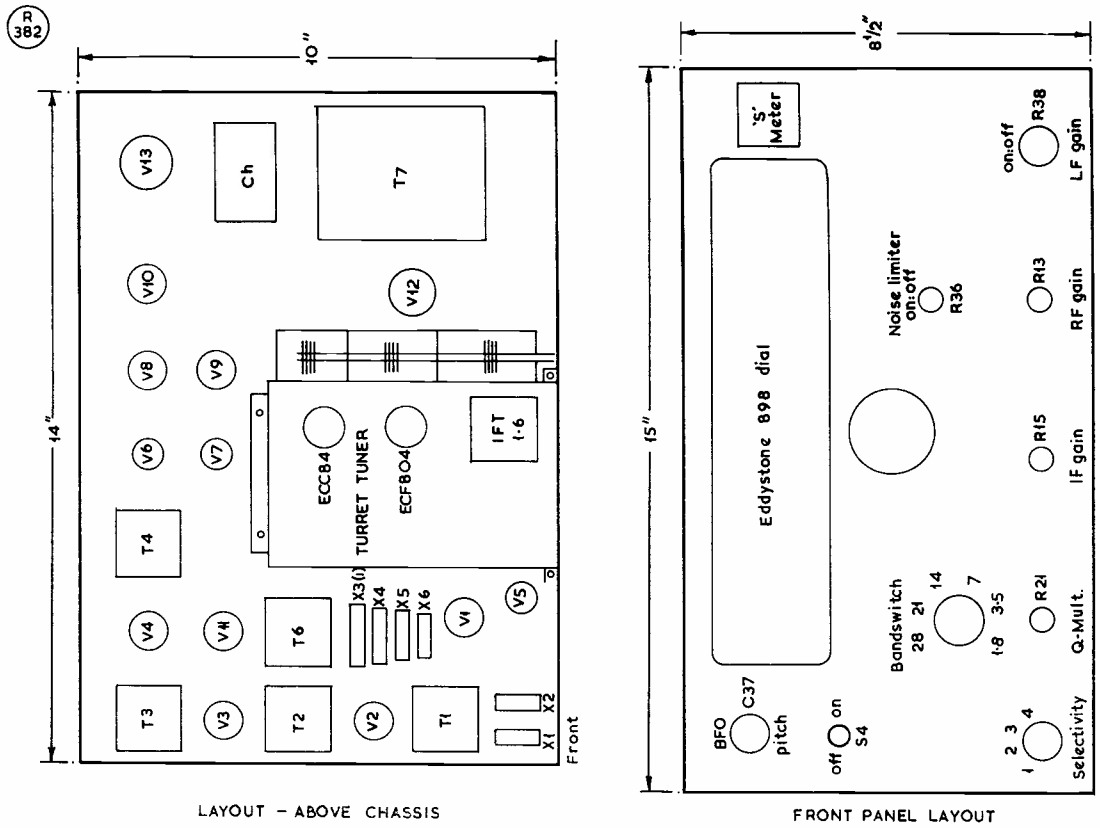


Fig. 4. The chassis and panel layout adopted by G5NH for the receiver described in his article, an impression of the finished appearance being given in the photograph. Since this design is intended to suggest circuit ideas to the more experienced constructor, no great detail is given as to its actual construction and mechanical arrangement.

The receiver can be constructed in sections to simplify the work, in the sense of Figs. 2 and 3. The turret front end can be built first and lined up by feeding into an existing receiver at 1685 kc and for this reason the first IF transformer is mounted on the turret as shown in the photograph; this also minimises IF break-through.

Modification of TV Tuner

First remove all existing snap-in coils and withdraw the coil-carrying frame from the assembly. This is held by springs at either end of the shaft. The fine tuner can be stripped off completely, as its capacity is too small to be used as a band edge marker. The existing IF coil and cascode neutralizing coil are taken out and the circuit then checked to see how it compares with Fig 2. It should be modified to follow this exactly, and the job is comparatively easy.

The 3-gang 20 $\mu\mu$F tuning condenser is mounted on the right-hand side of the turret (identified by the removable side plate) on brackets about 1 in. high, in order to position it correctly for the Eddystone dial. The turret itself has two right-angle brackets the width of the turret mounted just above the slots carrying the coil assembly frame spindle. This is then dropped into a cut-out in the main chassis and bolted to it. The coils can be wound on the existing biscuit formers, or on $\frac{1}{4}$ in. polythene rod suitably tapped to take the iron-dust cores. Nearly all turret coils have brass slugs originally and these are 2 BA, in which suitable dust-cores can be obtained.

To resonate the mixer coil the procedure is as follows: The coil is first placed in the biscuit and fixed, and when *in situ*, the turns are adjusted for maximum signal. This is necessary, as no means are provided for resonating this coil otherwise. The RF input coil and oscillator section can be resonated through slots in the turret in the normal way.

The coils are wound as in Table 1 using the GDO, but to simplify the job, if a 10 $\mu\mu$F condenser is put across all the padding condensers in the table and the coils brought to the mid-band frequency of each range, only very slight adjustment will be found necessary when they are in the turret. Strays can be neglected in relation to the value of the padding condensers.

The oscillator is on the *low* frequency side for 45-60 mc and 28 mc, and on the *high* side for all

other bands. For 160 and 80 metres, the best thing is to obtain small commercial coils (which are wave-wound) and to remove turns until they resonate according to the table.

The writer used the medium-wave aerial coils made by Weymouth, as their formers will slide on to the existing biscuit formers very nicely. These coils can be waxed into place, whilst all other windings should be secured with cement.

IF Stage

From the turret section Fig. 2, output is fed into the second mixer at 1685 kc, with the oscillator crystal controlled, to give output when mixed at 465 kc. This frequency was chosen in preference to either 50 or 100 kc, as the lower the second IF the more likelihood there is of cross-modulation taking place at IF.

The switched half-lattice filter is between the second mixer anode V1, Fig. 3 and grid of the first EF183, V2. The switch was mounted on a screening plate about 4 in. in from the front of the chassis and an insulated extension rod is used to operate it.

Crystals are of the FT241 type marked as 72nd harmonic, the marked frequencies being 33·5, 33·7 and 33·9 mc, giving frequencies of 465·29, 467·8 and 470 kc approximately, for X4, X5 and X6. These were the nearest available at the time, although it may be possible to obtain closer types for other bandwidths.

With any switched filter the mean IF may change very slightly on switching to other bandwidths, but without going to extremes this effect is unavoidable, although in practice a slight movement on the main tuning condenser will correct this without any apparent side effects.

The two-pole switch S1 is necessary in order that the filter crystals will be completely out of circuit in the broad position, to avoid the " ringing " which would otherwise take place due to various capacity effects.

If a wobbulator and 'scope are available alignment of the filter will be greatly simplified, but if not, a signal generator which has quite a wide scale at 465 kc will do.

The writer actually wound a coil and used the GDO and this gives a very nice degree of band-spread. As to align crystal circuits a modulated signal is not desirable due to harmonics causing false readings, no other modification is required of the GDO. It is advisable to get the S-meter circuit in place before alignment is commenced as this will simplify the final alignment.

It is sufficient at this stage to line-up the 465 kc section roughly by feeding the signal generator or GDO into the 2nd mixer grid (with the 2150 and 1220 kc crystals removed) and peak them all for *maximum* on the S-meter, with the exception of the last IF circuit feeding the diode detector which should be tuned for *minimum*. This is normal when AVC is derived from the last IF valve anode.

Now, depending on the crystals obtained, the 465 kc crystal should be plugged in and its peak found on the S-meter, using the GDO. This crystal is now removed and the next higher frequency one inserted and the peak noted again.

The mid-point on the GDO between these two peaks is now taken and the whole IF strip is lined up to this frequency, *with all crystals in circuit* and the switch in Position 2.

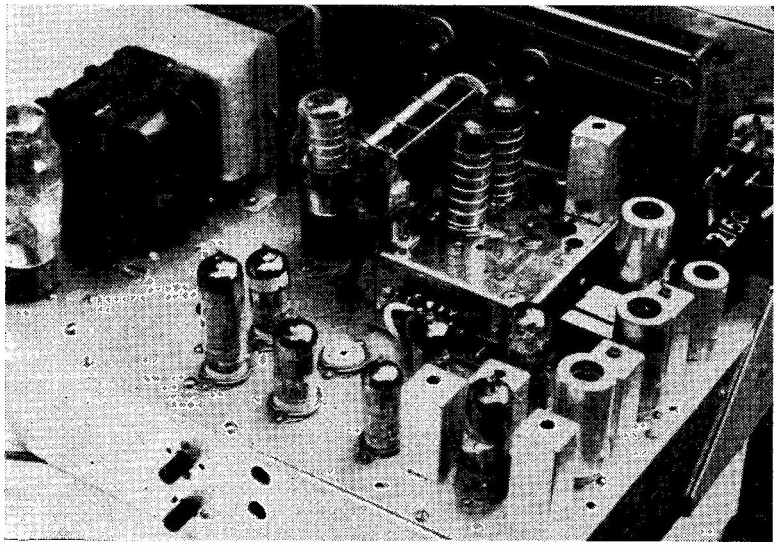
Assuming the first crystal was 465·3 kc, then the IF should be aligned as near to 465·15 kc as possible (and referring back to the sideband crystal selection the difference between these two crystals should now be 930·30 kc).

The crystal-controlled Q-multiplier V5 was decided on after various methods of obtaining the necessary high " Q " were thought about. Providing that crystals X3(1) and X3(2) are of the same frequency, 465·15 kc, the 465 kc IF strip can be aligned directly to this frequency.

However, one is usually anxious to get a receiver working and these refinements can be worked up later, hence the previous alignment details.

The noise-limiter, placed in the audio chain, is a variable peak limiter suitable for all types of signals and is a standard circuit. The BFO V11 follows normal practice except that it does not appear necessary to have a separate injection feed as, due to proximity, sufficient indirect pick-up is obtained.

By using a BC-221 or a 10/100 kc crystal calibrator the main dial can be calibrated and the actual measured frequency limits, band by band, were as



General layout above chassis of the G5NH receiver, using a modified TV-type coil turret as the main tuning unit. Full circuit details are given in the article, and a suggested mechanical layout in Fig. 4. The unfilled valveholder visible in this photograph is for possible circuit extensions.

follows: 29·9-27·8 mc; 21·6-19·8 mc; 14·5-13·9 mc; 7·0-7·29 mc; 3·5-4·0 mc; 1·75-2·0 mc.

An easy way to mark the dial is to obtain black transfers with sufficient numbers to accommodate the bands. These look neat and are easy to read.

General Comments

All grid and anode leads in the RF and IF sections should be screened where applicable, and be kept as short as possible, while the use of disc ceramics makes for really short earth returns.

The choice of a triode-pentode mixer/oscillator as V2 in Fig. 2 may be questioned, but the ECF804 is the frame-grid equivalent of the ECF82, which is itself an excellent valve for the purpose. In fact, by direct comparison, the noise is reduced almost to that of a triode, as these frame-grid valves will give excellent gain at low HT values, and the turret only has 130 volts applied, anyway.

In practice, it may be found that the injection condenser C10 Fig. 2 may not be required, as sufficient injection voltage is obtained by mutual coupling. In the writer's first effort an ECF82 was used, and this did require injection, but not using the ECF804. However, a lot depends on individual coil requirements. If it is found that C10 can be removed, it is essential to bypass R8 by a ·01 ceramic condenser, Cx in Fig. 2.

The receiver will give a good performance on SSB by the usual BFO method, but this obviously has limitations, and it is as well to concentrate on AM performance at this initial stage. The intention is to add a suitable SSB detector, and modify the AVC circuit accordingly.

The performance of the cascode circuit is still being evaluated, but the writer finds that from 14 mc upwards it is still better than the conventional RF stage, though this may be partly due to the extremely short coil leads in the modified TV turret.

On the question of cross-modulation, however, it is definitely superior. The writer lives within a mile of Overseas Broadcast transmitters using various frequencies between 4 and 26 mc during the whole 24 hours. At one period, three 100 kW transmitters are operating around 21·6 mc and no trouble is experienced, even using a 137 ft. end-connected aerial through an ATU to the receiver (which is, incidentally, designed for 80-ohm input). No other arrangement the writer has tried is comparable in this area.

Due to lack of suitable measuring equipment, no performance figures are available at the moment, but by comparison the general results are excellent and equal in all respects to any other receiver and better than a good many commercial ones. The circuit is not really critical or complicated, and the constructor can be assured that he will have a receiver which will amply repay the work put in.

BAND *mc*	COIL	TURNS	WIRE *enam*	SPACING	PADDING *capacity*	RESONANCE *frequency*	CORE *used*
45-66 TV	L1	3/5	18g.	w/dia.	10 μμF	55 mc	
	L2	5	18g.	w/dia.	10 μμF	55 mc	*none*
	L3	5	18g.	w/dia.	—	—	
	L4	5	18g.	w/dia.	15 μμF	53.4 mc	
28-30 10m.	L1	4/10	22g.	cl. wnd.	60 μμF	29 mc	dust
	L2	10	22g.	w/dia.	80 μμF	29 mc	*none*
	L3	9	30g.	cl. wnd.	—	—	—
	L4	10	22g.	w/dia.	60 μμF	27.4 mc	dust
21-22 15m.	L1	3/9	22g.	cl. wnd.	150 μμF	21.3 mc	dust
	L2	10	22g.	w/dia.	150 μμF	21.3 mc	*none*
	L3	10	30g.	cl. wnd.	—	—	—
	L4	9	22g.	w/dia.	120 μμF	22.9 mc	dust
14-14.5 20m.	L1	4/13	22g.	w/dia.	180 μμF	14.2 mc	dust
	L2	13	22g.	w/dia.	200 μμF	14.2 mc	*none*
	L3	10	30g.	cl. wnd.	—	—	—
	L4	12	22g.	w/dia.	200 μμF	15.8 mc	dust
7.0-7.3 40m.	L1	7/40	30g.	cl. wnd.	100 μμF	7.1 mc	dust
	L2	40	30g.	cl. wnd.	100 μμF	7.1 mc	*none*
	L3	8	30g.	cl. wnd.	—	—	—
	L4	20	30g.	cl. wnd.	110 μμF	8.7 mc	dust
3.5-4.0 80m.	L1		*see text*		20 μμF	3.6 mc	dust
	L2		*see text*		20 μμF	3.6 mc	*none*
	L3	20	34g.	cl. wnd.	—	—	—
	L4	55	34g.	cl. wnd.	40 μμF	5.2 mc	dust
1.75-2.0 160m.	L1		*see text*		30 μμF	1.9 mc	dust
	L2		*see text*		30 μμF	1.9 mc	*none*
	L3		*see text*		—	—	—
	L4		*see text*		50 μμF	3.5 mc	dust

NOTES:

(1) In the case of the L1 windings, the first figure is for the Ae. turns, and the second the grid coil.

(2) The Ae. coil is tightly coupled in each case.

(3) Grid winding L4 in oscillator placed next to plate winding L3.

(4) In the table, " w/dia." means spacing to wire diameter, and " cl. wnd." is close-wound.

(5) Coils will require adjustment if formers other than 1/4-in. diameter are used. Model built on Cyldon TV turret unit.

(6) Commercial coils are used for L1, L2 on 80m. and for L1, L2, L3, L4 on 160 metres — *see text*.

SINGLE-STAGE MULTI-BAND TRANSMITTER

CRYSTAL CONTROLLED ON FOUR BANDS, FOR CW WORKING

J. D. HEYS (G3BDQ)

Our contributor calls this his "Junk Box Special," because it involves but one valve and the minimum of parts, most of which readers will have to hand. Yet the bands 15-80m. can be worked with about 20 watts input, and at the least it will take you all round Europe—it may even give DX on the HF bands with a reasonable aerial system, also described. With no VFO'ing to worry about, it is simply a matter of keeping the station receiver on the transmitting frequency till a wanted station is heard calling. With band occupancy as it is today, there will be no shortage of QSO's.—Editor.

THE sophistication and complexity of many modern transmitter designs must prove rather frightening to the newly licensed amateur having only limited resources and little constructional experience. Rather than first buying a new or second-hand commercially built transmitter the beginner is urged to acquire some practical know-how by building and putting on the air his own simple rig.

The CW transmitter described here was made in under two hours, is virtually foolproof and yet very effective. By digging into a reasonably well-stocked junk box its cost need not amount to more than a few shillings, and if care is taken with the aerial tuning arrangements world-wide contacts can be expected.

Circuit

No originality is claimed for the circuit—one Old Timer upon seeing the transmitter remarked that the replacement of the double-superhet station receiver by an 0-V-1 would just about duplicate his own station as it was *circa* 1930!

An 807 beam-tetrode is used in a Colpitts crystal oscillator circuit with its anode tuned to a harmonic of the crystal frequency. This point is important, for should the anode tank circuit resonate *at* the crystal frequency there is a risk of excessive feedback, with consequent crystal heating and probably fracture. The power on the actual CO side is quite low, between 1½ and 2 watts, and providing the feedback condenser C1 (Fig. 1) is adjusted correctly there will be no danger of crystal damage. It is *not* recommended that the new miniature crystals be used; the older (and cheaper) QCC P5 or 10X types are more robust and better suited to this kind of circuit.

L1 can be a tapped winding as shown in Fig. 1 or plug-in units may be used with perhaps greater efficiency. If a tapped coil is decided upon the link winding L2 must be free to be moved along L1 to the tap points as bands are changed. The parasitic suppressor APC is always needed when using 807 valves and should not be neglected.

At first, cathode keying was attempted on the prototype transmitter but bad clicks and some chirp appeared. No amount of click filtering helped, so screen keying was resorted to and the trouble disappeared. R3 is an important element in the keying circuit for it helps to maintain the screen at the correct voltage (between 250v. and 300v.) and also eliminates all chirp from the signal. A simple click-filter using R5 and C6 seems quite effective. Remember to wire the key jack so that the body of the key connects to R4 which is at earth potential in the key-up condition. No meter is used, but one could be connected between HT positive and C5. A 100 mA instrument would be suitable. [*over*

Table of Values

Fig. 1. Circuit of the Single-Valve CC Transmitter

C1 = 3/30 μμF Philips trimmer
C2 = 120 μμF silver mica
C3 = 150 μμF variable, low-power Tx type
C4 = .002 μF ceramic, 500v. wkng.
C5 = .003 μF mica, 1,000v. wkng.
C6 = 0.1 μF paper, 1000v. wkng.
R1 = 47,000 ohms, 1 watt
R2 = 33 ohms, 1 watt
R3 = 15,000 ohms, 10 watt w/wound
R4 = 7,500 ohms, 10 watt w/wound
R5 = 330 ohms, 1 watt
APC = 6t. 18g. enam. wound over R2
Xtal = 1.75 mc, 3.5 mc or 7 mc to suit band (*see text*)
RFC = 2.5 mH RF Choke

COIL DATA

L1 = 22 turns 20g. at 16tpi. on 1½-in. diam. former. Tap at 5t. for 21 mc, 9t. for 14 mc and 14t. for 7 mc.
L2 = 2 turns at HT end of L1, or single turn Faraday shield (*see* Fig. 3 p.632.

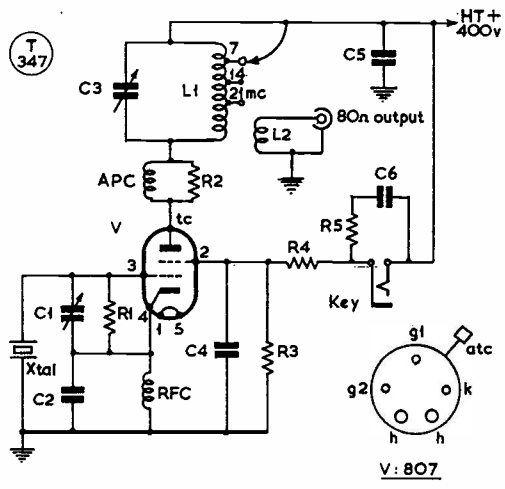


Fig. 1. Circuit of the single-valve transmitter ("one-lung perker" or "junk box special") built by G3BDQ in a couple of hours as a relief from SSB design and constructional problems. This is a simple 20-watt CW job capable of good results on four amateur bands — indeed, it will give world-wide contacts and involves no complications because it is crystal-controlled.

Construction

Almost any layout or form of construction can be used. The original transmitter was strung together on two pieces of plywood, the 807 being mounted horizontally in order to reduce anode lead length and to make the unit small and compact. Should the constructor wish to follow the more orthodox chassis and panel layouts no difficulties should be encountered providing the tank coil L1 is horizontally positioned an inch or so above the metal chassis. A final point is to keep the leads to the RF bypass capacitors C4 and C5 as short as possible to prevent the generation of unwanted VHF resonances.

Setting Up

The circuit as shown is based upon an HT supply voltage of 400v. If a power pack with this voltage is not to hand a lower HT supply may be used with of course a reduction in the power input. Alternatively up to 500v. HT is permissible, it then being necessary to adjust the values of R3 and R4 to prevent excessive screen voltage, the screen being the plate of the CO. If chirp is to be avoided with a single-valve transmitter of this type the power pack must have good regulation and be generously rated. In this circuit, the total cathode current of the 807 at 400v. is 45-50 mA and a power pack using choke input rated at 200 mA would be ideal.

Initially, a dummy load consisting of a 10-watt lamp should be used for test purposes. Always tune the anode circuit to a *harmonic* of the crystal frequency, *i.e.* for operation on 14 mc or 21 mc use a 7 mc crystal; it is surprising how much output can be realised even when tripling in the output tank circuit. The station receiver, suitably muted, can be used to check for chirp or key clicks. The feedback condenser C1 should be adjusted to the minimum capacitance required to maintain oscillation, consistent with a good note and clean keying. Too little capacity here will give rise to chirp or lag when keying; too much can produce crystal heating.

Aerial Tuning

With low-power transmitters it is essential to get every available watt into the aerial system. In order to do this an effective ATU and an SWR (or reflected-power) meter will be needed. If the SWR on the output coax is not known it is possible to "lose" as heat in the cable half or even more of the RF output power. Dangling a neon on the ATU coil is just not good enough for accurate matching and setting up. Reflected power meters need not be expensive or complicated instruments, and simple but effective designs can be found in the *Handbooks*.

Fig. 2 shows an aerial tuning arrangement used successfully for many years by the writer. An advantage of this system is that almost any random length of aerial can be loaded. Should difficulty in matching occur it often means that the impedance of the aerial at the station end is either too high or too low to be accommodated by the ATU. This can be easily overcome by adding a few feet of wire to the lead in.

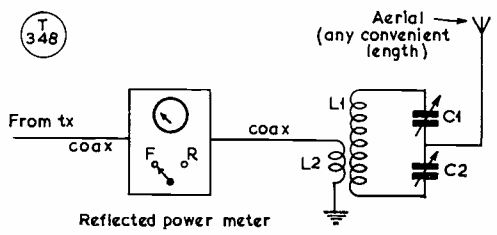


Fig. 2. Suggested ATU arrangement for the simple transmitter, as used by G3BDQ. To obtain maximum efficiency, an SWR or Reflected Power meter should be included on the aerial side, as shown here. The circuit components are: C1, C2, 300 $\mu\mu$F; L1, plug-in coil for the band; and L2 is a single-turn Faraday link, as shown in Fig. 3.

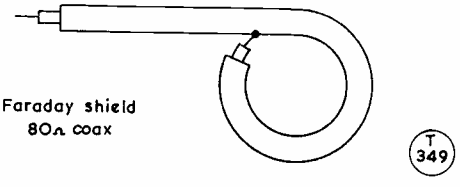


Fig. 3. A screened link winding (Faraday shield) can be made from ordinary coax cable. The end of the inner conductor is soldered to the outer braiding at the start of the link turn — and that is all there is to it.

It should be possible by adjusting C1 and C2 individually (Fig. 2), always maintaining resonance, to find a point where the SWR drops to a very low figure. If a ratio lower than 1·5:1·0 cannot be obtained, the link couplings at the transmitter and the ATU can be moved and the whole procedure repeated. Twenty minutes spent tuning up properly can give hours of operating ease and good signal reports, and the settings of C1 and C2 should be noted for future reference and easy band changing.

TVI

In order to minimise the radiation of high order harmonics the link windings on the transmitter and the ATU are made from coax in the form of Faraday shields (Fig. 3). With this precaution and in view of the power levels, TVI ought not to be a problem. In fringe areas, of course, more adequate screening and a low-pass filter may be required.

Conclusion

Instead of an 807 a 6L6 valve will work satisfactorily in the circuit although it will not be as efficient above 7 mc. No doubt other tetrodes could be used, but they should not be run at voltages in excess of their normal ratings.

The little transmitter as described has provided hours of pleasant and even exciting operating, and has been a welcome change for a somewhat jaded SSB exponent! Reports received have averaged S7

on all bands and S9 reports are not uncommon. All Europe can be raised easily, and the best DX to date has been a 559 report on 20m. from a W6 *via* the long path. This works out at something like 1,000 miles per watt without any elaborate aerial system—just 125 feet of wire strung from an upper window to a tree in the garden. Another advantage of this rig is that little receiver tuning is required—just sit on your crystal frequency and wait for them !

"JOYSTICK" ON TEST

The aerial system discussed here has aroused a good deal of interest and some controversy in amateur circles. Accordingly, we decided to give a standard "Joystick" an extensive test under practical conditions, both receiving and transmitting. These tests were carried out by a very experienced DX operator, whose own normal outside radiating system is highly efficient, thus constituting a very severe standard against which to compare the "Joystick." His findings are such as to justify us in recommending it as a sound and effective design for the awkward location.—Editor.

MANY keen amateurs are unable to use elaborate, or even adequate, aerial systems because of their immediate surroundings. Flat-dwellers, those who are temporarily in "digs" and those who have the misfortune to live in a congested neighbourhood where no space is available for an outside aerial, or where masts are not allowed — all these have to make do with something in the roof-space or, in the hardest cases, a wire "round the picture rail."

The "Joystick" aerial, marketed by *Partridge Electronics Ltd.*, has been designed largely to help such people, and its performance on test shows that it achieves its object, and that it can be used in such difficult circumstances on six amateur bands.

It consists of a copper tube, ¾-in. in diameter, at the centre of which is inserted a loading coil about 12 ins. long. The overall length of the aerial is 7 ft. 6 in., but one half of the tube is easily removed so that it will pack as a unit only 4 ft. 4 in. long.

The loading coil is completely weatherproofed, being covered and sealed with a plastic material through which four tapping points protrude. These are for 28 mc, 21 mc, 14 mc, and 7 mc ; operation on 3·5 and 1·8 mc is achieved by connecting to the foot of the Joystick, for which purpose another tapping point is provided.

The "feeder" is a short length of single flex, terminating in a crocodile clip at one end. The other end goes to an ATU, the use of which is essential. This reveals the novel feature of the aerial, which is a Windom (or "single wire off-centre") type of feed.

It is, naturally, least efficient on the LF bands, since on both 1·8 and 3·5 mc it operates as a loaded length of less than a quarter-wave. A neon tube shows relatively high voltage at the feed-point at the bottom, increasing all the way up.

On 7 mc it works in the half-wave mode, the feed-point being below the electrical centre—both ends show a high voltage, and the high current point occurs on the coil some distance above the feeder tap. On the HF bands it appears to function with the top half (the portion above the feeder tap) behaving as a loaded quarter-wave, the bottom half of the aerial remaining dead (as shown by the neon-tube test). If anything, the voltage on the loading coil falls off somewhat for a few turns above the tap, after which it builds up and gives a maximum at the top of the aerial.

The six feet of feeder between the ATU and the Joystick appears to carry quite a low standing-wave (as with a properly adjusted Windom feeder) and a pleasing feature of the aerial is that on all bands, with a normal type of ATU, it is possible to find a setting which gives a 1:1 ratio on the coax feed between the transmitter and the ATU.

Comparison Tests

Results on air tests were quite interesting. In comparison with a *good* outside aerial system, reports were from two to three S-points down on all bands. This meant that at a time when W's, on the HF bands, were giving reports of S9 or S9+ on the outside system, they could nearly always be raised on the Joystick, although reports were never above S7. If anything, there appeared to be less difference in the ease with which stations were raised on the HF bands ; the greatest fall in reported strengths occurred on 3·7 mc SSB.

The makers recommend that any outside aerial should be let down, earthed, or completely removed before attempting to assess results on the Joystick ; and it *was* found, on one occasion when this was not done, that the outside wire, though disconnected from everything, was resonating strongly enough to light a neon tube at the home end when the Joystick was radiating.

As a receiving aerial it behaved very well, with the same fairly consistent difference of two S-points as compared with the outside aerial. But it must be realised that many less efficient *outside* wires might also be one or two S-points down on the one with which comparisons were being made.

A final note: As with all aerials of the Windom-fed type, a reasonably good earth connection is essential, or at least highly desirable. There is no doubt that in many circumstances the Joystick will prove the ideal answer to a difficult problem ; and for temporary use at a /A location, where no other aerial is available, this little unit would be invaluable.

All the tests described above were carried out with a Joystick on the ground floor of a bungalow ; one would expect results to be even better in a higher location, such as the upper floor of a house or block of flats.

The unit is excellently constructed and finished in white cellulose, rubber pads being provided at both ends of the tube. It would stand on a tiled floor, leaning against the wall, without tending to slip. At £3 10s. (or £4 10s. for the *de luxe* model) it represents excellent value for money.

DETERMINING MIXER CURRENT

FOR BETTER RECEIVER PERFORMANCE

S. E. JANES (G2FWA)

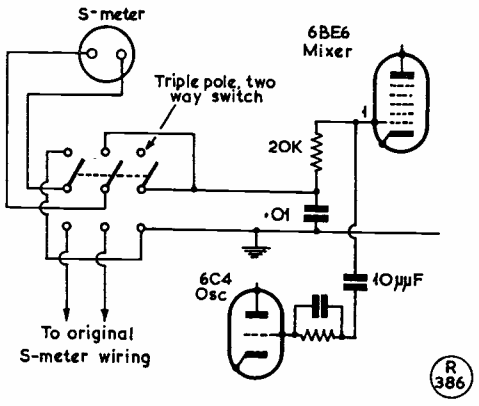
VERY few of us can be sure that our receiver mixer stage is functioning for optimum performance. It is customary to inject the oscillator output into the mixer valve by one of several methods, after which one hopes for the best—but there is really no standard of comparison. If the oscillator output is low the result may be poor front-end performance. On the other hand, excessive injection will give a high noise-level and possible unexplained "birdies." In addition it may also be responsible for TVI caused by the receiver tuning.

The construction of a 21 mc bandspread coil for an HRO receiver first raised the problem of knowing what the oscillator output voltage should be and its relation to the positioning of the cathode tap. Then the up-dating of this HRO by means of modern valves brought to light an interesting table which is repeated in each ARRL *Radio Amateur's Handbook;* in the 1961 edition, for example, it is on page 95. This shows the recommended operating voltages for several modern mixer valves, with a column giving the various grid currents for optimum performance. This latter point appears to be generally overlooked not only in receiver construction but also in other applications, such as the mixer in SSB transmitters.

Mention should be made concerning the method of bias for the mixer valve. If this is obtained solely by means of a grid resistor then the injection voltage is not so critical *providing it is adequate.* It should be made optimum, however, if maximum signal-to-noise ratio is desired. If cathode bias is used the injection voltage is somewhat more critical, while fixed bias on the injection grid makes the whole arrangement quite critical.

The original mixer in the HRO required 45 volts for screen grid injection, but only 10 volts is necessary for the 6BE6 used in the re-valved HRO. This requirement is satisfied by an injector grid current of 0·5 mA through a 20K resistor. The separate oscillator valve in this case is a 6C4, in the circuit which has become the accepted standard for modernising the old HRO types.

It was found that the range of HRO coils showed a grid current variation in excess of 5 : 1. For example, the 14 mc bandspread coil produced grid current off the scale of a 1 mA meter! This was reduced to the correct 0·5 mA by lowering the cathode tap by one turn in the direction of the grounded end. With some coils, it may be found difficult to re-set the oscillator cathode-tap, but any effort will be well rewarded. In particular, the construction of a good 21 mc bandspread coil will be facilitated by this check for finding the correct position for the tap.



Showing a method of measuring grid current in the mixer stage of a communications receiver fitted with an S-meter, in the circuit as used in an HRO. The grid resistor and by-pass condenser should be as close as possible to the mixer valve.

If it is desired to have a permanent means of checking the mixer operation use may be made of any existing S-meter. In the case of an HRO this is a 1 mA movement and it seems logical to take advantage of its presence. The diagram shows a method of switching the meter to perform the two functions. This refinement becomes a simple and direct method of reading the mixer grid current, and it is very satisfying to have this check on receiver performance. It must be remembered, however, that DC continuity to ground must be maintained for the injector grid of the 6BE6 and the switching as shown satisfies this condition. It is *not* necessary to close the S-meter leads when measuring grid current, as the original switching for this function simply open-circuits the leads to the S-meter when not required.

"... And now meet the Old Sock himself..."

TRANSISTORISED SPECTRUM GENERATOR

FOR RECEIVER CALIBRATION AND BAND-EDGE MARKING

R. DAVENPORT (G3IQI)

THE advantage of a pulse-type signal, as opposed to a square-wave (as would be obtained from a multivibrator), for frequency marking is that the fundamental power is less and the harmonic power very much greater. Adequate power can be obtained at the higher harmonics without blocking the receiver on the lower frequencies.

For the "pulse" section a crystal-controlled pulse generator, operating at a p.r.f. of 20, 25 or 100 kc, provides markers at the selected intervals, covering the whole spectrum into the VHF region. The spectrum coverage will depend on the rise time of the pulse, which will be limited mainly by the transistor used.

In this case, with an OC170, the rise time was measured at 50 milli-micro-seconds using a "Telequipment D31," which itself has a rise time of approximately 50 milli-micro-seconds, so the pulse could well be shorter.

From the "crystal" section markers are provided at 5 mc, 1 mc and 500 kc, or any frequency in the range 500 kc—8 mc, using external crystals.

Circuit Description

The crystal circuit is a Colpitts crystal parallel-resonance oscillator, which can be made to oscillate over a range from 500 kc to 8 mc with suitable fundamental mode crystals. Replacing the OC44 with a VHF drift transistor permits operation of the oscillator in the range from 10 to 25 mc with suitable overtone crystals. Provision is made on the switch for external crystals.

Output voltage of the crystal unit at 1 mc is 1 volt R.M.S. open circuit, and approximately 80

Table of Values

Fig. 1. Circuit of the Transistorised Calibrator Unit

C1, C2, C3, C7	= 22 $\mu\mu$F	RV1, RV2	= 5,000 ohms
C4	= 250 $\mu\mu$F	S1	= 2-pole, 2-way
C5, C6	= .04 μF	S2	= 1-pole, 4-way
C8	= 0.1 μF	S3	= 2-pole, 3-way
C9	= .01 μF	S4, S5	= 1-pole, 2-way
R1	= 39,000 ohms	RFC	= 1 mH RF choke
R2	= 47,000 ohms	X1	= 5 mc xtal
R3, R11	= 1,000 ohms	X2	= 1 mc xtal
R4, R5	= 15,000 ohms	X3	= 500 kc xtal
R6	= 470 ohms	X4	= 100 kc xtal
R7, R12	= 1,500 ohms	D2	= 6.8v. Zener diode
R8, R14	= 100 ohms	TR1, TR3	= OC44
R9	= 2,000 ohms	TR2	= OC71
R10	= 4,700 ohms	TR4	= OC170
R13	= 1,200 ohms		

COILS: L1 is on Ferroxcube LA3 former, winding L1A 180 turns 40g. tapped at 60th turn; L1B, 70 turns 40g., and L1C as L1B. L2 is on Ferroxcube E Core, winding L2A 15 turns 28g.; L2B 5 turns 28g., and L2C 3 turns 28g.

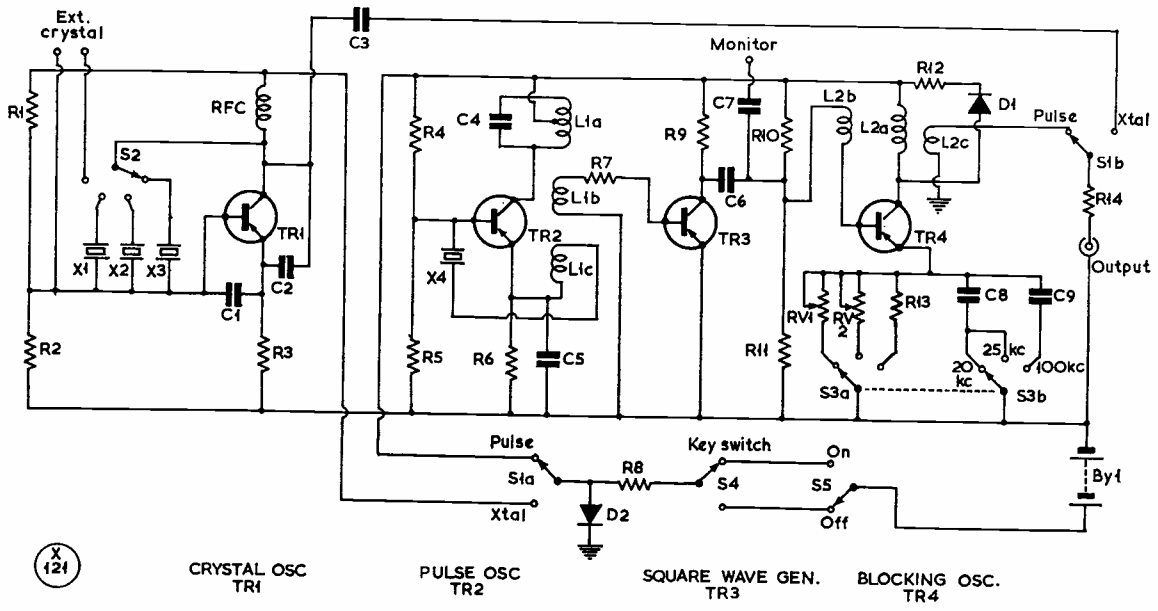


Fig. 1. Circuit of the transistorised crystal-controlled calibrator and band edge marker. The CO side, TR1, gives three outputs at known frequencies, which will be as exact as the calibration accuracy of the crystals used; provision is also made to switch in an external crystal, either for checking against the bars, or as an additional marker frequency. The section TR2-TR4 is a separate circuit, which gives strong harmonics through a wide frequency range from the 100 kc bar at TR2; the advantages of this are explained in the text. The wave shape, as obtained from the monitor point on the collector of TR3, is shown in the diagram at Fig. 2.

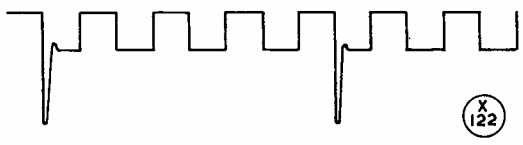


Fig. 2. Referring to Fig. 1, this is the waveform seen on a CRO with the output taken from the monitor point when the blocking oscillator is switched to the 25 kc setting, to give a 4 : 1 division of the fundamental frequency.

millivolts into 100 ohms.

Pulse Unit

A crystal oscillator with a tuned collector circuit is used, and the crystal connected in series with the feedback winding, L1C. The output from this oscillator is squared by TR3 and the square-wave is used to synchronize the blocking oscillator TR4. The square-wave must have a short rise time to ensure reliable triggering of the blocking oscillator, particularly when working as a divider; for this reason an OC44 transistor is also used in this stage. The blocking oscillator transformer L2 is wound on a Mullard Ferroxcube "E" core.

The variable time constant in the emitter circuit of TR4 determines the operating frequency of the blocking oscillator. In this case the circuit was adjusted to divide by 5, 4 and 1 by the resistor-condenser combination. The division was checked at the monitor point provided using an oscilloscope (*see* Fig. 2).

With the diode and damping resistor connected across the primary of the pulse transformer excessive overshoot is prevented (D1, R12, Fig. 2).

The power supply is stabilised by a 6·8v. Zener diode, to ensure stability of the blocking oscillator, particularly when operating as a divider.

Harmonic Output

This was measured by injecting the signal from the generator into the low-impedance input of a SP600 receiver, tuning to the desired harmonic and noting a reference level, and then substituting a signal from a standard signal generator. The results are shown in the table.

HARMONIC OUTPUT LEVEL

	Freq.	*Harmonic*	*Level*
P.R.F. 100 kc	1 mc	10th	100 mV
	10 mc	100th	10 mV
	20 mc	200th	1 mV
	30 mc	300th	250 μV
	50 mc	500th	100 μV
P.R.F. 20 kc	500 mc	25th	25 mV
	1 mc	50th	20 mV
	10 mc	500th	1 mV
	20 mc	1000th	200 μV
	30 mc	1500th	100 μV
	40 mc	2000th	80 μV
	50 mc	2500th	50 μV

Operation

The Pulse/Crystal switch controls the DC supply and switches the output socket to the appropriate position. A two-way press switch operates in conjunction with the on/off switch. In the "on" position, flicking the key switches the unit for identification. In the "off" position, operation of the key brings the signal on.

SOME OLD-TIMER STATISTICS

A browse through the *Call Books* for 1927-'28 has revealed some interesting facts about the amateur licensing position in Britain, to say nothing of the personalities who held transmitting permits at that time. In 1927, the total of U.K. amateurs with full licences was nearly 1,400—this figure not including the 400 or so with what were then known as "Artificial Aerial," or non-radiating, licences. This compares with the over 9,900 U.K. licences now in issue. Among some famous names who held callsigns in 1927 one can find Capt. Eckersley, 2OO, chief engineer of the BBC; Hotine, 2QM, who was in charge at the Daventry experimental station; Gambier-Parry, 2DV, until just recently head of the Govt. communications service; Scott-Taggart, 2LR, the well-known radio publisher; Vandervell, the industrialist, 2LK; Prof. Low, the scientist, 2WF; Marcus Scroggie, 5JX, still writing books on radio; Devereux, 5FA, now Editor of *Wireless World;* Burndept Wireless, Ltd., well-known radio manufacturers of the time, 5MW; Sir Ian Fraser, 5SU; Burne-Jones, 6CW, radio engineer; and Lord Egerton of Tatton, 6TP.

Checking on callsigns held then (1927-'28) and still appearing in the current *Call Book* under the same name, the list includes 2DX, 2HQ, 2TP, 2UV, 2WJ, 2XV, 5BG, 5CD, 5FJ, 5MA, 5ML, 5RZ, 5TZ, 5UM, 5XD, 5YN, 6AT, 6DW, 6MN, 6NF, 6OH, 6OM, 6OT, 6OU, 6QB, 6US, 6UT, 6YL and 6ZR—to name just a few; there are many more. Though there have, of course, been many changes of address over the years, an exception is the present G2SU, who was licensed as 2SU at the same address at which he still lives; and the same goes for G2GG!

As well as changes of address, there have been some changes of callsign: The present G2VS (still Bedford) started there as 2WD; and a well-known Torquay amateur is G5SY, who first came on the air in 1926 as 5JQ, in Torquay. The original 6HH, now held as G6HH by the Hastings club group, was a Gloucester station active on the 440-metre band. 5YC is still held, as G5YC, by the City & Guilds Radio Society. The original callsign of the Birmingham University R.S. was 5UN, but nowadays they sign G3IUB. In 1927, the then Manchester Radio Society held two callsigns, 5LL and 6MX, and 5SS was the call of the Stretford (Manchester) R.S. The Stoke-on-Trent Wireless & Experimental Society signed 6NC in those days, and at one time were very active on 440 metres; they used to exchange gramophone programmes with 5SS. And going a little further back, one finds that the Loughborough College Wireless Society owned 2PI and 2PJ. To the diligent researcher there is much else of great interest to be gleaned from these early *Call Books*—such as the fact that of the 1,400 British amateurs licensed in 1927, less than half were members of the national society! The figure today is a little better at about 60% belonging.

NOTE ON COIL CONSTRUCTION

USING SMALL FORMERS

L. E. PROFAZE (G3KAB)

THE small moulded plastic coil-formers, which are widely used in radio equipment, both commercially and by amateurs, fulfil their intended purpose admirably, being efficient in performance and neat in appearance. They are readily obtainable at reasonable cost on the surplus market though seldom with the essential tag cheeks, to which the coil ends are secured, and which seem in relatively short supply unless specially ordered.

The writer, an impatient soul, prefers to make immediate progress upon any project before enthusiasm wanes (which it does quite readily in the face of any trivial delay) and therefore these formers are normally used without the tag cheeks, the windings being anchored to support wires located in holes provided in the base. This is satisfactory providing one has the patience to contend with the difficulties thereby introduced.

Dropping the whole assembly just as the final turns are being wound is the principal hazard. Very often, however, the end is anchored safely and the first turn, held temporarily with a piece of adhesive tape, breaks loose. Sometimes the coil reaches completion and while one proudly examines it, prior to applying cement, the support wires are accidentally squeezed and, with tension released, the turns become loose and pile up on one another. The third or fourth adjustment for correct inductance value, in conjunction with the grid-dip oscillator, is usually accompanied by a supporting wire becoming unsoldered, and there have been occasions when having, with great enthusiasm placed two windings successfully on one former, it has then been found necessary to vary the mutual coupling by moving one relative to the other.

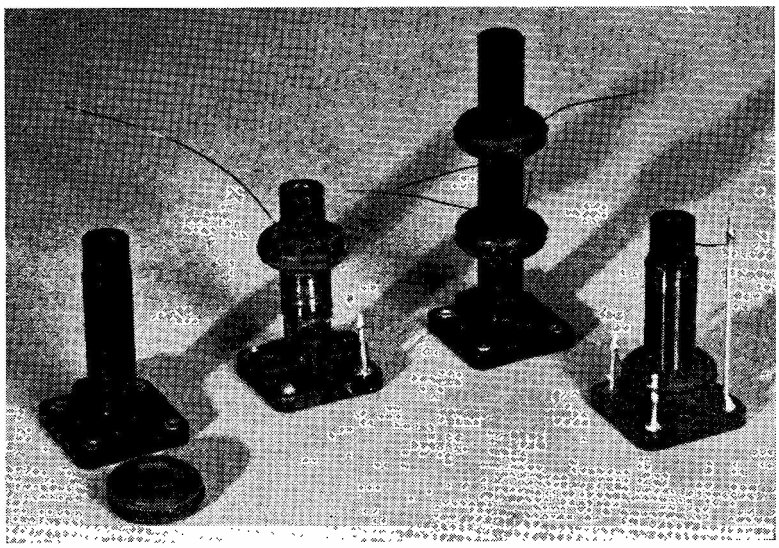
Grommet Grips

An expected spate of coil winding required that an efficient solution to these problems be found without delay and, of several methods tried, one appeared to have special merit. Rubber grommets, intended for the insulation of holes in chassis, can be found with dimensions which allow a push fit on these formers. Such grommets create both a ready-made winding groove and provide temporary security for the coil ends. A shallow diagonal cut in the rim, with a sharp razor blade, will grip the finest wire without risk of damage, or this may be pushed between the grommet and the former after inserting a small screwdriver or a compass point.

The illustration shows, on the extreme left, the principal component parts, adjacent to which is an example of a simple single-layer helical coil, secured at the lower end to a short supporting wire with the final turn held in place by a grommet, until the polystyrene cement has hardened, when the grommet is then removed and the second support wire added. The third winding indicates how two grommets, located on the longer-type former, provide winding grooves for the primary and secondary of an RF transformer. The special feature of this arrangement is that either coil can be moved easily in relation to the other to vary the coupling factor. The final item, on the extreme right, is a combination of the others; a single layer helical winding extends above a grommet which itself carries several turns to form a variable coupling winding.

It may be objected that the physical properties of rubber make it unsuitable for use as a coil former, and due regard must be paid to the intended function of the component produced in this manner; a high-stability oscillator would undoubtedly demand something better, and it is for this reason that the examples shown have restricted the technique to the production of coupling coils and those which do not demand an exceptionally high degree of mechanical stability.

The whole assembly can be bonded with polystyrene cement, or the grommet can be anchored to the former with a spot of adhesive, although for most practical purposes the natural friction of the rubber will suffice. A small quantity of liquid paint



Illustrating the points made by the writer in his article. Push-fit rubber grommets (as used for chassis insulation) secure the windings in place on the coil formers, either temporarily until cementing is completed, or permanently in certain applications. These grommets can also themselves function as coil formers, where coupled windings are required, enabling a close adjustment of mutual coupling to be made.

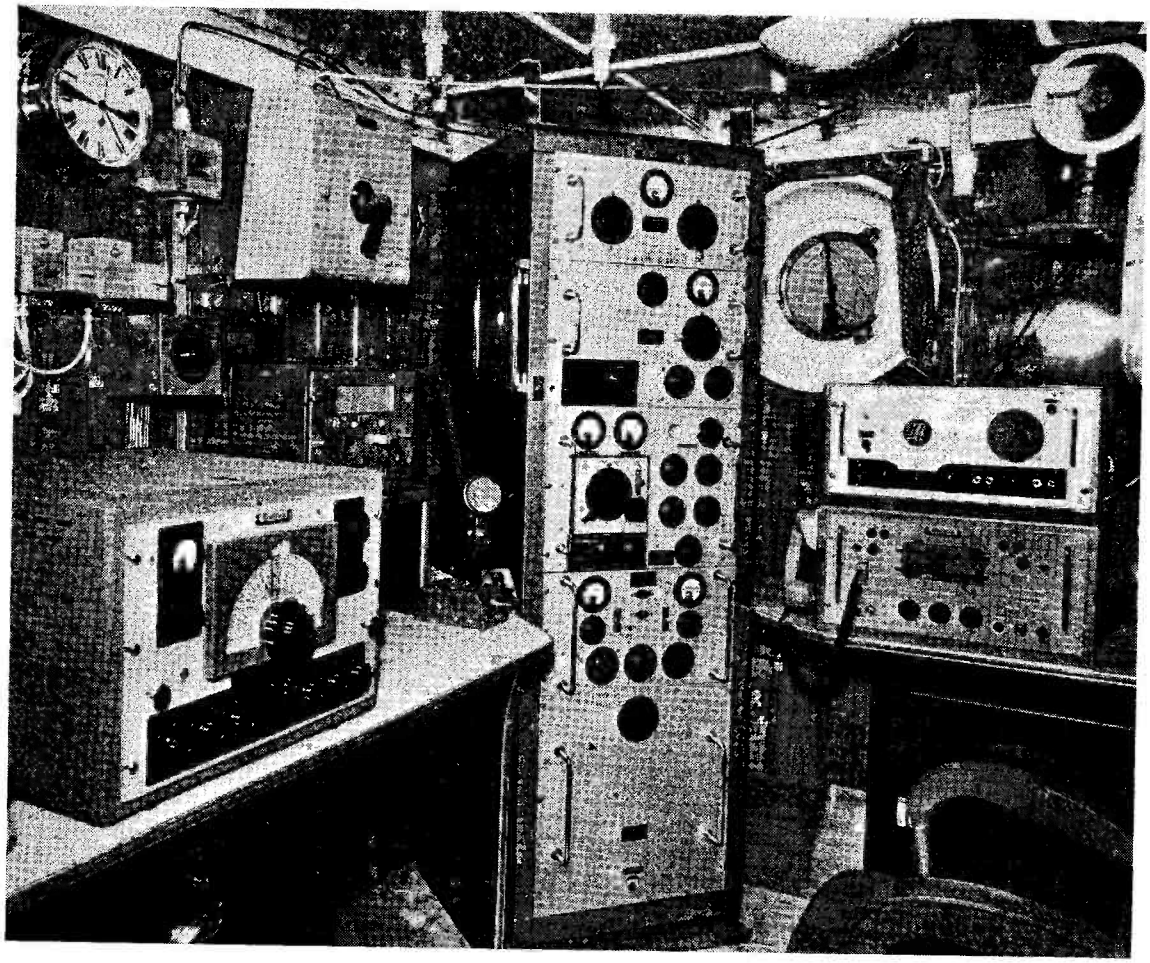
stripper, applied to the wire ends, will usually help to remove the enamel covering of the wire, with the aid of a razor blade, prior to soldering.

The dearth of written information referring to this subject seems to indicate that others either do not find the task irksome or prefer to purchase their coils ready made. Nevertheless it is the experience of the writer that he is not usually alone in encountering stubborn problems in the field of constructional radio, and it is hoped that the suggestions embodied in this article will be of equal value to others beset with similar difficulties.

For Readers' Small Advertisements—see pp.667-672

For "VHF Bands"—see pp.653-656

For Current Book List—see p.618



Interesting example of a modern commercial marine installation for local and long-distance working. The radio room of the new deep-sea trawler "Gerontius" (out of Hull) is fitted with Redifon equipment throughout. The main transmitter is in the rack-panel assembly and runs 100 watts on eight spot frequencies in the MF range, and eleven in the HF shipping bands, all crystal controlled. In addition, 28 channels are provided in the marine VHF band (for local control and port working), using the Redifon GR.286 radiotelephone. The main communications receiver, at left of the bench, is their R.50M. Not shown in the photograph is the Redifon receiver 262A for long-range navigation by Loran (that pulsey noise we hear on Top Band), and an MR.607 Rx for piping broadcast programmes round the ship. Another navigational aid is a D/F loop with its associated direction-finding receiver. The communication transmitters when on R/T can be operated through a speech inverter (speech secrecy equipment), as when discussing the fishing programme or market prices with base. For normal long-distance working, CW telegraphy is used and the hand-key can be seen at the end of the bench, with the microphone. It will probably surprise many people that such an elaborate installation is called for in a fishing vessel, but the modern trawler is able to keep at sea for weeks, and the newer ships, such as the "Gerontius," are fitted with aids unthought-of even a few years ago. And the radio officer on such a ship has a very important job, as he plays an essential part in the success of the fishing operations.

DX-PEDITION TO NYASALAND

ZD6JJ/ZD6JO, OCTOBER 14-22, 1962

M. GEDDES (ZE3JO/ZD6JO)

FURTHER to our Nyasaland trips in 1959 and 1960, when the calls of ZE3JJ/ZD6 and ZE3JO/ZD6 were used, this time we were able to have these calls issued to us for the period October 13-22, 1962.

After a pretty hectic and very dusty journey from Salisbury, Southern Rhodesia to Zomba, Nyasaland, *via* Tete in Portuguese East Africa, we were on the air on the Sunday evening, October 14, operating from the Ku Chawe Hotel; this is actually on the Zomba Plateau, at an altitude of about 5,250 feet. The transmitter was a Viking Ranger, and the receiver an Eddystone 888. One long-wire aerial of about 700 feet was slung through the trees on the top of the ridge behind the hotel, for the 7, 14, and 28 mc bands, with a vertical dipole for 21 mc. By taking it in turns for the first three days we were quietly knocking off lots of contacts, mostly on CW, with the odd phone QSO when conditions allowed. After the first three days ZD6GA, and G3JCJ/ZD6, who were in Zomba, visited us and offered the loan of a Heathkit DX-40U, and a Marconi CR-100. These were set up on the top of the highest peak on the plateau, at a height of approximately 7,000ft., the actual QTH being a new VHF station, not then in actual operation, but fortunately having an AC mains supply, the absolute necessity ! This station also had a 60ft. aerial mast, so in no time at all a long-wire of unknown length was up and going.

Though the conditions at this second QTH were very much better in all respects than those at the hotel, the snag was the time and trouble it took to get there—about 45 minutes by car from the hotel, as the road was practically vertical in places and extremely dangerous to take at a speed of more than a few miles per hour; the actual distance was only 10 miles. But it was an exceptionally fine location for DX working ! With ZD6JJ operating at the hotel it was found that up top, stations could be worked practically all day, whilst at the hotel he was only having the odd U.S.A. or European QSO. When the writer took his turn operating the hotel station ZD6JJ up top was getting out all round, whilst ZD6JO was registering practically *nil* at times. At the top-level station 40m. gave many contacts, especially when the writer was on an all-night session during the Saturday and Sunday of the last week-end of the trip.

DX on the Leg !

In fact, conditions were so exceptionally good that on this particular morning ZD6JO actually had five contacts using only his artificial leg as the aerial ! The way this came about was that whilst either op. was at the top QTH—where the weather was extremely cold, with high winds and mist—a half-jack of brandy was taken to combat the elements. This Sunday morning with the quota polished off, ZD6JO took off his leg for comfort, and suddenly thought it a good idea to see if it would be possible to get a contact or two with the leg as an aerial. It was connected to the transmitter with a one-foot piece of 5 amp. fuse wire from one of the metal joints, and tuned up, having shown by a neon that it was loading quite successfully. The first CQ call on 14 mc CW gave a QSO with a ZS station; a change to 21 mc produced contacts with ZS1, DL1, ON4 and a phone QSO with ZD6JJ down at the hotel.

QSO's and QSL's

After having had about 1400 contacts between us by more orthodox means, we finally closed down on the Monday, October 22. Upon return to Salisbury there were stacks of QSL cards for the ZD6 prefix, including one or two for contacts either not in the logs, or for dates of an alleged contact some days before we even left Rhodesia. It is certainly amazing that there are a few people who will send a QSL regardless of the fact that there had been no contact, possibly in the hope that a confirmation might slip through !

The one conclusion that both operators reached during this trip was that if the QTH is perfect, one can then have all the contacts one wishes even in poor conditions. In Salisbury, S. Rhodesia, despite an altitude of 5,000ft. above sea level and a pretty good situation, things are not quite the same as those experienced on the Zomba Plateau.

Cards have already been sent off in respect of ZD6JO for all contacts made, *via* the bureau. ZD6JJ is sending card for card.

We have both said that after this, our third trip to ZD6, it would be the last, due to the awful roads for hundreds of miles through Mozambique and parts of Rhodesia. Actually, we said this in 1959, and again in 1960, so it looks as if we might have another trip next year after all !

AN IDENTITY REVEALED

Older readers will remember, from years ago, the name of A. J. Alan, probably one of the greatest story-tellers ever heard on the air. Though it was generally known that "A. J. Alan" was employed in the Foreign Office, his real identity was always a mystery. By an odd chance, we have been able to uncover the facts, as the popular press might put it. His name was L. Lambert, and what makes it so interesting in the Amateur Radio context is that in the late 1920's he was licensed and on the air from West London under the callsign 2ST, first on 440 metres and then on the 180-metre band—this was before the G prefix letter was part of the callsign. So if anyone reading this ever worked 2ST, it was in fact A. J. Alan—and that callsign has never been re-issued.

For Mobile Rally Programme—see p.643

POWER PACK FOR QRO

DESIGNING A MULTI-OUTPUT UNIT

G. W. McDONALD (G2OX)

TO embark upon a scheme to increase the power of the average amateur station involves a little more than just increasing the HT to the final amplifier. Like in all other modifications to existing equipment, it is advisable to work carefully to a plan, with future developments in mind. It is always most profitable to find how each new idea will fit into the general scheme of the station.

The first consideration is the voltage and current required to run the final stage of the transmitter to the maximum licensed power of 150 watts. Suppose you only propose to run 75 watts—so be it, but it will cost no more to build a power supply for a future use of 150 watts than to build it for 75 watts. The most expensive item in any power supply is the HT transformer and in these days of buying on the surplus market the cost of a suitable type is around three pounds. One such transformer offered by *Magazine* advertisers is by a well-known maker and has the following specification: Primary, 230 volts 50 cycles; Secondary, 620-550-375-0-375-550-620 volts, rated at 275 VA, also 2 to 5 volt windings suitable for rectifiers. It will give a rectified output of 620 or 550 volts at 200 mA at the same time as 375 volts at 250 mA. It will be realised that in a project of this kind where many different voltages and outputs are required, permutations with the various transformers available could cut down the cost of the job considerably. In this respect the advertisement columns of SHORT WAVE MAGAZINE are always worth close study.

The layout used by the writer is a flexible one which can be followed identically or used as a basis for individual requirements with available components. Built as it stands, the cost should not exceed £12, including all chassis and cabinet work.

Supplies required to run the whole of the equipment in the station were as follows:

(1) 600 volts at 250 mA for the high powered RF stage of the transmitter, and a high power modulator,

(2) 350 volts at 150 mA to supply the exciter unit and other equipment, including perhaps a receiver.

(3) A 150-volt supply giving a current of around 15 mA, suitably regulated, for the VFO,

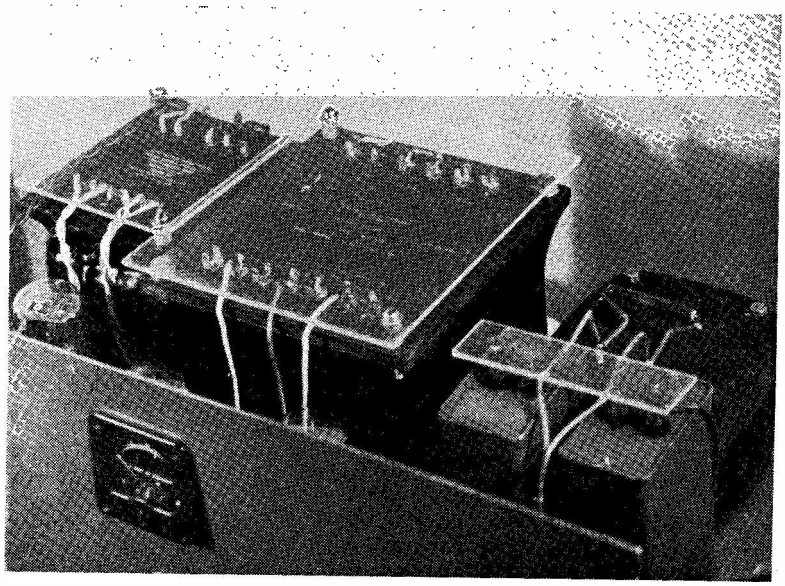
(4) A negative 150-volt 15 mA supply, regulated, to supply bias for various RF circuits,

(5) Filament supplies of 4 to 6·3 volts at 5 amps. or more as required, not to mention a 25-volt or 50-volt line for use in a remote control circuit.

Circuit

Starting at the supply mains input, a three-pin earthed plug is used in the interests of personal safety. A three-pin shrouded plug and socket is used at the chassis end of the mains lead, the earth pin of this being connected to the power supply chassis. This connector is so arranged that the cabinet cover cannot be taken off without removing the mains lead from the chassis. This does not prevent the power supply being connected to the mains with the cover off, so care must be taken when working under these conditions, as when initially testing a dangerous shock might be accidentally received. The mains transformer primaries are fed through a double-pole on/off switch and suitable fuse. An alternative method to the one shown in the circuit diagram would be to switch and fuse the individual primaries if part operation of the supply should be required.

The 600-volt supply takes a 5R4G rectifier in a perfectly conventional smoothing circuit. The smoothing choke should be of good quality and have satisfactory insulation between windings and frame to withstand 800 volts, because this is the order of voltage across the reservoir condenser under no-load conditions. The 4 μF capacitors C1, C2, are rated at 800 volts DC working (They are not obtainable



Showing how clear plastic covers should be fitted over all high-voltage components in a power pack. In this case, transformers and smoothing-condenser terminals are covered, making the power pack safe against accidental contact.

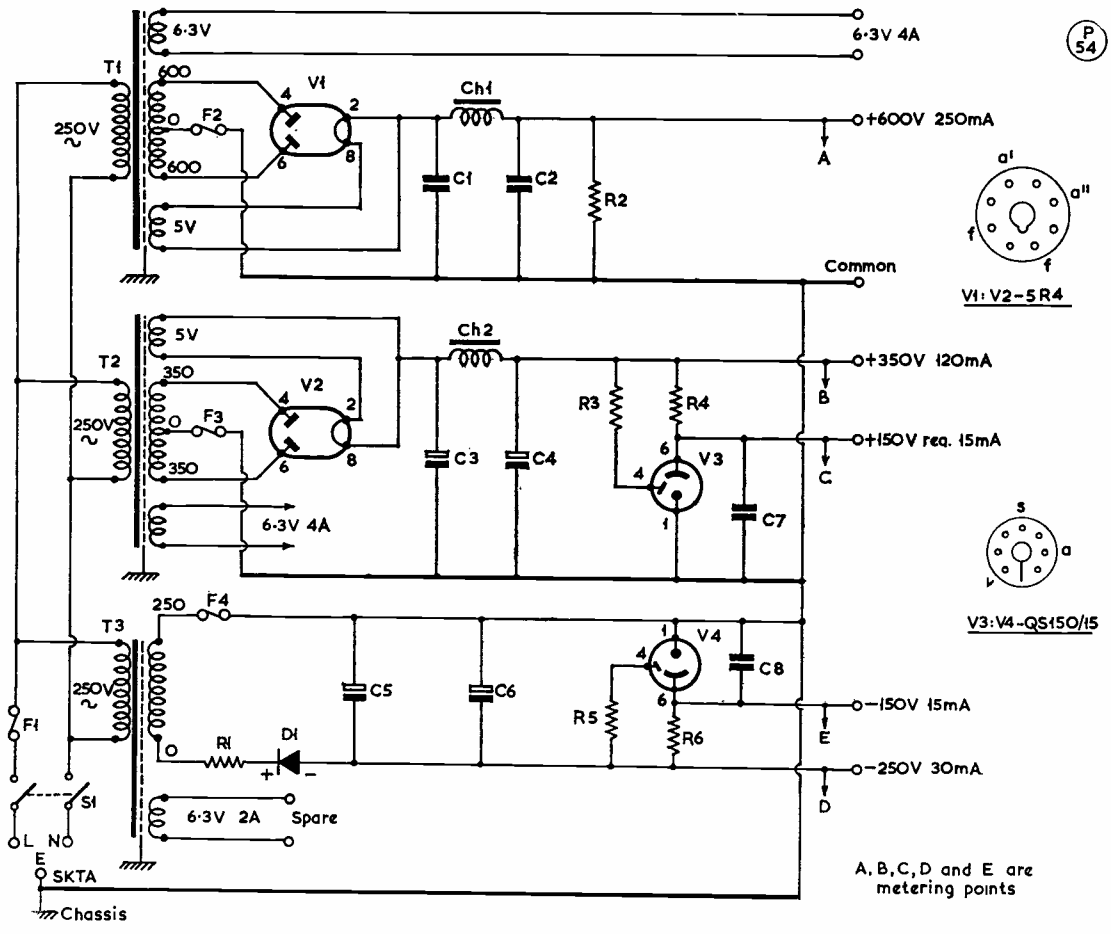


Fig. 1. Circuit complete of the multi-output power supply unit, using three transformers to get all the normally-required voltages for the operation of a transmitter running up to full power on the amateur bands. For a piece of apparatus of this kind, which is in the "fit-and-forget" category, good quality parts should be used throughout, all mounted on a substantial chassis, with proper earthing arrangements.

over-the-counter these days, but a good supply is available on the surplus market and they are regularly advertised.) In order that the final smoothing condenser does not hold a charge when the mains supply is switched off, a bleeder resistor R2 is permanently connected across C2. In the interests of safety, this resistor should be tested regularly because the only indication of its failure will be a severe shock from the HT line when the power is off! A kick from one of the smoothing condensers, though not likely to be fatal, can make the operator jump violently and in so doing may damage valuable equipment on the work bench.

For the 350-volt supply, a separate transformer T2 and a type 5R4G rectifier are used. The smoothing is as on the 600-volt side but with normal electrolytic capacitors for smoothing. It may be mentioned in passing that silicon rectifiers would be suitable for this position but their choice must be carefully related to the peak inverse-voltage characteristic. The p.i.v. for a 350-volt transformer is 2·8 times the nominal voltage (350v.), which is nearly 1,000v., and two series-connected silicon rectifiers of 500v. p.i.v. would be necessary, on each side of the transformer. They are compact and if used according to the makers' instructions very reliable—but don't imagine they can simply be wired into place instead of a valve, without reference to their working conditions.

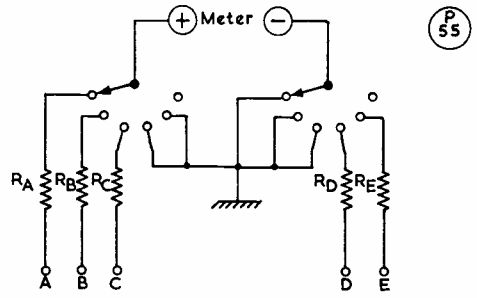
The negative grid bias supply is taken from a

Table of Values

Fig. 1. Circuit of the Power Supply Unit

C1, C2	= 4 μF	R4	= 12,000 ohms, 4w. w/wound
C3, C4, C5, C6	= 16 μF	R6	= 15,000 ohms, 4w. w/wound
C7, C8	= .01 μF	V1, V2	= 5R4
R1	= 10 ohms	V3, V4	= QS150/15
R2	= 25,000 ohms, 30w. w/wound	S1	= 2-pole, 2-way
R3, R5	= 150,000 ohms, 1w.		

TRANSFORMERS: T1, 600-0-600v. 250 mA, 6.3v. 4A, 5v. 3A. T2, 350-0-350v. 120 mA, 6.3v. 4A, 5v. 3A. T3, 0-250v. 50 mA, 6.3v. 2A. CHOKES: Ch1, 5 Hy 350 mA. Ch2, 5 Hy 150 mA.



Resistors R_A to R_E should be fitted under the chassis on a suitably insulated tagboard

Fig. 2. A suitable metering circuit, as a desirable refinement, for the power supply unit shown in Fig. 1. This meter, with its switching, could be mounted on the main chassis.

250-volt 30 mA transformer T3 *via* a reverse-connected metal rectifier MR1 of the older type. Note when connecting the smoothing condensers to this line that the positive side is connected to chassis.

Regulated Supplies

Several methods are available when one wants to regulate a DC supply, and cost bears a direct relationship to the closeness of the limits of regulation required. The series-regulator systems using high-current valves in series with the HT line are quite unnecessary for amateur transmitter work and the simpler methods, using a gas-filled regulator valve, are more normal.

The circuit diagram shows a 4-watt resistor R4 in series with a regulator valve connected across the HT line. The regulated voltage and range of current depends upon the type of valve used. Regulator valves are available for 95 volts at 10 mA up to 150 volts at 15 mA, and these figures indicate that the valve will give a constant voltage of 95v. at currents up to 10 mA, or 150v. at currents up to 15 mA, as the case may be. The resistor in series with the valve is found by subtracting the regulated voltage from the line voltage and working out the value required to drop this voltage at the given maximum specified current. Suppose we require a regulated voltage of 150v. from a 300-volt line using a QS150/15 valve. The rating of the series resistor would be calculated by having it drop 150 volts at 15 mA, which is 10,000 ohms, at 2·25 watts. To enable the regulator valve, which is gas-filled, to strike under all conditions, a priming electrode is provided; this is connected to the HT line through a resistor of from 50,000 ohms to 150,000 ohms (R3, R5 in Fig. 1). Full details are given in the valve manufacturer's lists.

Construction

The total weight of this power supply is not far short of 40 lbs. and this calls for a very well braced chassis. The chassis used by the writer was made of 16g. aluminium, with the edges flanged all round and the corners strengthened by brackets. This chassis supports the components without bending or twisting. Layout of the components is a matter of personal convenience and positions do not matter in the least as regards successful working of the unit. All transformers with open terminals on top should be covered with transparent plastic, as a safety measure—*see* photograph of the completed job, p.640.

Metering Circuit

This is a desirable refinement (*see* Fig. 2) and is a most useful addition to the unit. Indication is by an ex-Service mA meter (0-1 or 0-5 mA) coupled to the various supplies by a rotary wafer switch. All multipliers associated with this circuit are located under the chassis, as a safety measure against accidental contact when changing rectifier valves. No details of the calibration are given as this at best is a cut-and-try business and depends on the movement used.

DX — A Hobby or a Racket?

A Correspondent (name and address supplied) writes as follows:

FOR a long time I have felt that the DX aspect of Amateur Radio was developing an unhealthy tendency, and now I have amassed enough information to confirm my suspicion. Much as I dislike the word "racket," I can find no other to describe what goes on in certain circles these days. Luckily the ordinary honest-to-goodness amateur, who treats his hobby with sanity and moderation, is hardly affected, and those who merit the title of The World's Top DX-ers are not *all* under suspicion, by any means. However, the honest ones among them cannot avoid being tainted by the downright dishonest goings-on which have come to light during the past six months.

Example 1: QSL's for contacts that never took place. I know personally of at least three cases in which amateurs—to make a test case of it—have sent QSL's for purely imaginary QSO's with rare DX stations. These cards have been sent to "QSL Managers," with money enclosed. In all three cases a return QSL has been received, despite the fact that the contact could not possibly have been in the log, since it did not take place. (Let me emphasise that these three cases have been deliberately formulated, as a test, and not for purposes of dishonestly claiming a QSO.)

Example 2: One-way contacts with rare DX. Stations have been formed in a queue by a so-called MC, and have made their call when told it was their turn. In one case the station concerned was obviously not even *hearing* the DX station; but he asked the MC, first, "Did he come back to me?" and secondly, "What report did I get?" Finally he asked the MC to tell the other man that he was received "Three by three."

Example 3: Discrimination. There have been cases in which amateurs with the old-fashioned outlook like my own have refused to send money with a QSL. Not only have they not received a card

in return, but have been refused a QSO on a later occasion.

In my opinion, the whole thing started going bad when the first example of the "QSL-plus-one-dollar" technique was invented. Those who run DX-peditions are naturally out of pocket, but there is no compulsion on them to do it. If the thing is organised beforehand by a group of very keen DX-ers, they, and the manufacturers who are usually concerned with the sponsoring, should also take care of the financial side. Others who work the DX station would naturally not expect a direct QSL without sending IRC's or air mail postage, but they might reasonably expect one *via* the bureaux in due course. (WØMLY and W4BPD have been meticulously ploughing through all contacts —or rather their QSL managers have—with the result that even people who have not sent cards have received QSL's through their own bureau. This, in my opinion, shows the true amateur spirit and even something exceeding it . . . and *voluntary* contributions might well be sent afterwards.)

The last point I want to make is "What is it all *for?*" Must one figure at the top of a list, or have a piece of paper on one's wall, whatever means are used—and *why?* Now that the mere possession of a QSL is not even proof of a contact, one can make all the exaggerated claims one wishes, without bothering about QSL's at all. Perhaps no one will believe you, but they need not even if the so-called "proof" is shown.

Let us return to the days when Amateur Radio was a friendly hobby. We can well do without the likeness of a crowd of aggressive little boys all claiming that they can jump higher than anyone else. Even if they only damage each other by their antics, they are bringing into disrepute a hobby with over 300,000 devotees, nearly all of whom would not countenance the tactics used by the small but vicious minority.

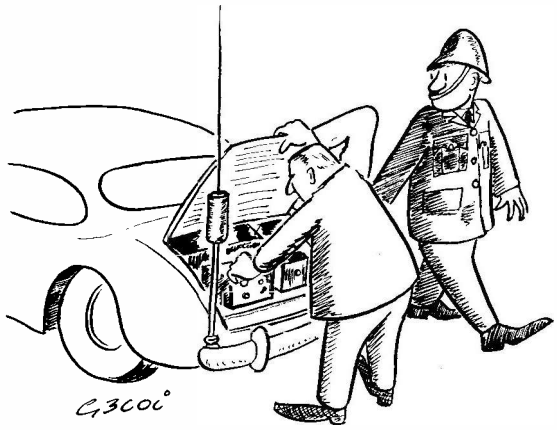
"One of the Old Gang"

Readers' comments are invited on the views expressed.—Editor.

MOBILE RALLY BOOKINGS

Further to the paragraph on p.580 of our January issue, following are the Mobile Rally fixtures as notified to us at close of press: International Mobile Rally, *Verviers, Belgium,* April 28; Peterborough A.R.S., *Hunstanton,* May 26; A.R.M.S., *Barford,* June 16; *Bridlington,* June 23; *South Shields,* July 7; *Chiltern, High Wycombe,* July 14; *Derby,* August 18; and *Lincoln,* September 15. A further list will appear in the March issue if the information is received in time (by February 13, *latest*).

By courtesy of G3BID, we now have full details of the Belgian event at Verviers on April 28. The meeting is open to amateurs of any nationality holding a /M licence, and those who wish to may obtain a temporary ON5 permit, the procedure being as follows: Send a formal request, with a photostat copy of your licence and the enrolment fee of 100 Fr. Belgian, to: R. Vanmuysen, ON4VY, 81 rue J. Baus, Wezembeek-Oppem, Brabant, to arrive not later than April 1st; the remittance should be made payable to Compte Chèque Postal 652667, Julien Counhaye. The application for the ON5 (visitor) permit, which will be valid for operation in Belgium from April 26 to May 3, inclusive, must be accompanied by a note giving the name and callsign of the operator, the make of car and its registration number, and the operating frequency to be used during the Rally, in either the 3·5 or 144 mc band, or both. While in Belgium, visiting operators will be permitted to use only the ON4 licensed bands—which in effect means that Top Band is excluded; in fact, you should not go over with 160m. equipment fitted in your car. Of the enrolment fee of 100 Fr. (about 15s.) 50 francs is for what is described as "insurance of civil responsibility for the car." A mobile operating programme has been worked out, with talk-in stations at Verviers on 3·5 and 144 mc, and some further details about all this will be given in the March issue of SHORT WAVE MAGAZINE.



"... Can I see your driving licence, certificate of insurance, test certificate, mobile licence and log book — please ..."

INTERNATIONAL RADIO FIXTURE

The annual Scout Jamboree-on-the-Air has become an increasingly important event in the Amateur Radio calendar, that held in October last being supported by Scout stations in no less than 62 countries. The 1963 radio Jamboree is provisionally fixed for October 19/20 and it is expected to attract an even bigger entry. The theme of the Jamboree is merely to put Scouts, and Scout-operated stations, all over the world, in touch with one another through Amateur Radio. The U.K. organiser is G3BHK (*QTHR*), who will be glad to have the support of anyone interested in Scouting.

NEW MARCONI FORMATION

The nature of Marconi's business in the electronic field has necessitated the build-up of a large design and manufacturing service which is purely mechanical in nature. To concentrate its activities in this direction and to provide a properly-organised consulting service, the Mechanical Products Division of Marconi's Wireless Telegraph Co., Ltd. has now been formed, and established at Felling Works, Gateshead.

DX COMMENTARY

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

F3DJ

IT frequently happens, in January and February, that this feature becomes virtually a Top-Band Commentary. The HF bands are not necessarily poor, but their working hours are very restricted, and the majority of amateurs find *Twenty* dead by the time they return home from work. One look at *Forty* is enough for many of them . . . according to your temperament, 40m. during the early evening can either fill you with interest or reduce you to a gibbering wreck. *Eighty* claims quite a few, on the way up, but inevitably a lot of unfamiliar callsigns appear on Top Band, where there is something of interest most of the time, and still (surprisingly) some room!

And *One-Sixty* is now becoming a genuine DX band, with more of an international flavour than it has had for years past. Some of its constant devotees regret this—they say the friendly spirit is being endangered by some rough-house tactics that are becoming evident. However, the main thing is for us to make use of all the bands that are available, and *how* we want to use them is really our own private concern—provided that we behave and don't make nuisances of ourselves.

The arrival of some of the really hard-boiled DX-chasers on Top Band has had a similar effect to the eruption of some brash youngsters into a respectable club for elderly gentlemen—and, perhaps, not a bad thing at that.

Conditions, on the whole, have remained surprisingly good; even *Fifteen* has been well ahead of the official predictions, and has been excellent over the North Atlantic path for many days in the month. *Twenty* has been a hive of DX activity at many times—but those early-closing hours we have already mentioned have made it a week-end band for so many people.

Most of the interesting news, this month, has come from the fortunate ones with well-heated shacks . . . most parts of the house have been cold enough, in all conscience, and if the shack happens to be a wooden shed, or part of the garage, or a corner of the roof space, then activity has not been high! Low voltages from the mains have been another hazard. Some transmitters set up for a nominal voltage of 240 don't go all that well when it is dropped to 215—one hears remarks about "lack of drive," in particular.

However, it will perhaps be above freezing point again, by the time you read this, so on with the news. And in keeping with the proportions of the mail, we will make a change and start at the LF end of the spectrum.

CALLS HEARD, WORKED and QSL'd

Top Band DX

First, a summary of W1BB's bulletin concerning the Trans-Atlantic Tests. On December 2 Stew was in KP4 and unable to be with us; but reports were that conditions were very poor and the band noisy. They improved in time for the second test (December 16), and on a "warm-up" (December 14 and 15) W1TX worked G2PL, 3ERN, 3PQA, 6BQ and GI6TK. Around this time, also, VP8GQ suddenly emerged and made a fine batch of contacts. December 23 was a very poor Sunday, with WWV sending "W3." Items of note: VP8GQ's contacts with G3FPQ, 3PU, 5XB and 6BQ . . . a resounding "first" between WB6AFH/WB6AFI and VR3O, Christmas Island . . . G3PU's contact with WØVXO . . . and an interesting note that the American Loran may eventually be removed from the band, now

that something better in the way of a navigational aid is on the way.

G5XB (Reading) says he was using a top-loaded vertical, 38 feet high, for his QSO with VP8GQ (0125 on December 16) . . . G3OQT (Romford) reports that on December 23, VP8GQ was worked by himself as well as by G3FGT, 3MYI, 6BQ and DL1FF; the time was 0430, when VP8GQ was 559.

Regarding the other Sundays, December 30 was very poor, but the following one, January 6, was terrific, and if it indicated a general swing to better conditions we are in for an interesting time during February. On this morning of the 6th G3IGW (Halifax) worked W1ME, 1TX, 3GQF, 1BHQ, 2KQT, 2UWD, 8HGW, 3RFA and 2YIB, in that order. Others were heard, including an HC1 calling W6KIP; this was, of course, the third of the official test days.

G3PGN (Basildon) also describes January 6 as "fantastic"—he ran out of logging paper! Worked were VE1ZZ and VE3AGX. G3OQT wrote before this date, concerning his VP8GQ contact, but says he was most strongly impressed by the fact that it was fairly easy on a day when no W's were coming over. He wonders whether the ZL path might be open at similar times, and hopes to arrange some ZL skeds, for a shot at his WAC on Top Band!

VP5XG (Kingston) got cracking on the band, and on January 6 he managed to work HC1DC, VP7NY and ten W's, including W9EWC. The only Europeans he heard were DL1FF, G3PU (0655) and G3OQT (0708). Peter was only using a short Marconi aerial, and before this appears he will have improved it and may even have got his signal across.

Another letter from Jamaica comes from *ex*-G3CCZ, who has been off the air for some years; he is now taking steps to get licensed again. No Europeans in his list, but 35 different W/VE stations—all W districts except 6 and 7.

G3PFH reports from s.s. *Clan MacTavish* to say that on January 14, when off Genoa, he heard G2PL and G6BQ, both 589, working W1TX, who was not audible there.

Several of our correspondents complain that W2FYT, who has one of the most consistent signals on the band, will persist in telling people to reply on his own frequency, or on 1801 kc. Human nature being what it is, several G stations do just this, and bang goes the band for DX while they are at it. (Blow you, Jack, and so on.)

Other Top Band News

All the foregoing, or most of it, relates to a few periods of intense activity between 0500 and 0800 on Sunday mornings. For the rest of the week, normal EDX and GDX continues to be interesting. The OH's, PA's and HB9T are all very active, and the occasional UB5 or UO5 adds a little spice.

G3IGW worked HB9T at *noon* on January 6, and got a 579 report; PAØPN, at the same time, reported him peaking at 589. Mike adds that 9G1EE, 5B4CN and OE3SE are all said to be active. G3JLA (Stevenage) reports working OZ5AB on December 3—anyone else raised him?

G3OQT has now worked 21 *countries* on the band (19 confirmed)—but his shack is an unheated garden shed, and the strength of will required at 0430 GMT is prodigious!

G2HKU (Sheerness) is back after a long absence, and has worked HB9T and the PA's . . . G3REA (Warrington) has raised OK's, DL's and UB5WF with his quarter-wave aerial, but can't work a W as yet; he asks whether anyone with a quarter-wave has done so, but we are sure that many have.

G3RJH (Greenford) is another who worked HB9T in daylight (1415-1435 on January 5) . . . G3PPE (Wallasey) got PAØPN and HB9T, with 5 watts to a poor aerial; his whole rig (including receiver) is home-built.

G3OLU (Chelmsford) has three grouses to air. First, the stations who call "CQ DX" for long periods when the DX is there, underneath them; secondly, the phone types who get mixed up with the CW ends; and thirdly, the same old complaint about W2FYT and the mess he causes by saying "QSX this frequency."

G3PLQ (Salisbury) is at sea again after all; he left home soon after Christmas, having stayed there just long enough to hold top placing on our G3O--/G3P-- Ladder! He will now be listening, aboard m.v. *Sulima*, and looking longingly at the ship's rig on occasions.

G3RBP (Abingdon) raised 5A3CJ and UA3FU, but finds great difficulty getting out further than that. However, he sends in a starting score that puts him at the head of the new G3P--/G3R-- Ladder.

GD3HQR (Onchan) is getting good results (OK's, PA's, HB9 and so on) with an aerial consisting of

FIVE BAND TABLE

Station	21 mc	14 mc	7 mc	3.5 mc	1.8 mc	Countries Worked
G2DC	268	286	147	101	12	307
G3FXB	269	276	162	93	9	307
G3FPQ	256	269	139	113	26	296
G3DO	223	282	62	65	10	301
G3NOF	184	184	19	29	2	234
G3LHJ	173	134	47	23	11	204
G3BHJ	165	65	29	11	1	180
G2YS	129	181	96	75	20	205
G3IGW	127	131	99	51	28	184
G3NFV	121	91	44	55	16	167
G2BLA	98	96	77	39	9	150
W6AM	87	316	59	30	8	320
G3JWZ	77	107	62	52	9	132
G3JVJ	77	89	72	41	4	129
G3KMQ	75	176	64	42	12	196
G8VG	72	150	85	38	12	168
G3PEU	68	122	17	15	4	138
G3IDG	63	51	27	17	9	92
GW3CBY	32	78	54	36	16	98
G3PEK	28	67	51	27	8	79
G3NYQ	17	32	38	30	11	55
GW3PSM	7	14	36	9	1	43

(Failure to report for three months entails removal from this Table. New claims can be made at any time).

a loaded vertical whip with a top section 3ft. 6ins. long, mounted on a metal mast with the feeder running down the inside. The coil is twenty feet up; and the system can be resonated over most of the band by a "roller" coil at the shack end. Normally one can move about 15 kc without re-tuning. After dark the aerial appears to have a poor spot around 150 miles, after which it picks up again; in daylight it is fine for phone QSO's up to 100 miles.

G3LZZ (Shipley) operates during term-time from Wye, Kent, whence he has raised OH, OK, DL, UB5WF and HB9QA, also hearing UO5AA and OY7ML. Best daylight contact was GW3OAY (Cardiff) at 1235.

GM3NVU (Bonnybridge) was working London regularly on phone, and has improved his aerial since then. Active GM's he mentions are GM3AEY (Fife), 3GDU (Argyll), 6TF (Clackmannan), 3AWF (West Lothian) and 3IWU and 3EHI, both in Lanark.

G3PMR (Retford) has found daylight conditions excellent—he is yet another who worked HB9T around mid-day; he will be on from Bangor (GW3PMR, of course) most Thursday evenings and some Fridays, during the University term.

G3PPE (Wallasey) says "When I was on Twenty I worked so many Europeans that I decided to move back to Top Band, where they would be nice DX" . . . a point of view that gives the band much of its popularity!

G3OSW (Corbridge, Northumberland) naturally works lots of GM's, but GM3KLA (Shetland) is DX even for him. OH2NB, OH3NY, PAØPN and OK's also keep him busy; on January 6 he raised G3NOH (350 miles) at 1100 and heard many other stations along the South Coast. In the reverse direction G3IDG (Basingstoke) reports hearing GI3PDN, GM3DXJ and GM6TF, all over 300 miles, and working GM3PBA for a solid hour one morning (1019-1118 GMT).

G3CED (Broadstairs), using a "Joystick" 30 feet up, with series tuning at the bottom of a 40ft. feeder, accounted for DJ, PA, HB9 and several GI's and GM's.

Eighty Metres

As one would expect after all that Top-Band DX, *Eighty* has also been looking up, with excellent W and VE signals as early as 2200. G3FXB (Southwick), on SSB, has raised FG7XT, HH2V, HI8XAG, OX3AI, PJ2AA, PZ1CH, K4PGL/VP9, W5JDX/VP9, W8UPV/VO2, YV5AGA and 4X4DK.

G3DO (Sutton Coldfield), also on SSB, collected FG7XT, HZ1AB, KP4AXU, 4CK and 4CL, OX3AI and 3KC, PZ1AX, VP2LS, VE3FFW/SU, VK3AHO, XE1CV, YV5ANS, and four ZL's.

G3PEK (Cheadle), not very long on the band, raised UA9KAA and W5ARV on CW—new countries and a new continent for him . . . G3PIT (Exeter), with a rather poorly-situated doublet, worked CW with OY1F, W6's (0445-0600), SVØWZ, OX3WF, TF5TP and KV4CI; he was heard more than once by W6OXJ and VP8GQ.

SWL's have again supplied some very useful logs. B. Curnow (Plymouth) sends a very long list, from which we extract the following, all on SSB: CT3AV (2250), PZ1AX (0810), VP2ML (0725), KP4AXU (0811), EA9AZ (2235), OY7ML (0825), FG7XT (2320), KP4's (0615), FM7AA (2140) and ZL's (0730-0830). Special mention for K4VC, "an outstanding signal at 0820—much stronger than many G stations."

D. Gray (London, N.3) wishes that Europeans trying to work W's in the mornings would not all cram themselves just below 3800 kc, where another group are trying to work ZL's and more exotic stuff. He suggests that if they stayed around 3790 kc and listened above 3800, things would be easier for themselves, as well as others. His log includes VK's, ZL's, VR3O (0715 and 0745), PJ2AA (0645), XE1CV (0655), VK3AHO (1910), OX3KW, YV5BNW and 5BFR, KP4AXU and W5JDX/VP9.

Forty Metres

A lot of SSB DX is now being worked on *Forty*, but CW still makes most of the news. The band is probably at its seasonal peak right now, and even in the afternoons the owners of good receivers can pull real DX through. G3FXB worked VK3IT on SSB (1945); CW fetched in HC1DC, KR6LJ, KV4CI, ST2AR, OX3BZ, SVØWZ, VE7ZM, VP5MJ, VP9BO, VQ4IV, ZD6JO, ZD9AM, ZS6IF/8, 5N2JKO and 9M2FZ. A notable one was W7PHO (1500); and others worked included UF6, UH8, UI8, UJ8 and UL7.

G3DO, on SSB, made it with JA1INJ, PZ1AX, VP2ML and EP2AD. G3LPS (Blackburn), on CW, was pleased to get some long-path W6's, all around 1515 GMT in December; other nice ones were ZD9AM, PX1AI, VQ4IV, 5N2LKA, HKØZU, HK1QQ, HI8XAG and ZL2GS. G3LPS notes how selective the skip seems to be at times—for example, HZ1AB was heard working DL and OK almost exclusively, and a VK5 was working only YO and UB5. He asks "If these people at times like this are favoured by conditions, why doesn't the same thing happen to G's more often?" Any suggestions?

G3RDC (Pett Level) reports for the first time. With inputs between 8 and 25 watts (CW) he has worked 38 countries, including VK3JF and 4SS, OY2H, 5A3TX, 5B4PB and 4CZ, ZB1BX and 4X4IX.

The former 5B4CT is now GW3PSM (Cwmbran), and he has stuck to 7 mc CW since returning home, with the following result: KV4AA and 4CI, KZ5EM, VP4BG, VP6LJ, VP8GQ, HK1QQ, HL9KH, 9M2RI, ZS5JY . . . and, later, with an improved aerial, VU2GG, VS9AAA. VQ4IV, ZB1BX, FA3OK and

TOP BAND LADDER

(G3O-- and G3P-- stations only)

January-December, 1962

THE FINAL LEADERS

Station	Counties	Countries	Total Figure
G3PLQ	89	14	103
GM3PBA	85	14	99
G3PRM	83	10	93
G3PHO	74	15	89
G3OLN	78	9	87
G3PGN	66	16	82
G3OWR	70	10	80

many others. Colin hopes to be signing G3PSM/A from Abingdon before long—probably on Top Band.

G3RJS (Stourbridge) is another new reporter; he worked CT3AB and UL7LA with an unmodified 19 Set and a Perdio transistor receiver, with 60 feet of wire lying across the roof and end-fed.

G3PIT remarks on the amazingly consistent signal from ZL2GS, who romps in almost every morning without fail. G3PIT is plagued by a noise which stops around 0800 (fluorescent street lighting?) but managed to get some interesting stuff after that hour—mostly W6 and 7. And he noted JA openings between 0900 and 1000, with JA8LN outstanding, and copying Europeans very well, mostly Scandinavians. Others worked were KV4AA (0148), CT2BO (0340), KP4BCL (0725), ZL's (0740-0840), VE8JJ (0950), VK2RA (1530), W6GRX (1540 and 1600) and VP8GQ (2340).

G3PEK raised PY7TY after much chasing of that country; also VQ4IV and VP8GQ, who both came back to CQ calls. A dipole and 40 watts were responsible for these.

G3RFS (East Barnet) worked CW with PY7TY, UN1BK, UF6AU, CT3AB, 5B4CT, 5A1TW and some W's; he heard 9K2AD (2000), CR7IZ (1930) and 4S7WP (2000).

Twenty Metres

At last this band is co-operating a little more by staying open later in the evenings, but nothing spectacular is happening as yet. G3DO, over the past two months, reports SSB contacts with LH4C, VP2ML, KC6BO, VK9LA (Cocos) and VS9MB. G3FXB's short list consists of LH4C, HL9KH and VQ9HB (all SSB).

G3RFE (Barrow-in-Furness) worked CW with HZ1HZ, VK3NM, VO1DZ, VP5XG, YV5BOA, 4X4HK and 5R8CQ. G8VG (Dartford), also on CW, raised HK7ZT, W6 and 7, 5N2OSR, VK3CX, YV5BET, ZL1AV, KP4BBN and YN1AA, as well as regular QSO's with his son Peter—VP5XG. G8VG himself is now retired, and says he wonders now how he ever found time to go to work!

G3PEK worked VS9AAA and KG4AM, the latter 579 both ways on a "dead" band at 1915. Several W6's make up his total for the month. G3LPS collected ZP9AY, 4X9HQ, VK7SM, KP4, PY's, VK's and ZS's.

GM3JDR (Sutherland) thought conditions were "rock bottom" but managed to get CW contacts with CT2BO, CR6CH, OD5AX, PY4UG, TT8AL, ZS5UT/MM and ZS6IF/8. SSB accounted for HC1RB, HV1CN, LA5FI/P and 9RG/P (both Spitzbergen), MP4BBW, OX3TO, VE3FFW/SU, VS9ACH, VS9MB, VQ2WR, XE1AB, ZS1JA, 5A1TG and 5N2HJA. He says "When I get home from work, the band is an empty hole!" But he thinks things will soon perk up, and he is pretty cheerful himself, having confirmed 200 countries on SSB—and on a single TT21 PA at that, not "150 watts to a pair of 813's in grounded grid" . . . we know what he means, only too well!

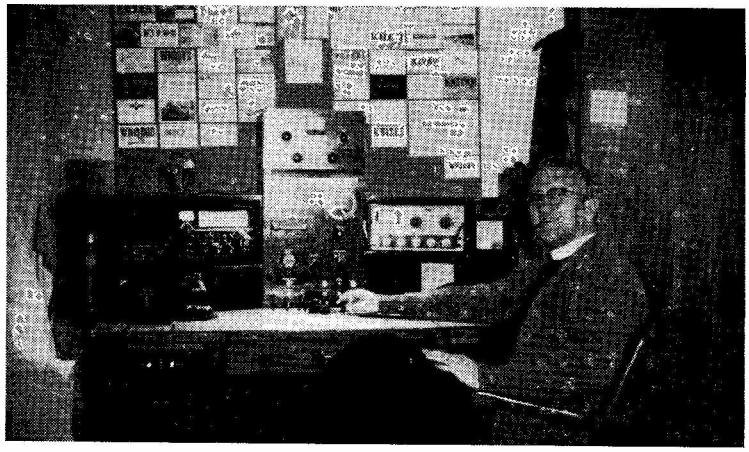
G3RFS, with his 40 watts of CW, raised TF3AB, UI8's, UL7's, UH8BD, W6's, VE1-4 and W7VCB/MM.

Fifteen Metres

Those who think "ancient modulation" has had it (and there are many of them) should study this list of 21 mc AM stations worked by G3FXB: AP2MR, CR7CK, CX8BE, EL2K, FG7XS, HC1DC, HI8MNW, HH2RV, MP4TAC, PY7AKW (Fernando do Noronha), PZ1CE, VP7CS, VP8DW, VS1GC, VQ8AM, XT2Z, YA1AG, VP9AK, ZD6RM, ZS9G, ZS3HT, 5H3IW, 5X5AU, 4S7YL, 9M2AH, 6W8AA, 5R8AG, 9U5CB, VP2KP/A (Anguilla). Have you got the message? SSB added KV4CE, 3V8CA, FG7XT, HC5EJ and ZP5CF.

G3PEK also worked AM, with ZE2JA, CN8EM, 9G1EE and 5A2TS. G3LPS, on CW, raised VQ2W, HC1DC, VK6SM, 5N2RSB and 2JKO, TU2AP, 5A2 and 5B4.

Most of our regular reporters for this band seem to have vanished this month; either their shacks or their letters were doubtless frozen up. [over



KN1VUP, RFD 1, Savarese Laine, Unionville, Conn. is operated by the Rev. J. R. Butt, of the Anglican persuasion. He runs a Heath DX60 with a Drake 2B receiver and regards Amateur Radio more as a means of making personal friends than of piling up a DX score — in other words, he likes a real rag-chew QSO and abhors the "Ur vy FB sigs QRU" type of contact. By now, he may have dropped the novice prefix and if you hear or can work K1VUP, you will find him a good, steady operator, glad to make the most of any QSO.

TOP BAND LADDER

(G3P-- and G3R-- stations only)

(Starting date July 1st, 1962)

Station	*Counties*	*Countries*
G3RBP	73	15
G3REA	60	9
G3RJH	39	8
G3PPE	36	9
G3PMR	36	6

(Note: This ladder will continue until the end of 1963. New entries will be accepted up to July 1st.)

Ten Metres

No, not a DX note—but an interesting report from G3OYX (Great Baddow, Essex), to the effect that he and some of the locals have moved themselves off Top Band and on to 10m. for their week-end nattering. Their experience is as foretold here: Strong signals all round, no QRM whatever, and a few watts into a vertical dipole quite sufficient to cover the ground up to ten miles or so. These results are encouraging other Essex stations to make the same move. And now, if we could get the /M's to take ten metres seriously for local work, the band would be away to a new lease of life.

General Chat

OD5CU, who also holds the calls G3BVP, MP4DAD, MP4QAT and MP4BDJ, is now moving to Kuwait and has added 9K2AU to his list; he will be active on most bands, AM and SSB, from February 1 onwards.

G3FXB thinks the following should be of interest to Top Band Dx'ers! He has been listening on the *medium* waves, where he has logged several Chinese stations, the V.o.A. in Okinawa and the Philippines, and KSBU (Okinawa) *in the afternoons* from 1430! Around 0100-0400 he has had good MW signals from Texas, Missouri and Iowa.

GM3JDR suggests a new idea for an award or a competition, based on actual call letters, not prefixes. Take a series such as PJ2AA, HZ1AB, PY2AC, XZ2AD, SV1AE, UA3AF, UI8AG and so on right through the A's, then starting on the B's and continuing right through the alphabet. (Where would three-letter calls come in, we wonder?) It seems to have the germ of an idea, for those who enjoy collecting things . . . what do readers think?

A card-index would be necessary for the foregoing—and that is what G3IDG writes about. He is a bit tired of repeating his name and QTH to stations that he has already worked many times, and thinks poorly of people who say "Can't fiddle about with card indexes" and let every station worked go to the extra trouble of repeating the gen. each time. (Never mind, having the other fellow's name at your finger-tips is a subtle form of one-upmanship, and he must feel *something* when he has to ask what yours is! Come to think of it, we would willingly go back to the days when everyone was "OM" except for real personal friends, whose names one wouldn't forget anyway.)

One pleasant short one, also from G3IDG: A PAØ station heard saying "My key is a side-sweeper"—and it sounded just like that, too!

Two cases of piracy are reported. G3RBB (Daventry) says his call is being used by someone else on Twenty and Eighty, and he has received over 70 QSL's as a result. Also G3RNU (Gloucester) has had cards for Forty phone and Top Band which could not possibly have any connection with his own operation.

SWL B. Curnow quotes a nasty incident on 3·8 mc SSB, when a DX net were standing by for FM7AA, and a G3-- came on the frequency calling a European. He was asked (politely) if he would QSY, to which the reply was that he was "quite at liberty to use that freqency and would continue to do so." After this, quite a little war broke out. We know that some of these DX nets are resented for some reason or other, but if they keep half a dozen stations or more on one frequency they are doing others a good turn, surely? A polite QSY of a few kc is so little trouble, whereas boorish behaviour just exposes people for what they really are. (It is well known that some of the meekest of men become ranting little Hitlers when behind the wheel of a car; if this phenomenon spreads to the amateur bands we may as well all take up embroidery as a hobby.)

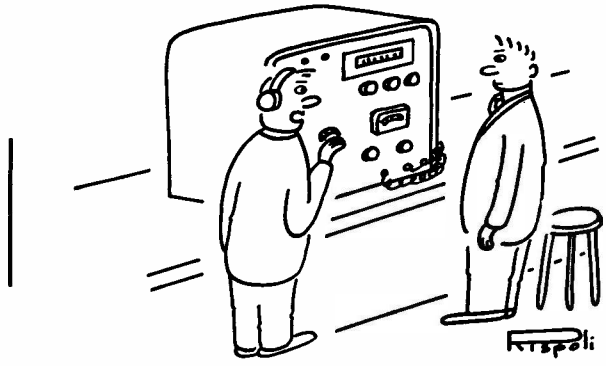
DX Strays

FB8WW was expected to show up from Crozet on January 1, but much probing by the DX gang, including the South Africans, revealed nothing . . . VKØVK, likewise, had promised operation from Heard Island, but his posting was changed and his call now emanates from Wilkes Base, Antarctica. Other Heard Is. activity is promised by VKØJM and VKØNL . . . Danny Weil, having left Samoa, was expected on from FW8-land by mid-January (no sign at the time of writing); he should be there during February.

Piracy on the DX level . . . VK9XO, said to be on Christmas Island, and KS4AZ, said to be on Swan Island, are both reported as No Good . . . 9L1RO has put Sierra Leone back among the workable countries—he is on 14 mc SSB (Ron Oxley, Pepel, Freetown).

ZL3DX hopes to make an expedition to VR4-land, if he can find a club or group to sponsor him . . . KC6BO, with a big signal on 14 mc SSB from the Western Carolines, is said to have his beam 250 feet up!

A recent poll by the West Gulf



" . . . We don't seem to be radiating, Smith. Would you pop up and give the aerial a tap . . . "

DX Club of the "most wanted" countries in the DX-pedition field showed the Top Ten to be as follows:—FB8 (Tromelin), AC3, AC4, VK4 (Willis Is.), 4W1, VKØ (Heard Is.), VQ8 (Rodriguez), ZA, C9 and FB8 (Comoro). If you've worked them all, then you haven't much left to worry about.

One future DX-pedition that should shake things up is to San Felix Islands (CEØXA), organised by a very hot team of W's, CE3AG, HK1QQ and HK3LX. Travel has been arranged and all seems set except the date.

ZS2MI, Marion Island, may be on the air during April—ZS1OU hopes to do the activation . . . 5N2SMW plans to make a sortie into Dahomey, 5V4, with a small portable rig . . . ZA1KFF, like all the others, says "QSL Box 77, Tirana"—but don't put a callsign or mention Amateur Radio on the envelope.

The ARRL DX Contest

The 29th ARRL International DX Contest runs this year with unchanged rules. As always, the Phone and CW sections each occupy two week-ends. *Phone:* February 9-11 and March 9-11; *CW:* February 23-25 and March 23-25. The number for DX stations is a six-figure group comprising the RST and the power input (three digits for the latter). For phone stations, the usual five-figure group, of course. Scoring—three points per QSO on each band, multiplied by number of call areas (*not* States) worked on each band (maximum of 21 per band).

Station of 5A3BC, Tobruk, Libya, operated by P. J. Crosbie, G3NMQ, whose home QTH is 73 Clyde Road, East Croydon, Surrey. He is employed as a field engineer by the Posts & Telegraphs Dept. of Libya, and the rig now on the air consists of a K.W. Vanguard, an Eddystone 888A, and a variety of aerials designed to give "suck" on the amateur bands. In about a year's operation under the 5A call a total of 164 countries has been worked, with certificates and awards as the main preoccupation — that is to say, DX achievement is his interest in Amateur Radio, and who is there to say that this is wrong. 5A3BC is a member of many of the DX clubs, and has handled the cards for about 8,000 DX contacts. He operates mainly on CW and enjoys the rag-chew type of QSO, whether on phone or on the key.

Final

Well, that's about it for this month, and feel pretty sure about better HF-band news for the next period. If both the DX and the WX improve, with that spring-like feeling not far off, we can look forward to some lively goings-on.

Next month we have the earliest deadline on record—**first post on Friday, February 8.** (Blame the calendar—we publish on March 1st and February is a short month!) Address everything, as always, to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1, and *please* don't be late.

Until then, we say Good Hunting, 73 and—BCNU.

AMERICAN MAGAZINE SUBSCRIPTIONS

Those interested in the American periodicals on Amateur Radio may like to be reminded that we act as U.K. subscription agents for *73 Magazine* (30s.), *CQ Magazine* (44s.) and for *QST* (48s.). These prices are post free by surface mail direct from the publishers, for a year of 12 issues. As we do not ourselves buy in more than a few copies a month (to special order) we regret that we cannot send out specimens, nor supply single copies of any issue. Subscription orders, with remittance, should be sent to our Publications Dept., with a note of the month with which the subscription is to start. If it is a *renewal,* please send the notice with remittance.

MORSE MADE EASY

A Japanese firm is now manufacturing a Morse decoding apparatus, which can run a teleprinter from Morse (or Vail!) signals. Known as the Morse Teletype Converter (MTC), the equipment can also give instantaneous translation of Morse code into letters; it will likewise invert, to transmit from a typewriter, or teleprinter, in Morse. The MTC has been designed to work either in the English or Japanese languages, and is intended for use in ships. While it would not necessarily eliminate all Morse working by the ship's operator, it would certainly relieve him of the necessity of sending, or reading. long transmissions.

STACK ARRAY FOR 70 CENTIMETRES

SIXTEEN ELEMENT, USING CHEAP MATERIALS

E. CHICKEN (G3BIK)

THIS very effective—yet cheap and simple to construct—433 mc beam originated in a home for tramps near Leeds, where thousands of galvanized (zinc-coated) iron wire coat-hangers are produced by the gentlemen of the road in return for their bed and breakfast. These coat-hangers are used by most of the local dry-cleaner firms who return each laundered garment on one, at no extra charge. Being non-returnable, the writer's wardrobe was quickly over-burdened with spare galvanized (zinc) coat-hangers, which were duly pressed into radio service.

The total material complement for this beam is: 12ft., of coat-hangers, 12g. galvanized; 10ft., 26g. tinned copper wire; two 5ft. x $\frac{3}{8}$in. diam. bamboo canes; 10ft. of thin, strong cord (fishing line); 8in. of PVC sleeving, and one reel *Arax* cored solder.

Each hanger is made from a 42in. length of galvanized wire, which is very strong. Figs. 1 to 9 show clearly the construction, step-by-step. The first thing is to straighten out the hangers, using a strong pair of pliers, after which cut and bend two pieces to shape as in Fig. 1, and four pieces as in Fig. 2.

Now bind these six pieces together with thin tinned copper wire, and solder with *Arax* cored solder, taking care to arrange the overlaps so that the centre phasing-line spacing is not stepped. This is achieved by laying the sections on the ground and arranging the overlap joints so that one lies on top of the other, and *not* as shown in Fig. 3, which is drawn for clarity showing the overlaps side by side.

These six pieces combined form the radiating elements and phasing lines. It should be noted that the phasing line sections between the upper and lower radiator sets have cross-overs in them. The spacing between the lines is one inch, and the cross-over is achieved by a judicious bend around a broom shank, thereby forming a semi-spiral in each line. The two semi-spirals thus produced result in a cross-over with a constant one-inch spacing. (This operation sounds much more complicated than it really is).

At this stage, strip 8 inches of the outer sheath of $\frac{1}{4}$-inch coaxial cable, cut into one-inch lengths, and slip one over each radiator element, positioning them at the centres.

Fig. 4 shows the construction of the element supporting members, of which two are required. Each one consists of a 41in. length of 12g. wire and four pieces $6\frac{3}{4}$ inches long. The 41in. piece is the vertical member and the $6\frac{3}{4}$in. pieces are fixed to it by twisting one end two complete turns in a downward direction. By giving two turns, the cross member is held rigidly at right angles to the vertical member. Now bend a downward hook on the remote end of each cross member, as shown in the drawing, forming an arm $5\frac{3}{8}$ inches long. As before, a stout pair of pliers is necessary for this operation.

Lay the two supporting pieces thus formed on the ground to ensure that all the cross members are in the same plane, and solder each spiral joint.

To form the reflector elements, cut 8 straight pieces of 12g. wire $13\frac{3}{8}$ inches long, and fasten one to the underside of each cross member, hard up against the spiral joint, mutually at right angles to the vertical and cross members, and bind in position with thin tinned copper wire. Solder at each joint after binding—*see* Fig. 5.

Now cut four pieces of bamboo cane 3 inches long from the 5-ft. canes, by taking 6 inches from each one. These pieces will of course have holes through their centres.

Take the two sections of aerial which form the supporting members complete with reflector elements, and lay them side by side on the ground. Make a pencil mark $1\frac{1}{4}$in. inwards from the inner end of each reflector, and push one 3in. piece of cane over these ends of each pair as far as the pencil marks, as shown in Fig. 6. This should leave a centre spacing of $\frac{1}{2}$-inch between the reflectors inside the cane spacers. Make sure that the spacers are a good tight fit by packing with scrap pieces of PVC sleeve if necessary.

Lay the two $4\frac{1}{2}$ft. canes down the back of this section, with a spacing of about one inch, and bind them with cord at each intersection between the long canes and the cane spacers. Leave about 12 inches of cane overhanging at the bottom for fastening to the mast head—*see* Fig. 7.

The final stage is to take the radiator and phasing line assembly (which is in two sections) and insert each radiator into the hook formed in each cross member. The position of the hook should correspond to the centre of each radiator, and the hook is then nipped tight with the pliers. The one-inch PVC sleeving pieces form insulating bushes between the cross arms and radiators, so ensure that they are not nipped through. Theoretically, these insulating bushes are not necessary as the centre of the radiator is a low impedance point, but in practise it is preferable to have them.

The phasing lines should be equally spaced about one inch along their length; the radiating elements $12\frac{3}{4}$ inches long, spaced vertically $13\frac{1}{2}$ inches; the reflectors $13\frac{3}{8}$ inches long, spaced vertically $13\frac{1}{2}$ inches; and the reflector-to-radiator spacing is $5\frac{3}{8}$ inches, which is 1/5th of a wavelength. It can be seen that both the reflector and radiator are mounted *below* the cross arm in each case.

For extra rigidity, and to help keep the phasing line spacing symmetrical, a 3 x $1\frac{1}{4}$-in. piece of perspex can be laid across the phasing lines between the top and bottom pairs of radiators, and fixed in position with PVC tape.

Feeding

The array is fed at the centre of the phasing lines, and has an impedance of 300 ohms.

It can be connected either by 300-ohm tubular twin feeder, or by 75-ohm low-loss TV type coaxial

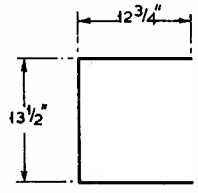


Fig. 1 2 off

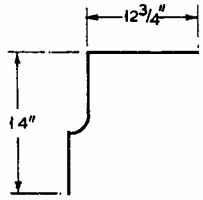


Fig. 2 4 off

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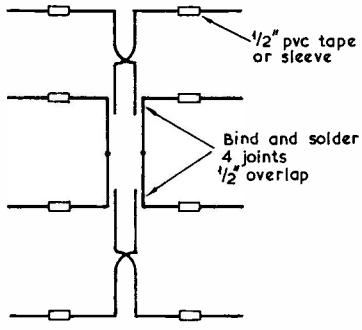

Fig 3. Radiators and phasing lines

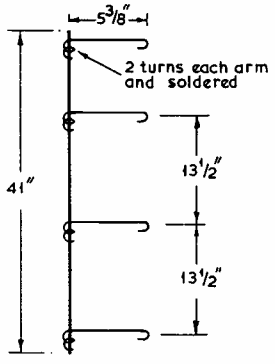

Fig. 4. Element support 2 off

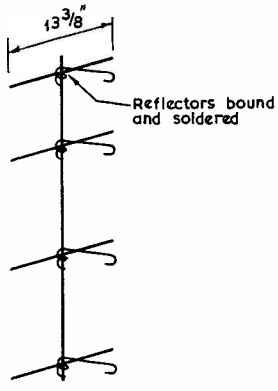

Fig. 5 Reflector mountings

See text for detailed descriptions of these diagrams.

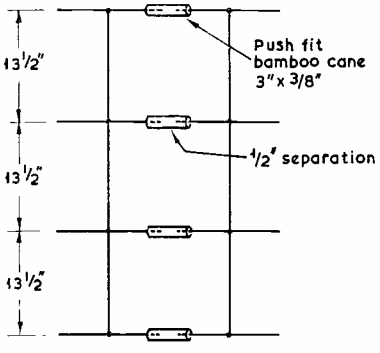

Fig. 6. Bamboo reflector spacers

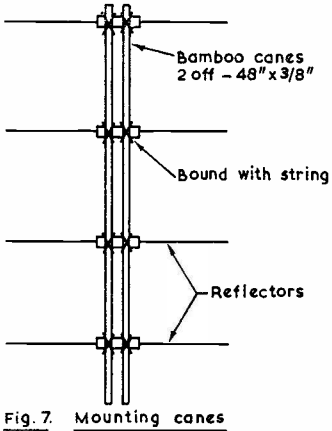

Fig. 7. Mounting canes

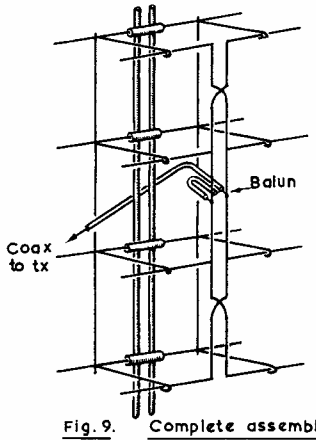

Fig. 9. Complete assembly

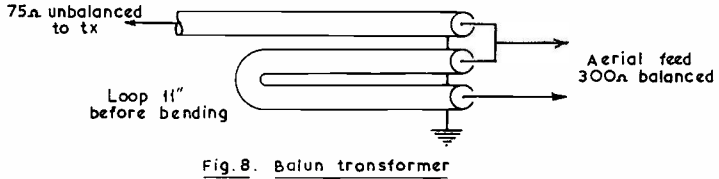

Fig. 8. Balun transformer

A 335

cable, with a balun transformer. A suitable balun of simple construction is shown in Fig. 8.

In the author's case, the balun is made with 75-ohm semi-air spaced coax, the total length of the loop before bending being ½ wavelength, which, after taking into account the velocity factor of the cable, is 11 inches for 433 mc. The three braided ends thus formed are strapped together (preferably soldered, but care should be taken to avoid melting the inner insulant) and earthed. In practise, the earthing has no noticeable effect and need not be bothered with. The centre conductors are connected as shown, and should be soldered to the centres of the phasing lines, after which the ends are sealed against moisture by liberally coating the bare ends with polystyrene or *Tensol* cement. As a further precaution, arrange the feed cable so that it runs *down* to the feed point, by taping the coaxial cable to the canes about one foot above the centre. Finally, clean off all residual flux from the joints, and rinse with water, as this flux is mildly corrosive.

The complete 16-element 433 mc stack, which took only 3 hours to build (in spite of the apparent complications) is extremely strong, light in weight, has low windage and is durable. It can be clamped to a mast by the canes. The beam at G3BIK as described here has survived many gales and much severe weather, 15 feet above the chimney, without damage or rusting, and has proved most effective, the performance being noticeably better than the previous array, which consisted of a dipole in a close-mesh 2 x 1 wavelength-sided corner reflector.

With only 10 watts RF into the array at a height of 30 feet, distances up to 85 miles have been worked on the 70-centimetre band. More recently, power has been increased to 100 watts.

Finally, it hardly needs mentioning that the same general design can be adapted to other materials—it is not likely that everyone, everywhere, has a full supply of galvanized coat-hangers!

The Knight Kit Electronics T-150 AM/CW Transmitter is a 150-watt job for all bands 10-80m., using controlled carrier modulation. The PA matches into any 40-600 ohm aerial load (which in effect means an ATU feeding out into any sort of aerial system) and keying is clean and chirpless; full modulation is obtained with a dynamic or crystal microphone. Band-switching is by single knob control, and the VFO gives smooth control against an illuminated scale. It is an American design by the firm of Knight Electronics, Inc.

The Redifon GR.336 pack-set is a portable radiotelephone for operation in the marine VHF band, 156-165 mc, crystal controlled on four selectable channels, rated at one watt RF output. The receiver side fully accommodates the transmitter range and only three controls are involved: Channel selection, audio gain, and on/off. Power supply is from dry cells and the application of the equipment is for close-range working, such as in harbours or on building sites.

LASERS AND MASERS

At the recent Physical Society Exhibition, the Royal Aircraft Establishment, Farnborough, demonstrated their latest helium-neon gas Maser, operating as a continuous oscillator. Although still the subject of research, experiments with Lasers and Masers indicate the possibility of their use in longe-range (optical path) communication systems. Laser radiation is coherent, and two such oscillators at slightly different frequencies can give beats as obtained from RF oscillators of conventional type. Laser beams have indicated vast potential applications, *e.g.* one such beam could carry several TV channels and literally thousands of audio channels simultaneously, and modulation is easily applied. Moreover, a Laser beam is far more nearly parallel than that which the most complicated radar aerial system can produce, the spread being less than 1:10,000. This would be of enormous value in a high-resolution radar system, or in longe-range inter-satellite communication. Another important application, this time in the fields of research and industry, derives from the fact that Laser radiation can be concentrated into a very small area.

VHF BANDS

A. J. DEVON

THOUGH conditions have been good at times, with some extraordinarily high barometric readings—a new all-time pressure record at A.J.D.'s was set on December 23, when the graphing pen was pushed off the scale—the weather has been far too cold generally for any tropospheric development, and much too cold for most people to be sitting about in the shack. For many, the struggle for daily survival has absorbed all their energies, and bed has been about the only safe place for most of us!

However, as usual there is quite a lot of interesting material to report and discuss, even if the mail this time has not been as heavy as it was last month. Looking again at the barometer, another unusually high reading of 31·7", of about 1040 mb, was recorded on January 13, following a week of steadily rising pressure but under extremely cold conditions. It seemed as if some GDX might be possible, and the beacon was a better signal, but in the event there was hardly enough activity to give any real check on the state of the band.

And this reminds us to say that the guardians of the beacon, GB3VHF, report that the reason for the erratic signal and its poor QRK is a fault in the aerial system. As they can hardly be expected to tackle mast work under the Wx conditions we have been having, it may be some time before GB3VHF can be restored to its full potency.

Of particular interest this time are two reports of successful meteor-scatter working. OK2WCG (Brno), one of the dab hands at this highly specialised method of VHF communication, worked UA1DZ *via* MS on December 10 and 11; they had two solid QSO's, reported as S26 (this is in the special scale used to evaluate contacts by meteor-scatter), making it the 12th country worked *via* MS by OK2WCG, and putting him in the *solus* position on the 17th rung of Countries Worked. Ivo is very keen on MS work, as his excellent results show, and he is still anxious for meteor-scatter schedules with any GC, GD, GI or EI stations in a position to co-operate. The main requirements are high power into a good beam, combined with very accurate frequency setting. The rest depends upon careful schedule-keeping, patience and luck.

Another very successful MS operator, with lots of experience of the mode and its technique, is G3LTF (Galleywood, Essex), who worked OH1NL on January 2, for his 5th MS contact and 20th country on two metres. Their QSO took place between 1815 and 2240 GMT, and reports exchanged were S23 both ways, with signal bursts of up to S7-8 at times. G3LTF points out that all this happened when the shower, officially, had set, and asks for an explanation, astronomically speaking—so far, we have not been able to find the answer to this one! OH1NL runs 800w. to a 52-ele long Yagi (a man-sized job on two metres) and his Rx is a 6CW4 converter. The input at G3LTF is 250w. (he has a QRO licence for VHF, for this sort of work) and the beam is a 12-ele long Yagi, his frequency being 144·975 mc. G3LTF's station was described in detail in the August 1962 issue of SHORT WAVE MAGAZINE.

To keep things up-to-date, space has been taken this time to spread out the Two-Metre All-Time and the other current tables—about 60 movements in all are recorded, and there are many changes in the big one. We hope that all interested find themselves in the right place. With so many claims being made just recently, and it not being possible to show the Two-Metre All-Time very often, there is always an accumulation of bits of paper in the latter file, and the trick is to keep them sorted out! Needless to say, plenty of space is available in all the Tables, and new claims are always welcomed. Though it had been hoped and intended to open a 4-metre annual, this has been dropped temporarily because we have not yet had sufficient claims; however, the all-time for that band has become well established.

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1962

Starting Figure, 14

From Home QTH Only

Worked	Station
58	G3BA
54	G3BOC
53	G3EDD
51	EI2W
49	EI2A
48	G3BNL, G3CO
44	G4LU
40	G3PBV
39	G3JXN
38	G3OXD/A
37	G2AXI
36	G3JYP, G3NUE
35	G3FIJ
34	G3OJY
33	G3JWQ, G3PSL
31	G3DVQ
29	G2BHN, G3HRH
27	G2DHV/P
26	G3NOH, G5QA, G5UM
22	G3LQR, G3PTO, G8VN
20	G3JHM/A, G3NPF, G3PKT
18	G3CK, GI3ONF
17	G3GVV
14	GW3ATM

This annual Counties Worked Table will close on August 31, 1963. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. QSL cards or other proofs are not required when making claims. The first claim should be a list of counties with the stations worked for them. Thereafter, counties may be claimed as they accrue. **Note:** ***While new claims can be made at any time in the period from now to end-June 1963, all operators are asked to send in amended scores as often as possible, in order to keep the Table running up-to-date. After June 30, 1963, only amended scores from those already standing in the Table at that date will be accepted.***

And another department that needs bringing up-to-date is that of the issue of VHFCC Certificates, which has been getting behind just lately, due to the pressure of other events. Anyway, no less than thirteen fall to be recorded this time, as follows:

VHF Century Club Certificate No. 333 goes to L. W. Sharrock, G3BNL, Keyworth, Nottingham, whose claim is based on G-cards only. VHFCC Certificate No. 334 is awarded to B. R. Timms, G3MLE, London, W.1, who says it took him about two years to work to 100 stations "and a little longer to get the cards"; he is in a very difficult location, surrounded by buildings up to 80ft. high, with only one gap, subtending about 10°, in the WSW direction; G3MLE runs 20w. to a QQV03-20A, with a 5-ele Yagi and an A.2599/A.2744 cascode converter giving 4-6 mc IF tuning.

R. Wahl, DL1DC, Stuttgart, gets Certificate No. 335 for confirmed contacts with 100 different stations, in four countries, no G's being included in his lot. DL1DC is also chief operator on DLØST/P, for which he likewise claims VHFCC, and is awarded No. 336. Qualifying for Certificate No. 337 is W. von Schimmelman, DL6SW, Ditzingen, whose list contains DJ/DL's only.

Then we have V. Horacek, OK2BCI, of Hodinin, for Certificate No. 338, his cards being mainly for OK contacts, though he has also worked about 25 stations distributed through HA, OE and SP. Next is A. E. Latham, G3JLA, Stevenage, Herts., with No. 339, who made most of his contacts running 24w. and a 5-ele Yagi; he

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Home QTH Only

Worked	Station
86	EI2W
85	G3CCH, G5YV
84	G5MA, G6NB
80	G3HBW
79	G3CIW (417), G3BA
76	G3AOS, G3EHY
75	G3IUD
74	G3KEQ
72	G6XM
71	GM3EGW (310)
70	EI2A
69	G3BLP (1,061)
68	G3BW, G3GHO
66	G2OI (585), G3JWQ (569), G3KPT*, *G5BD*
65	G3HRH, G6XA (333)
64	G3DKF
63	G2FJR (542), G3FAN (1,000)
62	G3BOC, G3CO (610)
61	G2HIF, G3HAZ, G4LU, G6RH
60	G3DMU, G3IOO, G3JYP
59	G4SA, G5DS (883), G8VZ
58	G3LHA, G8OU
57	G8SB
56	G3WW (770)
55	G2HDZ (495), G3PBV, G5BM, GW5MQ
54	G3NUE (339)
53	G2AJ (519), G4CI
52	G2NH, G3FZL, G6XX, GM3DIQ, GW2ADZ
51	G3LTN, G5ML, GW3MFY
50	G3ABA, G3GSE (518), G3NAQ, GW3ATM
49	G3AYC
48	G3FIH, G3LAR, G3OJY*, G6TA (487), GW3ATM
47	G3OJY, G5WP
46	G3MTI (242), G3OHD, G4HT (476), G5BY, *G6YU*, GC2FZC
45	G2AHP (647), G2DVD (362), G2HOP, G2XC, G3BJQ, G3GFD, G3MPS, G5JU, G6GN, GI3ONF
44	G3BK, G3DVK (282), G3GSO, G3NBQ (218), G8DA
43	G2BHN (238), G2DDD, G2FCL (322), G3BNC, G3COJ, G3DLU*, G3HWJ, G3KHA (262), G3KQF, *G3KUH*, G3NNG, G3WS, G4RO, G5DF
42	G2AXI, G3DO, G3IER, G3JHM/A, G5UM (918), G6CI (220)
41	G2CZS (282), G2FQP, G3FIJ (465), G3JAM (481), G3JLA, G3JXN*, G3OXD/A (194)
40	G3CGQ, G3FUR, G5MR (366), G8KL
39	G2IQ, *G3GBO* (434), G3LTF, G3NOH, G3OSS, G3VM, G8IL (325)
38	G3APY, G3CKQ, G3HTY, G8VN (190)
37	G2DHV, G2FNW, G2FZU (180), G3DLU, G3MAX, G3OSA, G8DR (482), GC3EBK (260)
36	G2DCI (155), G3CXD, G3DLU*, G3IIT, G3OBD, G6CB (312), G8IP
35	G3FYY (235), G3HCU (224), G3IOE, G4LX, G5TN
34	G2AHY (295), G3AEP, G3HWR (506), G8IC, G8NM
33	G2BDX, G3DVQ, G3HHY (125), G3ICO, G3PSL, G3PTO, G4JJ/A
32	G3BYY* (274), G3HIL, G3NNK (325), G3OBB, G8QY, G8VR
31	G3HXO, G3KPT (180), G5RP, GM3LDU
30	G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GW8UH
29	G2CVV, G2DHV/P, G3AGS, G3AKU
28	G3ITF, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G3JGY, G3LDY (102), G3LTF/A, G6GR, GI3GQB, GW3GWA
26	G2BRR, G3CFR (125), G3MED, G3SM (211), G3YH, G4MR (189)
25	G2BLA (138), G3JHM, G3JMA, G3JXN (220), G5SK, G6PJ
24	G3FD, G3FEX (226), G3FXG, G3FXR
23	G3BDQ, G3CWW (260), G3HSD (168), G3NPF (143), G3OPR (144), G3PKT, G5PY, G8VN (125)*
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM, G5UM/P, GC3OBM
21	G2AOL (110), G3IWJ, G6XY
20	G3EYV
19	G2HDR, G3GCX, G5LQ (176)
18	G3DBP, GC2CNC
17	G3EGG, G3MHD (195)
16	F3XY (200), G3FRE, G3MLS
15	G3IWA
14	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 accrue.

*** New QTH**

says he had to work over 200 stations to get 102 cards. Certificate No. 340 is awarded to P. G. Bonner, GI3OFT, Belfast, 5, who shows a good spread of QSO's on the two-metre band.

From his new QTH near Penzance, Cornwall, A. M. Laidler, G3OJY, is able to claim VHFCC with Certificate No. 341, his countries-worked total being six and including a number of interesting /M, /P and DX-pedition contacts. An unusual claim is that from G. W. Tibbetts, G3NUE, Worcester, as his is the first VHFCC (No. 342) awarded with a proportion of 4-metre QSO's in the list. (The rules specify "from 50 mc upwards," and if anyone could make an all-70 mc claim, we would be happy to endorse the Certificate accordingly.)

W. D. Sellars, G3PBV, Wolverton, Bucks., gets VHFCC No. 343, and G. Eddowes, G3NOH, of Bournemouth, Certificate No. 344 for an all-G claim. The last one in this batch, No. 345, goes to D. Schmitzer, DJ4BG, of Nuernberg, who worked his lot (nearly all DJ/DL) with less than 15w. input, his total of different stations logged being about 220.

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
27	G3EHY
26	G3JHM/A
22	G5FK
19	G3BNL
18	G3OHH, G5JU
17	G3LZN, G3PJK
16	G3NUE
14	G3OKJ
12	G3LQR, G5DS
9	EI2W, G3IUD
8	G3AYT
5	G3PTO

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.

The CW Test Periods

Just a reminder about the CW Test proposed here last time—it is for Sunday, February 3, 1000-1200 GMT, and again on Saturday, February 9, 1800-2000 GMT, the ploy being simply to call "CQ Test"—and mind it's on CW!—with the idea of finding out what is really possible in the way of GDX under average conditions, with everybody scraping in the noise for weak signals. Of course, if either of these Test periods should happen to strike an opening, it will be a party. But A.J.D.'s bones seem to suggest that openings are not likely—and when it comes to forecasting conditions so far ahead, the throw of the bones is about all there is to go by. This may sound like witch-doctor stuff—well, as a matter of fact, it is!

And whatever may transpire, don't forget to make a report of it, with all stations worked at distances over 100 miles listed on a separate piece of paper.

News and Views

In bringing his claims up to date, EI2A (Navan) mentions a new station, EI2AC, who is giving Co. Tipperary; he is on 145·35 mc, with adequate gear, and looking for G's. EI4Q is planning a lot of /M work, come the summer, and will be in some of the more unusual EI counties. EI2A himself is now standing very well in all the Tables, and is at 12C in Countries—two good QSO's for him during the last big opening were DL1FF and OZ5AB.

And here we should mention that—arising from the comment on the point in this space last time—it has since been reported that G3HS worked OH2PS, and G3NJF (Grimsby) got a contact with SP3PJ, both during the December opening, of course. G3NJF has a QQV03-20A in the PA, taking 15w., his aerial is a slot-fed 5/5, and the converter a cascode job; he remarks that Lincs. is not as flat as it is made out to be, and he has ground rising to 500 ft. in the westerly directions, making GDX difficult unless conditions are good.

G3PBV (Wolverton) is busy getting the 70 cm. gear ready, and

70 CENTIMETRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1962

Starting Figure 4

From Home QTH Only

Worked	Station
29	G2CIW, G3KPT
25	G3LQR
20	G3AYC, G3EDD
17	G3LHA
14	G3BNL
9	G3NOH, G5UM
7	G5QA
6	G3BIK

This Annual Counties Worked Table is reckoned from September 1st, 1962 and will close on August 31st, 1963. All operators who work four or more Counties on the 70-centimetre (430 mc) band are eligible for entry. Counties should be claimed as they accrue, and otherwise the rules are as for the Two-Metre Annual Table.

G2BLA (Welwyn, Herts) claims 6 new counties for the All-Time, with 138S now worked, in six countries. G3NJO/T is a 70-cm. man and goes up to 12C in the All-Time for that band. G3BOC (Willaston) reports that the super-EDX of the December opening did not seem to extend quite to the Wirral, although some interesting stuff was heard and worked.

G3LTF (Galleywood, Essex) now has SSB on two metres, running about 150w. peak to a 4X250B driven by a QQV03-10 buffer; his frequency is 145·025 mc, different from that used for the special MS work. Peter is also fabricating the gear for 23 cm., and has a DET-22 tripler giving 1-watt RF out; his Rx is a crystal-mixer arrangement, in the trough-line circuit arrangement; he remarks "I have heard some radars on this machine, and I hope to have a dish up outside when the Wx improves."

G2CIW (Birmingham) had 18 QSO's on 70 cm. during the period, including two with G3NOX/T (Saffron Walden), but found things dull and uninteresting otherwise; however, a report from a DL/SWL in Cuxhaven turned out to be confirmation of the reception of Jack's signals there on three separate auroral occasions last year, two being for

periods when no EU's at all were being heard *via* Aurora at G2CIW, though GM's were coming through and being worked.

Active in Co. Armagh, GI3ONF (Portadown) is a sea-going radio officer who can only be on during leave spells—when, of course, he has plenty of time for it. With GI3NFM, he has started on 4 metres, using a cascode converter consisting of a PCC84 into a triode-connected 6AK5 as mixer, and an oscillator chain starting with a 7 mc xtal; the Tx runs two 5763's to multiply into a QQV03-20A as PA, which will eventually run up to 50w. input; the aerial used with this lot is a 2-ele job, to be improved in due course (next leave) to a 6-ele, fully rotatable. Good communication results have been obtained with GI3NFM (Dungannon, Co. Tyrone), who in turn has worked GI3HJA, at Omagh in the same county. These chaps used two metres as their talking channel to get the gear set up, and as they will be joining in the Sunday-morning 4-metre activity, should be interesting contacts on the 70 mc band.

After the exciting experiences of the December opening, G3IOE (Newcastle) reports things quiet and flat up there, with not much local activity. G5UM (Knebworth) claims for the tables, and has now worked 82S in 18C on 70 centimetres. G3LHA (Coventry) puts in his latest scores, and mentions two new ones worked on 70 cm.—G3ILX for Lancs., and G5QA for Devon. Ray says he has not been very active lately "due to a re-building campaign," and is looking forward to getting out /M and /P again.

G3OJY (Penzance), always full of ideas, suggests that the many people with converters for two metres, but as yet no transmitters, might like to try cross-banding (from Top Band or 80 metres) with some of the Cornish stations on 144 mc. The suggestion is that those interested, and willing to search for the eight or nine two-metre stations in the Cornwall area, should write G3OJY *(QTHR)*, who will be glad to arrange schedules. In fact, a lot of cross-banding of this sort does go on, up and down the country, though it is usually a matter of fairly careful frequency selection to avoid heavy beats in the two-metre tuning range from the LF transmitter; if your 80-metre rig, running full power on AM, is throwing squiggers on two metres, Murphy's Law ordains that the loudest and dirtiest of them will fall on, or very near, the frequency of the station you are trying to find!

Among the regular Sunday-morning stations on 4 metres is G3LZN (Rowington, Warks.) who runs 20w. input to the PA, has a cascode converter into an Eddystone S.750 tuning 24·0-24·2 mc, with a Labgear bi-square as aerial; since starting on the band about 15 months ago, G3LZN has worked 17C on 70 mc.

TWO METRES
COUNTRIES WORKED
Starting Figure, 8

20	G3HBW, G3LTF (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP)
19	G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OE, OK, ON, OZ, PA, SM, SP)
19	G3CCH (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, OE, OH, OK, ON, OZ, PA, SM, SP)
18	G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OK, ON, OZ, PA, SM, SP), ON4BZ
17	OK2WCG
16	G3GHO, G3KEQ, G5MA, G6RH, G6XM, PAØFB
15	G2XV, G3AYC, G3BLP, G3FZL, G4MW, GM3EGW
14	G2CIW, G2FJR, G2HDZ, G3CO, G3FAN, G3HAZ, G3IOO, G3JWQ, G3KPT, G3WS, *G5BD*, G6LI, G8OU
13	G2HIF, G2HOP, G3BA, G3DKF, G3DMU, G3DVK, G3EHY, *G3GPT*, G3NNG, G3PBV, G5DS, G6XX, G8VZ
12	EI2A, EI2W, F8MX, G3AOS, G3GFD, G3GHI, G3JAM, G3NUE, G3OBD, G3WW, G5CP, G5ML, G8DR, GW2HIY
11	G2AJ, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3HRH, G3IUD, G3JYP, G3JZN, *G3KUH*, G3LHA, G3OHD, G4RO, G4SA, G5UD, G6XA, OK1VR
10	G2AHP, G2AXI, G2FQP, G3BK, G3BNC, G3DLU, G3GSE, G3JHM/A, G3KQF, G3LAR, G3LTN, G3MED, G3OSA, G5MR, G5TN, G8IC, GC2FZC, GW3ATM, GW5MQ
9	G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BYY, G3FIJ, G3FUR, G3JLA, G3RMB, G4LX, G5UM, G8GP, GC3EBK, GI3ONF, GM3DIQ, GW3MFY
8	G2DDD, G2XC, G3AEP, G3AGS, G3EKX, *G3GBO*, G3HCU, G3HWJ, G3JXN, G3KHA, G3PKT, G3MPS, G3OJY, G3OXD/A, G3VM, G5BM, G5BY, G8SB

SEVENTY CENTIMETRES
ALL-TIME COUNTIES WORKED
Starting Figure, 4

Worked	Station
40	G2XV
35	G2CIW, G3KPT, G6NF
34	G3JMA
33	G3JHM/A
32	GW3ATM
31	G3JWQ, G5YV
30	G3KEQ, G3LHA
29	G3LQR
28	G3HAZ, G3HBW, G3NNG
26	GW2ADZ
24	G3LTF
23	G3BKQ, G6NB
21	G3AYC, G3IOO
18	G5UM
17	G3BA, G3MPS
16	G2DDD, G3MED
15	G2OI, G4RO
14	G2HDZ, G3FAN
13	EI2W, G2BDX, G6XA
12	G3NJO/T, *G5BD*
11	G3BYY
10	G3HWR, G3IRW, G5DS
9	G3BNL, G5QA
7	G2HDY, G3JHM, G3OBD/P
6	G3FIJ, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G3LTN, G5ML
4	G3EKP, 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

And to Conclude—

As this goes down, practically the whole country lies frozen under snow—and if it should start easing by the time this appears we can expect flooding on the grand scale, which would make A.J.D. a bit vulnerable. However, assuming that we are not washed away, closing date for March issue must be **Wednesday, February 13,** with everything addressed to: A. J. Devon, "VHF Bands," SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1. Till then, may Allah guide your footsteps.

RTTY Topics

ABOUT FSK AND AFSK—RUNNING SSB TRANSMITTERS FOR RTTY OPERATION—THE TWO-TONE OSCILLATOR

W. M. BRENNAN (G3CQE)

This feature has appeared in alternate months since April, 1961. Our contributor is well known in amateur RTTY circles throughout the world and he has covered a wide variety of topics—technical, practical and on-the-air—of interest to the AT station operator running radio-teleprinter equipment. Though the machinery required remains in rather short supply and is difficult to acquire at reasonable prices in the U.K., there is now a considerable following for amateur RTTY working, and many countries are regularly represented on the bands.—Editor.

WITH the usual falling off of good propagation conditions that we expect at this time of the year on the HF bands, RTTY activity, like the birds, seems to have migrated south for the winter and 80m. is once again quite active. With many of the regular operators back again and the addition of some newcomers the problem at weekends is just when to sign off and get on with some building. G3GNR recently moved up to Fort William and is once again on 80m. with the appropriate GM prefix. DJ4KW writes in to say that he was recently lucky to obtain a complete RTTY Diversity Receiving set for less than 1% of its original cost. The unit is housed in a six-foot rack and includes two receivers, two TU's and complete power supplies; this outfit involves no less than 84 valves ! He is looking forward to carrying out tests with space diversity in the near future. The December issue of *DL-QTC* carried an eight-page RTTY article by DJ4KW. This is an excellent contribution and is well worth reading by anyone to whom such words as "Empfangskonverterschaltungen" (TU circuits !) are not a complete mystery.

Questions about the suitability of this or that type of transmitter for RTTY seem to be becoming more frequent recently and so it is perhaps worth taking a closer look at some of the transmitting aspects of RTTY. FSK (Freq. Shift Keying) is a form of frequency modulation. FSK can be used as a means of transmitting Morse or T/P signals. Present amateur practice is to use a difference in signal freq. of 850 c/s to differentiate between the mark and the space frequency. The accepted standard is to transmit a carrier to denote the " mark " frequency and to move this carrier 850 c/s lower to produce the " space " signal. Obviously then, a good RTTY transmitter should be capable of a fairly high degree of frequency stability. A transmitter that does not drift more than about 50 c/s during a period of say a 10-minute transmission would be really excellent. Such an amount of drift would probably go unnoticed at the receiving end. A transmitter that drifts a total of 1,000 cycles over a similar period would cause the receiving operator to retune his receiver several times and no doubt some comment would be made on the next over ! On the whole, though, RTTY operators seem to be a great deal more patient than their SSB brethren and a gradually drifting VFO is considered to be more of a nuisance than a menace. On the other hand a VFO which wobbles up and down by 100 cycles or more may quickly consume the patience of even the most placid RTTY operator. The other main attribute of a RTTY Tx is that it must be capable of transmitting a continuous carrier for periods of at least up to 15 minutes without overrunning any of the valves or components. As FSK is a frequency-modulated system the PA stage does not need to be a linear amplifier—indeed, from an efficiency angle the usual Class-C PA as used in CW and high-level modulated A3 is preferable. Providing an existing transmitter is stable in freq. and can operate continuously without producing any wisps of smoke it will probably be quite satisfactory for RTTY. If it is of the VFO-FD-FD-PA variety, the only real disadvantage will be the need to adjust the amount of FSK applied to the VFO when changing from band to band.

FSK Keyer Unit

Fig 1 over a simple but very reliable FSK keyer stage. This particular circuit has been in use at the writer's QTH for about three years and has never given any trouble. Its keying characteristic is very

Three well-known RTTY operators. Left to right: G3IVP, GM3GNR and G3JFF — the latter is also known under the callsigns VR1M, VR2EA, YJ1MA, VS1HU and 9M2MA ; it is a pity that the camera-flash caught him at an awkward moment !

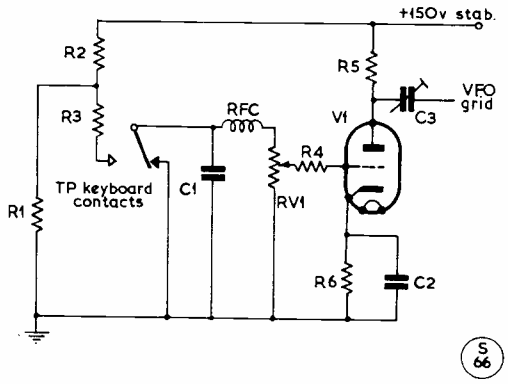

Fig. 1. Circuit for an FSK Keyer, as explained in the text. The 850-cycle deviation is applied to the VFO of the main transmitter. Adjustment is by means of C3 and RV1 for correct operation, and the keyer is driven by the transmitting teleprinter.

Table of Values

Fig. 1. Circuit of FSK Keyer

C1	= .005 μF	R4, R5	= 47,000 ohms
C2	= .05 μF	R6	= 7,500 ohms
C3	= 50 μμF trimmer	RV1	= 100,000 ohms
R1, R2	= 22,000 ohms	RFC	= 2.5 mH RF choke
R3	= 100,000 ohms	V1	= 6C4

good and the stability of the arrangement is such that the shift adjustment potentiometer does not have to be touched from week to week. The action of the circuit is simple enough: A preset capacitor C3 is connected in parallel with the VFO tuning condenser *via* the 6C4 valve and its associated cathode circuit. With a positive signal applied to the grid of the valve through the T/P transmitting contacts, it conducts and produces a low-impedance path between the capacitor and the 6C4 cathode circuit, thus adding additional capacity in parallel with the VFO tuning and swinging the VFO output lower in freq. With zero voltage applied to the grid of the valve, the current through it is held to a low value by the cathode bias resistor, R6; the impedance across the valve is relatively high and so the capacitor has little effect on the VFO. The positive DC input to the grid can be varied by the "Shift Adjustment" potentiometer, RV1; this in turn controls the degree of conduction taking place through the valve and thus the total effect of the capacitor when the positive keying voltage is applied. The 6C4 HT must be taken from a stabilised supply and the keying voltage must also be derived from a well-regulated and smoothed source, although any voltage from about 25 upwards will serve. In practice, it is convenient to use the same 150v. source for both and this is shown on the diagram. The RF choke included in the keying circuit is to eliminate any RF that may be picked up on the leads connecting the T/P keyboard contacts to the keyer stage; it is also important that these leads should be screened to prevent both RF and hum pickup.

The initial adjustment consists of nothing more than setting the potentiometer to about ¾ of the way up and then with the keying voltage applied *via* the "space" contact, adjusting the trimming capacitor C3 to produce 850 c/s shift on the band which requires the maximum VFO shift. Any reduction in shift for other bands is subsequently made by adjusting the "Shift Adjustment" potentiometer only. The unit should be constructed with the same care that would be given to the construction of a VFO and it should be mounted as close as possible to the VFO in order to reduce the length of the lead which connects the trimmer to the VFO tuned circuit. The shift adjustment control can of course be mounted on the front panel of the transmitter.

SSB Transmitters on FSK

The owner of an SSB rig can add FSK to his Tx in the manner just described, and indeed many amateurs do just this. In some SSB Tx's a 6C4 cathode-follower stage buffers the VFO; by replacing the 6C4's B7G base with the B9A base a 12AU7 can be substituted. One half of this valve can thus replace the 6C4 and the other section can be used as the FSK keyer. No changes in component values are required. There is a great deal in favour of producing FSK in a SSB Tx in this manner. However, owners of expensive commercial transmitters are understandably reluctant to get busy with a soldering iron on such modifications. Fortunately, there is another method of producing FSK from a SSB Tx without any modification at all to the transmitter. If a single audio tone is applied to the AF stages of such a Tx the output from it will be a steady carrier at the operating frequency; if the tone is now raised 850 c/s in freq., the RF carrier will move 850 c/s (higher or lower depending upon which sideband is in use)—and so, by the use of two audio tones, FSK can be produced at carrier

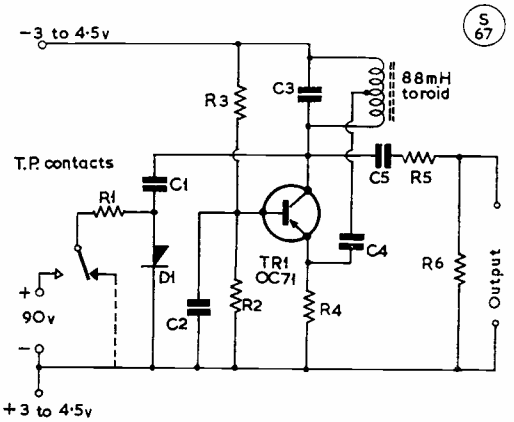

Fig. 2. An AFSK keyer, or two-tone oscillator, for use as a plug-in unit for an SSB transmitter, no modification of the Tx being involved. The 88 mH toroid is an ex-G.P.O. surplus item and the 850-cycle frequency shift is obtained by switching C1 from the T/P contacts. Due to the high gain of the first AF stage in most transmitters, only a low level of output is required from this oscillator. Values are: C1, .045 μF; C2, C5, .05 μF; C3, .03 μF; C4, 1 μF; R1, 47K; R2, 8.2K; R3, 10K; R4, 1.2K; and for R5, R6 see text. (Note that in this circuit the diode is an OA70.)

frequency. The tones can be fed into the microphone input socket of the transmitter and thus no disturbance to resale value is involved.

Many SSB Tx's are keyed in this manner and the signals produced by these transmitters are very good on the whole—however, it is not uncommon to encounter very poor FSK produced by such a system. This can be for several reasons, one common fault being severe overload of the first AF stage of the Tx due to too high an input level; the AF gain control is always after the first AF amplifier and although the AF level can be adjusted correctly for the later stages, the damage has already been done in the first stage. Another much less obvious fault is a keying bias produced by the transmitter's uneven response to the two audio tones. This may be due either to the AF stages or the sideband filter, or both. Two tones commonly used for applying Audio Frequency Shift Keying (AFSK) to VHF Tx's and also for the " mark " and " space " channels of TU's are 2125 and 2975 c/s. It is quite natural, then, to use the same oscillator that produces these tones for the HF SSB rig. If the Tx is capable of passing both frequencies at the same level such a practice is quite in order and a filter type of Tx using a Collins 3·1 kc mechanical filter with the carrier generator freq. correctly positioned on the 20 dB point of the filter will pass both tones perfectly well. However, a similar Tx with the 2·1 kc filter will produce a " space " signal that may be 2½ S-points down on the " mark " signal. This would of course produce a very bad marking bias. In the case of the phasing type of rig, which uses a passive phase-shift network, the response of the audio stages is (or should be) tailored to attenuate drastically all audio freqs. outside the range 300 to 3,000 c/s. In this case, there may again be several dB difference in the response at 2125 and that at 2975 c/s. All of which goes to show that the actual tones to be used for keying a SSB transmitter should be chosen with care and that the final criterion is the difference in output from the Tx between one tone and the other.

RTTY operators, together at a recent meeting. Back row, left to right: LA5LG, G2FUD, PAØFB and G3CQE. Front row, left to right: PAØLQ, G3KZI and G3BXI. They can all print out on 80 metres, and are always glad to make T/P contacts.

Two-Tone Oscillator

Fig. 2 is the circuit of a two-tone oscillator which can be used to produce FSK from a SSB rig; it is also very useful indeed for testing TU's and for feeding into a tape recorder in order to make recordings either for test purposes or for automatic CQ's, and so on. It can of course also be used for AFSK on the VHF rig. The original circuit was produced by W4MGT and later a modified version by K8KDC, both versions being shown in *RTTY Magazine*. The circuit given here at Fig. 2 has again been altered to take an OC71 transistor, and to reduce the difference in output level of the two tones caused by the different L/C ratio when the additional capacitor C1 is switched into circuit to produce the lower freq. tone. The actual measured difference in the writer's version is 1·1 dB, a figure thought to be quite reasonable.

The circuit makes use of the familiar 88 mH " telephone loading coil " (available from surplus

" . . . one of the most difficult combinations I've ever come across, this is . . . "

sources) and together with C3, this inductance forms the tuned circuit for the higher of the two frequencies. An additional capacitor C1 is held off by a diode until the application of a positive bias voltage from the T/P keyboard contacts switches it into circuit thus reducing the oscillator frequency. The diode used is an OA70 but almost any type will do. The actual keying bias voltage is not in the least critical but the value of R1 should be adjusted so that with the voltage used, the current through the diode is neither too high nor too low. Say, about 5 mA for the average small type of germanium diode. If however, due to the use of a low voltage keying bias, R1 has to be reduced to a value below 10K the connection between the "mark" contact on the keyboard and earth should be omitted to avoid shunting the diode when the keyboard tongue contact is over in this position. The values of C1 and C3 should of course be adjusted for the two frequencies required. The value of C1 is somewhat higher than the figure that would be obtained by calculation; this may be due to the fact that the diode and the battery are also part of the tuned circuit when C1 is switched into circuit. (The battery could of course be by-passed by a 50 or 100 μF electrolytic capacitor if desired.) C4 must have reasonably low leakage otherwise it will produce an unwanted emitter bias. R5 and R6 form a potential divider to reduce the output to a level suitable for the input requirements of the apparatus it is required to feed. If a variable output is needed R6 can be replaced by a 50K potentiometer and R5 by a 27K resistor. The output is then taken from the potentiometer slider and earth, of course. As fixed resistors, R5 plus R6 should give a total value of 50 to 100 thousand ohms.

It is interesting to note that certain manufacturers of transmitters for amateur use are beginning to build into them full FSK facilities. In time yet to come purchasers of commercially built amateur gear will expect to find a socket labelled FSK just as they at present look for a microphone and key socket —*73 de G3CQE.*

Miscellany

INCIDENTAL INFORMATION, AND ITEMS OF TOPICAL INTEREST

(The heading under which almost anything may appear)

The Winter edition of the international *Call Book* reveals that 12,962 new U.S. amateur licences have been issued by the FCC since the publication of the Fall, 1962, edition. That, in turn, showed an increase of 16,492 over the previous edition—a total of more than 29,000 new licences in the U.S.A. over a period of six months. For the rest of the world the figures were 2,640 and 2,981. Totals, as given by the current issue, are over 252,000 licensed amateurs in the United States and around 123,000 in the rest of the world. So. if you switch on your receiver on any of the HF bands, the odds are roughly 2:1 that the first signal you will hear comes from the U.S.A. !

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The U.S. Sonics Corporation is undertaking the development of a means of converting the sound of jet aircraft into electrical energy, intending to power the whole aircraft from such a source. This should be of great interest to amateurs who have young children in the household; they seem to equate sound with enjoyment, measure joy in decibels. Two or three enthusiastic youngsters might be effective in supplying the primary power for a kilowatt amateur station plus all ancillary equipment.

(*"Collector and Emitter," Oklahoma*)

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When copying a weak CW signal, make sure that you count all the dots. When Vic Desmond, G5VM, meets Jack Hum, G5UM, the usual greeting is "You're the man who gets my QSL's! "—and this sometimes arises also from indistinct handwriting. But a missing dot could also be the root of the trouble. On this subject, G5UM observes that the GPO must have had a special sense of humour when they issued G5UM to him in 1927—the call has just one dot more than his name. Incidentally, the allocation of "self-evident" calls like this (our Editor also has one) began in about 1925 and ceased in 1936, when the G8 series was issued in straightforward as-they-came alphabetical order.

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Still on the subject of callsigns . . . those who are interested in those fashionable IQ-type Quizzes might like to try their hand at this question, which is not as obvious as it appears. Complete this series, to six terms: G2, GC5, GD6, ...

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Readers who are plagued by noise radiated from the super-grid (275 kV) might note with interest that in Russia they have been using 500 kV transmission lines for at least three years, and that they are now working on an experimental 750 kV line. And it may be news to some that here in the U.K. we now have a 35-mile length of 400 kV line under test, with a full-scale network planned, and 750 kV in the laboratory stage.

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Those who find it difficult to understand the operation of transistor circuitry are recommended to read an article by VE7QL in the January issue of *CQ*, which really covers the subject ("Understanding

Transistors as Applied to Amateur Radio") from A to Z. Another interesting article (same issue) describes a clipping-and-muting unit for mobiles, using one valve and one transistor only.

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The conversion of sunlight into electricity is under investigation all over the world, and a unit sponsored by the Aeronautical Systems Division of the U.S. Air Force seems to represent a major advance. Using five caesium diodes and a parabolic mirror, this generator develops 100 watts, though weighing far less than the comparable number of batteries. It is hardly suitable for amateur experimentation, though, temperatures up to 3500° C. being involved.

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Discussion recently heard on an SSB net: Will amateur radio equipment go "vertical" again, as fashions change? Look at station photographs of ten years ago, and you will find rack-and-panel layouts reaching from floor to ceiling, occupying one corner of a room. Nowadays some of the show stations spread horizontally from wall to wall, but occupy only one layer in the vertical plane. Table-toppers are all very well when the station is simple enough to be housed, literally, on a table; when they necessitate a bench twelve or fifteen feet long, surely it is time to review the position and decide whether we should not, like the modern architect, "build upwards."

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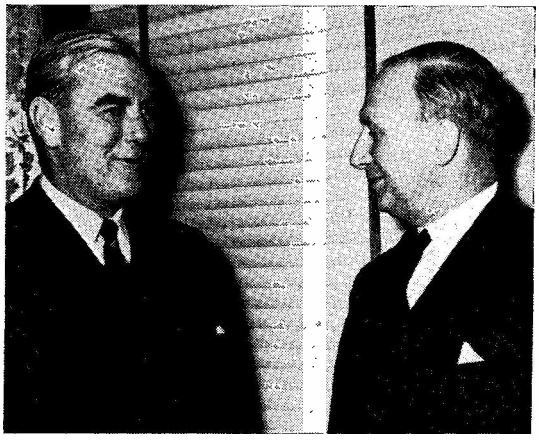
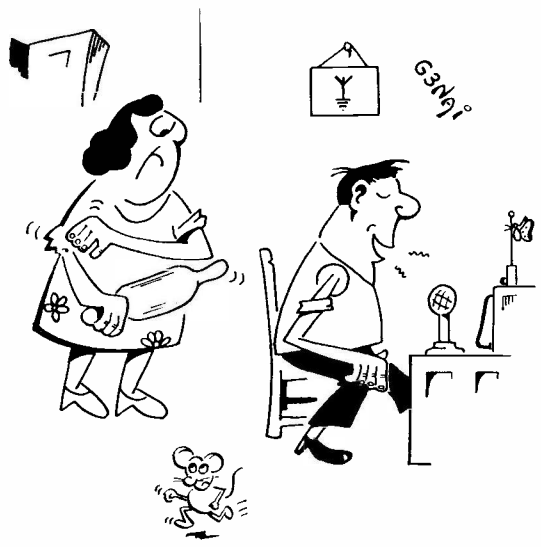
The new jargon is a little hard for "squares" to keep up with. We know that a gallon is a kilowatt, but what is a ton? And we deduce that in amateur parlance an after-burner, or re-heat, means a linear amplifier—but what part of an AT station can it be that goes into orbit? Strange that a hobby with so



When the new President of the American Radio Relay League, Herbert Hoover, Jnr. (son of the U.S. President of the inter-war years) visited Ireland in January, he was met by H. L. Wilson (EI2W) and made guest-of-honour at various functions in Dublin, which included a meeting with Mr. de Valera, President of the Republic of Eire. In this photograph, we see, on the left, Mr. Hoover, with Harry Wilson, EI2W, who is the leading light in Amateur Radio circles in Eire.



" . . . Of course, in the end she always does as I say . . . "

much peculiar jargon of its own should have to start borrowing from other technological activities. Given a little reciprocity, we may be hearing from future astronauts that all systems are QRV or that they are about to QSY from automatic to manual.

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Referring back to the article "Forty Years on Top Band" (December 1962 issue, p.517), G6DW writes: "You made me look up some of my old logs, being in the fortieth year of owning this call. My first phone QSO (with the late G2BZ) was in November 1923 on 440 metres, and I see that we were working the Continent in 1925 with under 3 watts on 45 metres." Other points noted by G6DW are that Moscow was first worked in 1929, and that the receiving log mentions Eiffel Tower (FL) "audible on the floor below" when using a crystal set and loud-speaker in 1922. Hearing was more acute then, and external noise lower !

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"A point to remember—every time anyone presses a key, or speaks into a microphone, whatever goes out over the air is a direct reflection on the operator concerned. If it's clottish nonsense, then the operator must accept being branded as a clot. It amounts to a personal pride in what you do. We never know who is listening to what we say, so we should operate with this in mind." *(Letter from G3IDG)*

5B4 QSL BUREAU

We are asked to mention that the address for 5B4 cards is now: Cyprus Amateur Radio Society QSL Bureau, P.O. Box 216, Famagusta, Cyprus. This new QTH became effective from January 1st this year.

NEW QTH's

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

EI6AL, D. J. O'Connor, 35 Whitehall Road, Terenure, Dublin, 6.

G2FNT, C. Phillips, Oddacre, Joydens Wood Road, Bexley, Kent.

GM3OZI, A. Gray, 16 Manse Road, Newmains, *by* Wishaw, Lanarks.

G3PTJ, J. Robinson, 31 Tadcaster Street, Leeds, 12, Yorkshire.

G3RBD, F. I. Hanson, 207 Grant Road, Knotty Ash, Liverpool, 14. *(Tel.: STOneycroft 0144.)*

GM3RCI, A. Thomson, 5 Shepherd Crescent, Leven, Fife.

GW3RIB, W. R. Huxley, Crompton, Park Avenue, Shotton, Flints.

G3RJS, P. F. Barry, 47 Gerald Road, Wollaston, Stourbridge, Worcs. *(also in London, S.W.9.)*

G3RKH, J. L. Marshall, 11 Rosyl Avenue, Holcombe, Dawlish, Devon.

G3RKP, D. A. N. Evetts, 8 Upper Shelton Road, Marston, Bedfordshire.

G3RNT, D. Broadbridge, 26 Norley Drive, Sale Moor, Cheshire.

G3RNU, S. S. Cook, 60 Widden Street, Gloucester, Glos.

G3ROD, R. Davenport, 2 Pembrook Road, Holbrooks, Coventry, Warks.

G3ROH, C. J. Village, 128 Station Road, Cropston, Leics.

G3ROY, 50 (N) Signal Regt., T.A., Amateur Radio Club. *Hon. Sec.,* A. E. Bosten (G3BIN), TAC, Larchfield Street, Darlington, Co. Durham.

G3RPB, K. Spicer, 22 Clifton Road, Finchley, London, N.3.

G3RPC, M. Goodey, Hilbre, Telegraph, St. Mary's, Isles of Scilly.

G3RPX, G. Grant, Magpie Cottage, Sidbury, Sidmouth, Devon.

G3RQQ, H. Robertson, 2 Craven Close, Craven Walk, London, N.16. *(Tel.: Stamford Hill 9602.)*

G3RQT, A. P. Carpenter, 472 Long Riding, Basildon, Essex.

GI3RQU, S. J. Laverty, 21 Silverstream Park, Belfast, 14.

G3RQV, K. Simpson, 3 Hall Drive, Middleton, Manchester, Lancs.

G3RQZ, P. M. Madagan, 55 Clarendon Rise, Lewisham, London, S.E.13. *(Tel.: LEE Green 0341.)*

G3RRF, P. S. Godwin, 17 Downs Road, Epsom, Surrey.

CHANGE OF ADDRESS

G2JM, H. A. Musgrave, 133 Brooklyn Road, Cheltenham, Glos.

G2WY, H. J. Swift, The Garden House, White Notley, Essex. *(Tel.: Silver End 119.)*

G3AGD, A. L. Drakeford, Tregoddick Farm, Madron, Penzance, Cornwall.

GW3CBA, J. Kellaway, 24 Hywel Crescent, Barry, Glam.

G3EHA, G. F. Hendriksen, 11 Myton Crofts, Leamington Spa, Warks.

G3ERB, L. N. Goldsbrough, 56 Kings Lane, Bebington, Wirral, Cheshire.

GM3FAO, A. F. Davidson, 90 Eglinton Road, Ardrossan, Ayrshire. *(Tel.: Ardrossan-Saltcoats 1364.)*

G3GWL, C. Whittingham, 5 Roche Gardens, Bletchley, Bucks.

G3HOX, Manchester and District Amateur Radio Society, c/o P. Singleton, 207 Droylsden Road, Newton Heath, Manchester, 10.

G3HVA, D. G. Pinnock, 265 Chesford Road, Luton, Beds.

G3IZJ, M. J. Faulkner *(ex-VP8AZ),* 142 Beta Road, Oak Farm Estate, Farnborough, Hants.

G3JFD, B. J. C. Brown, 60 White Street, Derby.

G3KEV, M. C. Hamilton *(ex-GI3KEV),* 12 Avondale Road, Loughborough, Leics.

G3KPU, E. Prince, 90 Ollerton Road, Retford, Notts.

G3LHN, R. D. Muir, 23 Grange Park Avenue, Winchmore Hill, London, N.21.

GW3LSB, J. Lloyd-Jones, Holcombe, Vicarage Avenue, Llandudno, Caerns.

G3MJX, A. Bird, 13 Stortford Hall Park, Bishops Stortford, Herts.

GM3NFF, W. G. Dobbie, 32 Limeside Avenue, Rutherglen, Glasgow.

G3NMJ, G. C. C. Knapp, 24 Ocklynge Close, Little Common, Bexhill-on-Sea, Sussex.

G3NML/T, M. E. Slater, 38 Whalesmead Road, Bishopstoke, Eastleigh, Hants.

G3NOM, R. Gerrard, 1 Chatham Street, Edgeley, Stockport, Cheshire.

G3NXX, I. Miller *(ex-GM3NXX),* 13 Lynton Drive, High Lane, Marple, Cheshire.

G3PEU, G. Smillie, Button End, Church Drive, Linby, Notts.

GM3PFU, W. Laughlin, 2 Kinglas Road, Stonedyke, Westerton, Bearsden, Glasgow.

G3PLI, W. D. N. Berry, 12 Warwick Crescent, St. James Park, Harrogate, Yorkshire. *(Tel.: Harrogate 3807.)*

G3PUO, L. D. Rooks, 127 Cambridge Road, Great Shelford, Cambs.

G3PYQ, F. Wright, Aingarth, Walkeringham, *via* Doncaster, Yorkshire.

G3RAE, R. A. Eldridge, 22 Marloes Road, Earls Court, London, S.W.5.

G3RDT, J. C. Taylor, 78-A Aldwick Road, Bognor Regis, Sussex.

G3XC, W. J. Colclough, Highview, Indian Queens, St. Columb, Cornwall.

GM6XW, C. M. Winton, 8 Broomagebank, Main Street, Larbert, Stirlingshire.

THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for March Issue: February 8)

(Address all reports for this feature to "Club Secretary")

CLUB Publications, which we acknowledge month by month, come in all sizes and shapes. The most popular is a simple News Sheet consisting of two duplicated pages, containing notes on forthcoming meetings and perhaps reports of past ones, with a few personal snippets about members' activities.

Working up from these, we also receive quite bulky newsletters running to four, six or eight sides of foolscap (and with single spacing that means quite a lot of words). These often include technical gen. of some sort, and the more ambitious efforts add circuit diagrams. Strangely enough, there are some of these which we scan in vain for any news of forthcoming meetings!

Then come those, still duplicated, which are given a cover and folded to form a small book. Technical notes and members' advertisements are popular when the club magazine gets to this stage; but, again, we often note examples in which it is impossible to find anything about club meetings, which seems most peculiar. On the other hand there are some (such as the excellent Newsletter put out by **Wolverhampton**) which always include details of the future programme, plainly and concisely set out. This must be of considerable benefit to members, and in our opinion is one of the prime requirements of a good club publication.

Coventry are also to be commended on a sensible layout, with the first page showing the officers and committee, together with full particulars of meeting times and places. (Many others are equally good in their own way—we are not being invidious in mentioning just these two.)

At the moment we should say that all these efforts are improving steadily—and there are always new ones coming along. Once a club reaches a certain size, a news sheet of some sort seems to become a necessity, rather than a luxury.

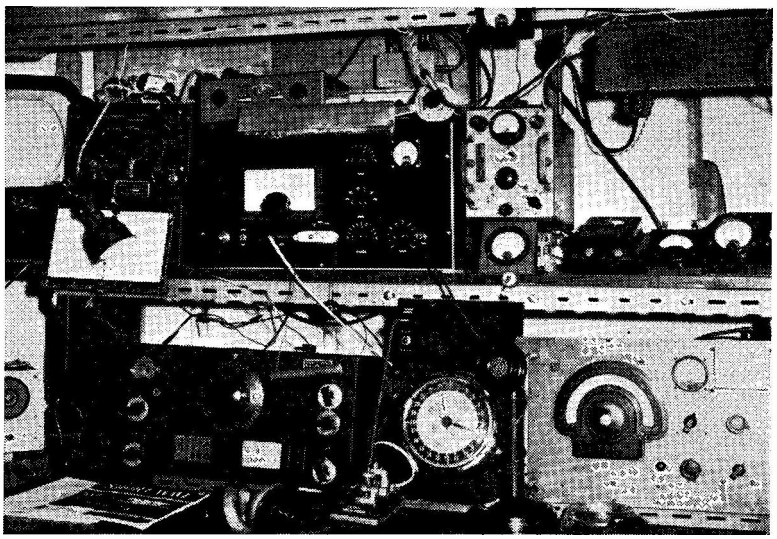
Acton, Brentford & Chiswick will be holding a "New Members' Night" on February 19. Anyone in West London who is interested in Amateur Radio is invited to attend, at the AEU Club, 66 High Road, Chiswick, at 7.30 p.m.

Coventry meet every Monday evening, 8 p.m., at the Willenhall Scout Headquarters, Little Farm Buildings, Littlethorpe, Willenhall. Their February programme is not stated.

Derby hold their AGM on February 6, a film show on the 13th, an Open Evening on the 20th and a demonstration of measuring equipment, for junior members, on the 27th. In addition, they are having their Annual Dinner and Social on Saturday, February 16, at the "Derbyshire Yeoman."

Exeter meet on the first Tuesday at the YMCA, St. Davids Hill, at 7.30 p.m. They held their AGM at the January meeting. **Halifax** get together on alternate Tuesdays, 7.30 p.m. at the Beehive and Crosskeys, King Cross Street, but negotiations are in hand for a permanent clubroom.

Hastings are basing their future meetings on a



Operated by G3FYE and G3PEK, the Stockport Radio Society signed G6UQ (which is the Club callsign) for the recent MCC, and came up in second place with 554 points. Their Tx is a Panda Cub, the receiver an HRO, and the aerial a half-wave. G6UQ is installed at the Stockport Radio Society headquarters.

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.
A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.
BARNET: F. Green, G3GMY, 48 Borough Way, Potters Bar.
BURTON-ON-TRENT: H. Harrison, 38 Baker Street, Burton-on-Trent.
CAMBRIDGE: H. L. Lowe, G3PEI, 34A Verulam Way, Cambridge.
CHILTERN: H. D. Coltman, G3PVJ, 301 Micklefield Road, High Wycombe.
CITY OF BELFAST: R. H. Payne, 25 Arundel Street, Belfast 12.
CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley, Surrey.
CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn.
COVENTRY: A. J. Wilkes, G3PQQ, 141 Overslade Crescent, Coundon, Coventry.
CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
DORKING: J. Greenwell, G3AEZ, Eastfield, Henfold Hill, Beare Green, Dorking.
ENFIELD: R. Langston, 54 Poynter Road, Bush Hill Park, Enfield.
EXETER: S. Line, 46 Roseland Crescent, Heavitree, Exeter.
GUILDFORD: D. Hobden, 121 Great Goodwin Drive, Guildford.
HALIFAX: J. Ingham, G3RMQ, Lambert House, Greetland, Halifax.
HASTINGS: W. E. Thompson, G3MQT, 8 Coventry Road, St. Leonards-on-Sea.
I.H.H.C.: M. Allenden, G3LTZ, 16 Grovefields Avenue, Frimley, Aldershot.
LOTHIANS: T. Simpson, GM3BCD, 118 Braid Road, Edinburgh 10.
MITCHAM: B. Blandford, 1 Biggin Avenue, Mitcham.
MORECAMBE: K. J. Singleton, G3NLM, 8 Westmoor Grove, Heysham.
NORFOLK: J. D. Simpson, G3NJQ, 50 Vicarage Road, Norwich.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.
NORTH KENT: B. J. Reynolds, G3ONR, 49 Station Road, Crayford.
NORTH NOTTS: E. W. Badger, G3OZN, 20 Tennyson Drive, Worksop.
PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
R.A.I.B.C.: Mrs. F. E. Woolley, G3LWY, 10 Sturton Road, Saxilby, Lincoln (acting).
READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.
REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
RODING BOYS: S. Wright, 10 Newton Road, London, E.15.
SILVERTHORN: B. A. Lea, G3ICY, 9 Balgonie Road, Chingford, E.4.
SLADE: D. D. S. Williams, 117 The Boulevard, Wylde Green, Sutton Coldfield.
SOUTH BIRMINGHAM: T. W. Legg, Flat 3, 80 Alcester Road, Birmingham 13.
SOUTHGATE: R. W. Howe, G3PLB, 162 Victoria Road, London, N.22.
SOUTH HANTS: P. A. L. Shoosmith, G3MDH, 7 Fairfield Close, Hythe, Southampton.
SOUTH LONDON MOBILE CLUB: B. Negri, G3LXN, 17 Voltaire Road, London, S.W.4.
SOUTH SHIELDS: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.
SPEN VALLEY: L. A. Metcalfe, 1a Moorlands Road, Birkenshaw (acting).
STRATFORD-UPON-AVON: P. Robinson, G3MGJ, 43 Loxley Road, Stratford-upon-Avon.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
THAMES VALLEY: A. Mears, G8SM, 4 Broadfields, East Molesey.
TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
W.A.M.R.A.C.: Rev. A. Shepherd, G3NGF, 121 Main Street, Asfordby, Melton Mowbray.
WESSEX: G. J. Fowle, 138 Surrey Road, Branksome, Poole.
WHITENESS MANOR: D. Grigg, Whiteness Manor Radio Club, Kingsgate, Broadstairs, Kent.
WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington.
WOLVERHAMPTON: J. Rickwood, 738 Stafford Road, Fordhouses, Wolverhampton.
YORK: H. Ferguson, 29 Victor Street, York.

questionnaire of members' suggestions. Next two are on February 5 and 19, 7.30 p.m., at 33 Cambridge Road, Hastings. **Lothians,** who meet in the YMCA at 14 South St. Andrew Street, Edinburgh, will be holding a Brains Trust on February 14 and a talk on Two-Metre Aerials and Propagation (by GM3BDA) on the 28th. Both meetings at 7.30 p.m.

The **Civil Service Radio Society,** who meet at the Science Museum, London, twice a month will have a lecture-demonstration on Fault Finding by Mr. J. Thomas (Avo Ltd.) on February 5, and an informal meeting, with talks by members, on the 19th. The meetings begin at 6 p.m., and the staff entrance in Exhibition Road is open for members up to 6.30 p.m.

Cornish now meet at a new QTH at Pool, near Camborne—in the staff recreation hall of the South Western Electricity Board. The first Thursday of each month is the new date for their meetings.

Peterborough meet at the Technical College on the first Friday, 7.30 p.m. **Purley** assemble on the first and third Fridays at the Railwaymen's Hall, Whytecliffe Road, 8 p.m.

Reigate are booked for a Film Show on February 16, and a talk on TW equipment (by T. Withers, G3HGE), on March 16—both meetings at The Tower, High Street, Redhill.

Mitcham gather on alternate Fridays at The Canons, Madeira Road, February 15 is the date for their AGM. **Morecambe** report that attendances are down, but they hope to pick up in the new season. On February 6 they will have a talk on Fault Finding, by G2FCL, and March 6 is booked for a Film Show.

Norfolk have adopted fortnightly meetings during the winter months, because of the cost of heating the clubroom. They have now joined forces with the Dereham group. **Northern Heights,** also meeting fortnightly, have a Ragchew on February 13, a talk on TVI and BCI on February 27, a Junk Sale on March 13, and a talk by Mr. L. Dougherty of the Halifax Technical College on March 27. The QTH is the Sportsman Inn, Ogden, Halifax.

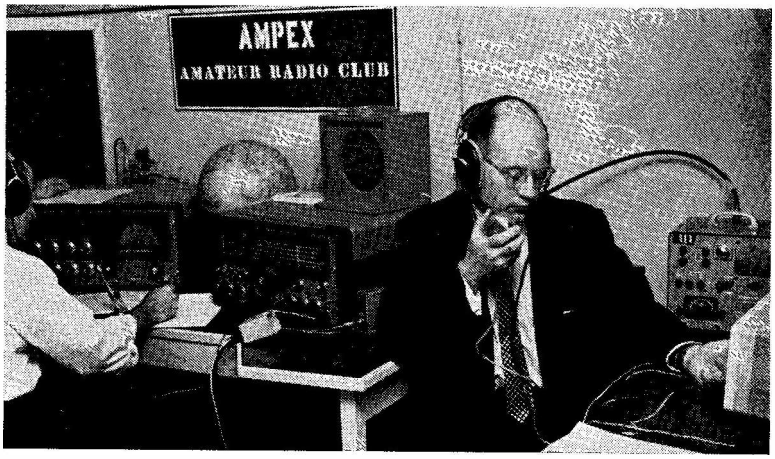
Spen Valley will be hearing about TW equipment —in their case on February 7; and on the 21st

CLUB PUBLICATIONS

We acknowledge, with thanks, the receipt of the following Club Publications: **ARMS** (*Mobile News*, November and December); **Coventry** (*CQCARS*); **Crystal Palace** (*Newsletter*, No. 85); **Enfield** (*Lea Valley Reflector*, December); **Hastings** (*Natter-Net Notes*, December); **IHHC** (*Newsletter*, Autumn, 1962); **Mitcham** (*Newsletter*, December and January); **North Kent** (*Newsletter*, Nos. 62 and 63); **Purley** (*Splatter*, December); **RAIBC** (*Radial*, December); **Reigate** (*Feedback*, November and December); **South Birmingham** (*QSP*, December); **Southgate** (*Newsletter*, December and January); **South Hants** (*QUA*, December and January); **Surrey** (*SRCC Monthly News*, December and January); **Wolverhampton** (*Newsletter*, December); **WAMRAC** (*Circular Letter*, Nos. 25 and 26); **Cray Valley** (*Newsletter*, December); and **R.S.E.A.** (*QTC*, December).

the title of the meeting is "What's New?" and the speaker Mr. S. Marsden of Richard Allen Radio Ltd. Their Annual Dinner, originally fixed for January 12, has been postponed until April 27, still at the Park Café, Batley.

The **Whiteness Manor** Radio Club write in for the first time (Whiteness Manor is a home for crippled boys, at Broadstairs, Kent). They report an eventful year, and we are very glad to read of so much willing assistance given to them by amateurs, both local and remote. (As an example, they received a gift of a CR-100 from "The Top-Band amateurs of Kent and Essex"; and a station was installed for them on the occasion of the Jamboree-on-the-Air event, using the call GB3WRC, and operated by several visiting amateurs.)



The Ampex Amateur Radio Club of San Mateo, Calif. has a nice array of gear — mainly Hallicrafters equipment. The Ampex group played a very important part in the "Oscar" (satellite) operations, as they provided the main communications control centre. The operator on the right is ex-G2CIN, who is active from his own station under the somewhat exotic callsign VE2AGF/W6.

Barnet, now boasting a membership of 55 and an average attendance of 30, report a very successful Christmas party. At the January meeting G3KRC talked on Hints and Kinks for Home Constructors; the February event is on the 26th, but details are not yet available. Full details of the 1963 programme, however, from the secretary (*see* panel for QTH).

Crawley also reports an increase in membership and turn-out. On February 27 their guest speaker will be 5N2JKO (G3JKO), who will discuss Amateur Radio in Nigeria. The third Annual Dinner will be held on March 2. **Silverthorn** have now moved to new premises at Friday Hill Community Centre, where they will meet on all Fridays except the first Friday of the month, at 8 p.m. They hope to have a station regularly on the air before long; new members will be especially welcome if they will get in touch with the secretary.

South Hants will hold their normal monthly meeting on February 9, and their Annual Dinner and Dance on the 16th. The Group Net continues to operate on Sundays, 1030 on 1910 kc, and on Sunday evenings they have a two-metre activity period from about 1830 onwards. At the February meeting they hope to have a talk on GPO Automation.

Surrey (Croydon) will be hearing about UHF Front Ends (Mr. Gregory of Mullard Ltd.), on February 12; they report excellent attendances for the last two meetings, which have covered Masers and Lasers (Dr. J. C. Walling), and Third Method SSB (G3JJG).

Thames Valley held their AGM 'midst snow and ice on January 2; all officers and committee members were re-elected, and an increase in membership was reported. This is the club's 30th Anniversary Year, and it will be celebrated by a special dinner towards the end of the year.

South London Mobile Club will see a Film Show (five films altogether) on February 2. On the 19th there will be a ragchew, mostly devoted to the problems concerning mobiles for the coming season. Both meetings 8 p.m. at the club Hq., Clapham Manor Road, London, S.W.4—and visitors to the Film Show will be welcome.

South Shields meet every Friday evening, and also on the last Wednesday of the month, at the Trinity House Social Centre, Laygate. The Wednesday meeting is devoted to business, followed by a talk, film show, discussion or similar activity. For February 27 the topic is "Is CW outmoded?"; the March meeting will end with a Film Show. A Mobile Rally is planned for July 7th.

Torbay held their January meeting in Arctic conditions, and those who braved them were well rewarded. G3JFF gave an illustrated talk on his experiences with exotic DX call-signs in the Pacific over the past two years. On February 9 it is hoped that G3OGH will be giving a talk, with films, on the Decca Navigator system.

Chiltern will meet on February 28 (8 p.m.) in the British Legion, St. Mary Street, High Wycombe, to hear G5TP's talk on SWL's and DX. **Dorking** held their AGM in January, electing G3LHC chairman, G3AEZ secretary and G3PIQ treasurer. They are organising a drive for new members, and have arranged a Junk Sale for March 26 at the Star and Garter, Dorking—visitors welcome.

City of Belfast, a club founded as long ago as 1921, meet every Wednesday and Saturday at 8 p.m. Constructional facilities have been improved, a library is available, and a full programme of lectures and visits has been arranged. A history of the club is being prepared, and any useful information would be welcomed by the secretary (*see* panel).

Guildford report a successful Annual Dinner; they meet on February 7 and 22, with a demonstra-

tion of TW Equipment on the latter date. The venue is the City Café, Onslow Street, Guildford.

North Notts. will be holding their Annual Dinner on February 9 at the Royal Hotel, Worksop. The club Tx is nearing completion; their meetings are on Thursdays, with special beginners' sessions on Tuesdays. Visits were paid, recently, to Chesterfield to hear a lecture on D/F, and to Newark to hear their own president, G8ON, talk about his Top Band aerial (the "G8ON Special").

Reading had a Questions and Answers session in December, and the AGM in January. On February 23, G3OLA will give a lecture-demonstration on his transistorised Top Band gear, and on March 30 the club's own transmitter will be under discussion.

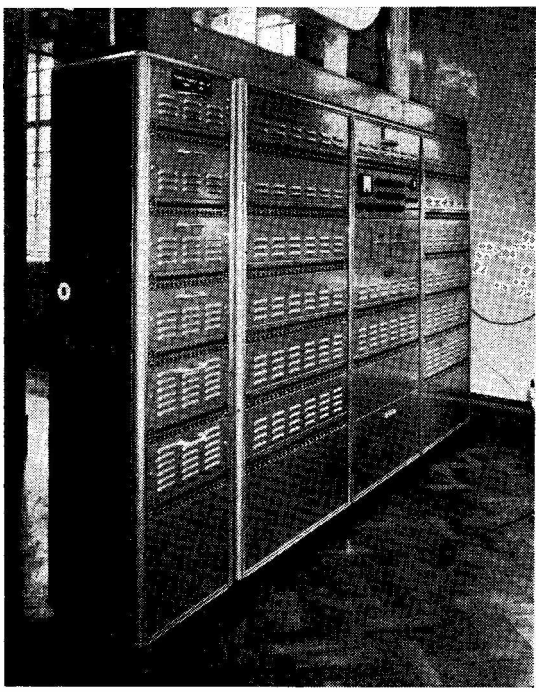
Roding Boys' Radio Society continue their Tuesday meetings at Wanstead House, with G3JIX's series of lectures on Basic Valve Theory. Several members are preparing for the May R.A.E. and a combined visit to the Science Museum and the London "junk shops" is being planned.

Slade have a Junk Sale on February 22 (members only, but "passive" visitors allowed); on March 9 they will be showing two Mullard films, and this meeting will be in the Great Hall of the Birmingham and Midland Institute, Paradise Street, 7.45 p.m.

Wirral meet on February 6 for a talk on Two Metres by G3BOC; on the 20th, a Symposium on Power Supplies, led by H. Schroeder; on March 6, the DX Bands, by G3ERB. **York** announce a change of Headquarters—they now meet at the British Legion Club, 61 Micklegate. Note also the change of secretary (*see* panel for new QTH).

Wessex have no February meeting, but on March 4 there will be a talk on Electronics by a representative of the National Radio Co., Bournemouth, and on April 1st a Film Show and lecture on The Steam Locomotive, by their secretary.

The **Cambridge** group run a weekly programme on Fridays, with Thursday evenings for juniors; the main meeting for February will be a "70 cm Converter Evening". It is reported that their "heating sub-committee" has been carrying out tests to ensure rapid warming-up of the room they use at Hq. in Victoria Road! A club news-sheet is being started, and we are asked to say that all contacts with GB3PKF are now being QSL'd. **Burton-on-Trent** have their own station signing G3NFC, and the group meeting is open to visitors at the Stapenhill Institute any Wednesday evening; the main subject being discussed at the moment is SSB, under their chairman, G3KBE.



Probably the largest of their kind in the world, these boxes enclose stabilised HT units giving 62 amps at 250v. and involve no less than 180 valves, with a reliability factor for the unit as a whole of "continuous uninterrupted working, 24 hours a day." This installation is for the new Electronic Telephone Exchange at Highgate Wood, and was designed and provided by A.P.T. Electronic Industries, Ltd. Their problem was that no sudden valve failure should put the Exchange out of action. The power unit is designed so that the supply is maintained with up to 10% valve failure, which is within the limits of weekly inspection.

SOME IMPRESSIVE STATISTICS

W6KG, Berkeley, Calif., has been licensed since 1929. The record shows that since then he has had more than 100,000 QSO's, for which he holds 50,000 QSL cards, all filed by country and callsign, alphabetically. W6KG also displays no less than 300 DX operating awards.

AMATEUR LICENCES IN FORCE

The G.P.O. count on December 31, 1962, showed 9,920 U.K. amateur transmitting licences in issue at that date. Of these, 1,251 were endorsed mobile, and 118 were for ATV. As the total figure on August 31, 1962, was 9,748 the nett increase in the four months to the end of December was only 172—though probably at least 300 new licences were actually issued in the same period. The discrepancy is, of course, due to the fact that there is a high turn-over, or "wastage rate" because, apart from the usual reasons for ceasing to appear, radio amateurs tend to enter the industry and allow their purely amateur interest to wane. This is certainly not true in every case; on the other hand, it appears to apply much more these days among the younger members of the fraternity.

THE MAY RADIO AMATEURS' EXAMINATION

Those taking the next R.A.E., in May, are reminded that their applications to sit should be in before the end of *this* month. An application can be made either through the instructor of an organised class, or the technical college or evening institute at which the instruction is being taken, *or* through the office of the local Education Authority, *or* by reference to the City & Guilds of London Institute, 76 Portland Place, London, W.1. In all applications "Subject No. 55—Radio Amateurs' Examination" must be quoted.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

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

SITUATIONS VACANT

ELECTRONICS TEST ENGINEER for varied and interesting work in laboratory. O.N.C. or equivalent desirable. Canteen and pension scheme. Knowledge of E.I.D. procedure desirable. **ELECTRICAL AND ELECTRONIC INSPECTORS** also required. Contact Mr. Quaddy, **THO 5556.**—Norbury Instruments, 91 Beddington Lane, Croydon.

TRADE

BRAUN ELECTRONIC FLASH, appointed for sales and service. Comprehensive range of spares and accumulators for immediate despatch.—Parker Photographics (G3DUV), 308 Lichfield Road, Birmingham, 6. *(East 2466.)*

AIR-DRY HAMMER-FINISH PAINT. Brush Application, grey finish. Instructions enclosed with each 2½ oz. jar, 3s. 9d. post free. Sample piece, send 6d. Special rates larger tins, clubs, etc.—Fairclough, 28 Rimmer Green, Southport, Lancs.

" SPECIAL OFFER " for limited period. Communicator mobile 2 or 4 metre Tx/Rx, £75, brand new, normally £90. H.P. terms.—R.E.E. Telecommunications Ltd., Telecomm. Works, Crewkerne, Somerset.

VE3DFC DESPERATE for Manuals of R.206-1 and R.1392D. Will buy, rent or borrow. Return/outgoing carriage and insurance will be paid. QTH R.R. No. 1, Caledon, Ontario, Canada.

WEBB'S LOG BOOK for recording signals heard and worked; 112 pages 9¾ in. x 8 in., approved format, semi-stiff covers. Excellent value ; 6s. 0d. post free, or callers, 5s. 4d.—Webb's Radio, 14 Soho Street, London, W.1.

QSL CARDS: Buff, blue, pink, green. 100, 14s. 6d.; 250, 23s.; 500, 40s.; 1,000, 75s.—Samples (s.a.e.): Reilly, Panxworth, Norwich, 56.Z.

BAMBOO POLES, LONG, STRONG, FOR CUBICAL QUAD ANTENNA (LABGEAR AND (GM3BQA) ALWAYS STOCKED.—WHINES & EDGELER, BAMBOO PEOPLE, GODMASTON, DORCHESTER, DORSET.

WANTED FOR CASH : Good clean communications receivers and SSB equipment. Please state price.—Short Wave (Hull), Radio, 30/32 Princes Avenue, Hull. *(Tel. 18953.)*

CATALOGUE NO. 15. Government Surplus Electrical and Radio equipment. Hundreds of items at bargain prices for the experimenter and research engineer, 2s. 6d. post free ; catalogue cost refunded on purchase of 50s.—Arthur Sallis Radio Control Ltd., 93 North Road, Brighton.

QSL CARDS AND LOG BOOKS, G.P.O. APPROVED. CHEAPEST, BEST, PROMPT DELIVERY. SAMPLES. — ATKINSON BROS., PRINTERS, LOOE, CORNWALL.

NECKTIES featuring your own Call Sign neatly woven into the Tie in Gold or White on either Navy, Black, Wine or Green background. Minimum of two Terylene Ties in same colour at 31s. 6d. per pair post paid. Cash with order to Macaseta Ltd., Goodall Street, Macclesfield, Cheshire.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

PANDA PR120V 150-watt Tx, late model, perfect condition, £50.—French, 53 Reddal Hill Road, Old Hill, Staffs.

BARGAIN. " Olympic " T.150 AM/CW Tx, 150w., band-switched 10-80 metres, absolutely new and unused, cost £100, will sell £50 o.n.o.? Or interested exchanges, mobile gear, receivers, or what-have-you? —Box No. 2737, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

840C, extension speaker, £42, buyer collects (Essex), CR-100 manuals, 37s. each (send P.O.).—Box No. 2738, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Commercial single sideband Transmitter or Transreceiver, also 32V2 or 3 Transmitter, or LG.300.—P. Landor, Grange House, Reigate Hill, Reigate, Surrey. *(Tel. Reigate 6007 evenings.)*

TCS-12 TRANSMITTER, perfect, minus power socket, £6 10s. TCS-12 Receiver power pack, £5 10s. Q-Fiver, as new, unused, £3 10s. RF-24, as new, unused, £1 10s. Letters only.—Riddle, 17 Downfield Place, Edinburgh, 11, Scotland.

2-METRE nuvistor converter by Tiger, IF 28-30 mc, brand new and unused, £10. 2-metre 100 watt Tx, commercially-made table top model, brand new, £60. TCS-14 Receiver, mint condition, complete with original NL, power socket connector, speaker matching trans, and AC power pack, £10.—Box No. 2739, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERS ? Class-D Wavemeter, mains, range 1900-8000 kc, with 1 mc markers to 30 mc. Also plate transformer 1900-0-1900v., 200 mA. WANTED: Panel meters, 300 mA, 100 mA and 50 mA.—G4AH, 160 Cathill, Barnet, Herts. *(BAR. 4272.)*

HELP urgently required, Eddystone 358 coils, amateur bands or full range, what offers? — W. Craine, 29 Manor Crescent, Liverpool, 25.

TCS-6 TRANSMITTER with power supplies and xtal mike pre-amp, FB AM/CW. Exchange for S.640, or sell.—GM3NXA, 2 Kintillo Road, Bridge-Of-Earn, Perthshire.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE, due to lack of space, R.206 receiver with power pack, frequency coverage 0·55-30 mc, offers to — D. S. White, 14 Clepstone Avenue, Middlesbrough, Yorkshire.

BROOKS GRYPHON ¾ h.p. motor, 3,000 r.p.m., new, boxed, £6 10s. Heathkit VFU1 VFO. £7 10s. RF-26 unit + PSU, modified 70 mc, £4. Linear amp. pr 6146's; Labgear wideband multiplier. wired, with valves. Offers, carriage extra.—G8DT, 18 Newcourt Park, Cheltenham.

WANTED: Valve 4D32, new and boxed, price and particulars.—Box No. 2740, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Communication Receiver, general coverage, good condition, state details.—H. Cochrane, 63 Auckland Street, Possil Park, Glasgow, N.1.

FOR SALE OR EXCHANGE: Geloso 222 Tx, 75 watts to 6146; Geloso G.209 Rx, both as new; Tiger Tx, less HT supply; Truvox Tape Recorder; Grundig GDO; Mobile 2 mtr. Tx/Rx with transistor power supply, also AC supply for home use; 12v. to 230v. 150 watt alternator; CR-100 Rx; Selecta Unimat with ACCS (table-top lathe); electric drill with planer, jig-saw and brand new hedge-cutter. Any reasonable offer considered, s.a.e. please. —Darn, 44 Laurel Avenue, Ripley, Derbyshire.

SALE: Eddystone Receiver 750, very good condition, £38 o.n.o.? Carriage paid, or exchange Heathkit Mohican. — G3NKN, Trebell, St. Mabyn, Bodmin.

WANTED URGENT: Four coils for HRO-MX Receiver, in working order, all letters answered.—G. Curran, 7 Dryad Street, Thornliebank, Glasgow.

AVO ELECTRONIC TESTMETER, as new, £20. MCR1 Receiver, £5. ZC1 Mk. II fixed and mobile, all accessories, whip, PSU, remote control unit, etc., £12. 50-watt Vortexian Amplifier + 1 spare, £5 the lot. Reflectograph Model 300, £60; this tape recorder cost £103, and has had 200 hours' use. —D. Pratt, G3MHS, 23 Kent Street, Upper Gornal, Dudley, Worcs.

SSB STATION to be sold, due to unexpected posting. K.W. VICEROY Mk. III, as new, £115. HALLICRAFTERS SX-111, latest model with separate product detectors, few hours' use, mint £95. K.W.-500 Linear Amplifier, £60. MOSLEY Triband TA-33 Jr. Beam, £14. CDR Rotator for above, 110 or 220 volts AC, with control unit and cables, £13. 35 ft. light steel Erecto tower, dismantles to 10 ft. sections, cadmium plated bolts, £18. Last three items complete installation, £43. HEATHKIT Valve Voltmeter with probe, £9 10s. Monomatch, £3. Delivery arranged.—Major Baynham, 16 Rawlinson Road, Catterick Camp, Yorks. *(Telephone 2385.)*

FIRST £20 SECURES mint Eddystone 640 Receiver, carriage paid, inland.—Box No. 2741, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Minimitter Mercury 200 with TT21's final. *(Reigate 6007 evenings.)*

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: Creed Teleprinter, Type 7B, also 58 Walkie-Talkie, BC-950 VHF Tx, and APS-13 Radio Altimeter. Also WANTED: Motor and handbook, etc., for Telewriter, Type YB-02251. — Box No. 2742, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

ELSTONE MAINS TRANSFORMERS, three-way mounting: 350-0-350v., 80 mA, 6·3v., 4A. tapped 4v., 5v. 2A., tapped 4v., 33s.; 350-0-350v.. 150 mA, 6·3v. 5A. CT, 5v. 3A., upright mtg., 51s. Brown's F headphones, 33s. Crystal microphones: MX3, 39s. 6d.; Acos 45, 22s. 6d. Test meters: Caby A10. £4 10s.; EP10K, £5; Model 500, £7 19s.; TP5S, £5 10s. All brand new, mail only please, postage extra. — Thompson, 134 Royal Oak Road, Manchester, 23.

SALE: 4m. Marconi Mobile Transmitter/Receiver, unmodified, with 17 valves, QV04-7 PA, microphone and 12v. vibrator PSU, less crystals, £4, carriage 10s.—G3LYN, 196 Southdown Road, Bath.

SALE: HRO (R.106) with coils for 480 kc to 30 mc, operation and repair manuals, and overseas packing case; new condition, £20 carriage paid.—Davis, 58 Leeds Road, Harrogate, Yorks.

JOHNSON VIKING INVADER SSB TRANSMITTER, 200-watts SSB/CW, 90-watts AM, as new, with autotransformer, cost £285, offers around £185. COLLINS 75S-1 RECEIVER, fitted additional 500 c.p.s. mechanical filter, and matching BFO crystal, extra HF crystals, with autotransformer/speaker unit, offers around £200. Vacuum variable capacitor, 5-100 pF, 7500 volts, £10 or offer. Two new Mullard QV06/20, 22s. 6d. each.—G5RP, Old Gaol House, Abingdon, Berks. *(Tel. Abingdon 380.)*

SX-28 in original and excellent condition throughout, complete with manual, £26; HRO-MX, new and mint, complete with 9 coils (80 and 10 metres bandspread) and matching p/p, £21. 2-metre commercial 16-element stack complete, brand new and boxed, £7 10s. Western Electric Portable VHF F/S Meter, 100-160 mc, chrome telescopic antenna, 200 microamp meter, brand new, 65s. G3FIF 160m. mobile whip, new, £4 10s. S440B power pack, unused, 50s. BC-221, new, with V/S p/p, £11 10s. Admiralty absorption wavemeter, 1-10 mc, 17s. 6d. 4-metre QRO PA units by Plessey, takes QQV06-40, new, unused, 50s. 430 mc converter, tuning unit TN18 300-1000 mc, excellent condition, £6 10s. RF-26 and 27 Units, new, 30s. Three 12 ft. 2 in. o/d dural aerial poles, new, 37s. 6d. each. All items plus carriage. WANTED: BC-348 manual; *Post-War Communication Receivers* manual, Vols. 1 and 2; U.S. Army LS3 speaker; TW and G2IQ 2-metre converters.—Box No. 2743, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE 8 mm. Brumberger (Japan) triple turret cine camera, built-in filters, meter, pistol grip, case as new, for decent Rx. Offers?—Enderby, 40 Anderson Street, Glasgow, W.1.

FOR SALE: A complete Morse Code Course by the well-known Candler System Co., £3. "Globe-King" battery receiver, 10-100 metres with headphones, working, 45s. Power connector for TCS Receiver, £1. Postage paid.—R. Harvey, 21 Whatman Road, Forest Hill, London, S.E.23.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: DX-40U plus VF-1U, mint condition, with manuals, £30 o.n.o.?—Box No. 2744, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MINIMITTER MERCURY 200, TT21's final, £65, offers? AR88LF with speaker and manual, £30, offers? Deliver Midlands.—G2BOZ, Three Willows, Rushock, Droitwich. *(Phone Cutnall Green 297.)*

FOR SALE: Hallicrafters S20R, 550 kc-44 mc, internal PSU, LS, electrical bandspread, £17 10s. Also HRO-M, including PSU, Broadcast/Top Band coil, and handbook, offers?—G3OLU, 2 Westbourne Grove, Chelmsford.

2-METRE AND 4-METRE cascode, crystal controlled converters, several IF's available, £6 each, comprehensive miniature oscilloscope, £12; 150-watt modulator with UM3, £7; T1131 modulator, unmodified, £4; high stability VFO's, 5·0-5 mc and 8·5-9·5 mc, £3 10s. each. All items guaranteed, carriage extra. —G3LGK, 21 Dale View, Ilkeston, Derbys.

FOR SALE: Ellams Flat Duplicator, recently reconditioned, complete with ink and supply of stencils, suitable club work, £6 5s. plus 10s. carriage and packing, or nearest offer.—Watts, 62 Belmore Road, Norwich. *(NOR 72.T.)*

CR-200 (B29.) good condition, offers? Buyer collects.—G3PVO, 88 Upperthorpe, Sheffield, 6.

PANDA CUB, one owner, perfect, £30. Bendix TA-12B, plus power unit, £8. Grundig TK5 Recorder, £18.—G3HQH, 28 Lea Street, New Mills. Stockport, Cheshire.

GELOSO CONVERTER, perfect working order, £12 10s. WANTED: *Short Wave Magazine,* December, 1957, 3s. paid.—Winstanley, Bryn Awel, Waun Fawr, Aberystwyth.

R. 1155A with PSU, good condition, suit SWL. £10 10s. plus carriage.—D. Warburton, 14 Castle Road, Dollar, Clacks, Scotland.

TIGER TIGLET. 80/60 metres. Phone/CW, high-level mod., matching mains PSU, xtal mike, £22 o.n.o ?—Akehurst, Stevens Cottage, Ippleden, Devon.

MINIMITTER CONVERTER, fully bandspread Top Band in place of 40m. band, 40m. coils included ; self-contained power supplies, output at 1·5 mc, £9 10s. Radiovision Hambander receiver. 1·6 mc IF, fully self-contained, with 230v. AC mains input, output stage and speaker, BFO and Tx/Rx switching ; amateur band coverage from 160m., £12 (post inc.). Both items in first class condition.—G3PVT, 4 Minworth Road, Water Orton, Birmingham. *(Castle Bromwich 2329.)*

WANTED TO EXCHANGE: DX-100 and AR88LF for SSB Transceiver, or DX-100 only for SSB Transmitter or Exciter.—Wells, 184 Somersall Lane, Chesterfield. *(Tel. 6033.)*

HEATHKIT VF1U complete, mint condition, under 10 hours' usage, tested by Heathkit, £9 10s. —G5FH, 17 Knottsall Lane, Oldbury, Nr. Birmingham.

WANTED: Heathkit SB-10U single sideband adaptor, complete with instruction book.—G3IVG, 5 Waingate, Rawtenstall, Rossendale, Lancs.

SMALL ADVERTISEMENTS, READERS—*continued*

SSB OUTFIT. Minimitter Tx (807's) with SB10U, all in mint condition. Excellent SB suppression and speech quality. May be air tested. £80 o.n.o.—G3RDW. *(Tel. Brownhills 3550.)*

SALE: Oscilloscope 13A Erskine and Hartley, exc. cond. and complete with all access., £20. Delivered in London area. Also one Eimac 4-125, brand new, with base, £5.—G3AMF, 226 Prospect Road, Woodford Green, Essex. *(Tel. Buc 4052.)*

230V. 8A. VARIAC, good condition, cost £20, £12 10s. carriage paid. Also chokes 1 Hy. 180 mA, 7s. 6d. each; 5 Hy. 100 mA, 5s. 6d. each.—Box No. 2745, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED URGENTLY: Complete B2 Tx/Rx outfit, very good price offered.—R. Eslor, GI3KIX, Mail Room, R.A.F. Goch, BFPO.43, W. Germany.

MODULATION TRANSFORMERS, brand new 25-30 watt modulation transformers. 5K ohms + 5K ohms primary, for push-pull modulators; 5·5K ohms secondary for PA valve; size 2½ in. x 2¾ in. x 3 in. high; 4-hole fixing; 30s. each, two for 55s. Brand new Erie resistors, assorted values and wattages. From 10 ohms 10 megohms, ½ watt-3 watt (manufacturer's surplus), 100 for 10s., 1,000 for £4.—R. W. Davies, 23 Hillside Crescent, Enfield, Middlesex.

FOR SALE: HRO Receiver PSU, two GC coils, £12, good working order.—G2DPD, 3 Raymond Way, Claygate, Esher, Surrey.

PANDA EXPLORER TRANSMITTER, £45. VHF Wavemeter and Sig. Gen. type W1649, £2. VHF field-strength meter, 30s. Filament transformer 2·5v. 10A CT twice, 7,500v. test, £1. All carriage extra, but prefer buyer collects.—G3GEJ, 14 Brandles Road, Letchworth, Herts.

AR88D, v.g.c., professionally re-aligned, with spare valves and manual, trimming tools, £37 10s.—J. Anthony, G3NDY, 5 Seagrave Road, Fulham, London, S.W.6. *(FUL 1976.)*

FOR SALE: Minimitter 160 Mobile Whip, £3 10s. *Radio Handbook*, 15th Edition, £2 5s., both plus post. WANTED: 1 in. 1CPI CRT; Mobile transistor power supply, 12v. input, 300v. 125 mA approx. output; T1131 rack.—Please write G. Eden, 78 Stratford Road, Sparkbrook, Birmingham, 11.

EXCHANGE Pair 813's with fil. trans. (all new) and Lionel high-speed Bug, for transistorised Car Radio.—G3GGL, Eton House, Windsor Road, Albrighton, Wolverhampton.

DRAKE 2B Rx, 6 months old, excellent condition, £85 or near offer?—Williams, 22 Fieldway, Bradford, Yorks. *(Ring Queensbury 3361 evenings.)*

EDDYSTONE 640 and 740 Receivers offered in exchange for Eddystone 750 or 680X, both clean and in perfect order; 2-metre converter, 50s.—Box No. 2746, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SX101A RECEIVER, 80-10 metres with converter band 30·5-34·5 mc, as-new condition, £140 or offers?—Butcher, 12 Beech Avenue, Buckhurst Hill, Essex. *(BUC 5335.)*

SMALL ADVERTISEMENTS, READERS—*continued*

REMOVAL SALE: U.S. enclosed 6 ft. rack, £5; Mosley 3-band mobile whip, £6; AVO Multiminor, £5; pair QY3-125, 50s. each. Valves, transformers, etc. s.a.e. list.—Butcher, 12 Beech Avenue, Buckhurst Hill, Essex.

EXCHANGE HRO COILS 100-200 kc, 900-2050 kc, for 50-100 kc and 500-1,000 kc.—Peabody, 182 Cavendish Road, Walsall, Staffs.

FOR SALE: LG.50 Tx, clamper fault otherwise as new.—Best offer Mrs. Aird, 24 Academy Street, Alloa, Clackmannanshire.

SALE: R1155, built-in PSU, external speaker; modifications, BFO pitch, second output, front panel re-sprayed; good condition.—Wickstead, 99 Earlsfield Road, Wandsworth, London, S.W.18.

WANTED: AR88D in good condition, state price, all carriage charges refunded.—Write to Pond, 48 Blakelaw Road, Alnwick, Northumberland.

FOR SALE: Two Pye VHF Radio Telephones P.T.C. 102, 12v. input, one in box with handset, one without case, good condition, £20 the two, or exchange Minimitter Converter or S.27.—Box No. 2747, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Eddystone S.840C short wave receiver, as new, £40.—Box No. 2748, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

PYE Eight Wave-Band Receiver, perfect condition; R.206, long-wave converter three bands, new. Will exchange for Wavemeter.—Stimpson, 13 Wyndham Street, Hull, Yorks.

20 NEW and Boxed 13-Channel Turret Tuners, various IF's, 10s. each. 200 Assorted Valves, new but unboxed, 5s. each; s.a.e. for list.—Box No. 2749, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Heathkit valve voltmeter and RF probe, mint condition only, offers and details to—175 West Drive, Cleveleys, Blackpool, Lancs.

FOR SALE: BC-348 M unmodified, mint condition, £17 10s. BC-453 unmodified, used condition, £4 10s. National 1-10, less coils, requires attention, £2 15s. Eddystone Power Pack S.441B, 300v. 200 mA, 12·5v. 3A., 6v. 3A., brand new, £4 10s. Avominor, brand new in leather case, DC volts/current/ohms ranges, £2 15s. PCR Receiver 6-18 mc, 200-550m., 900-2000m., brand new, built-in speaker, AC power pack, £7 5s. Wavemeter W.1649, 155-255 mc or 140-240 mc as signal generator, brand new, unused, £3 10s. Two Parmeko shrouded chokes, 8 Hy 250 mA, 12s. 6d. each. Spares available for AR88D/AR88LF, send s.a.e. for list. Manuals for AR88D, CR-91A, 25s. each; SX-28A. 35s.—A. J. Reynolds, 139 Waller Road, New Cross, London, S.E.14. *(Tel. New Cross 1443 after 7.30 p.m.)*

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