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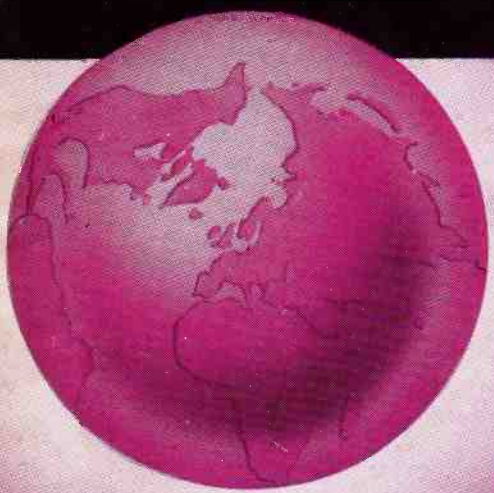
The SHORT WAVE Magazine



EXCLUSIVELY FOR THE RADIO EXPERIMENTER & TRANSMITTING AMATEUR

VOL. VIII No. 10 DECEMBER 1950

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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

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THE *SHORT WAVE LISTENER* ASSOCIATED WITH THIS MAGAZINE IS SPECIALLY FOR THE RECEIVING ENTHUSIAST

SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

Christmas

Every year at this time it is our pleasure to spare those who may glance over this space any discussion of the burning controversies of the moment—and instead to send them greetings and good wishes for the Christmas season.

We number our readers in all corners and in every country in the world, and some will not in fact be seeing these lines till well on in the New Year. In the realm of Amateur Radio, however, time and space are hardly ever factors of any great significance—for amateurs girdle the earth and are in constant communication. And it is in this realm of Amateur Radio that the true spirit of Christmas still lives.

So it is the season of the year when once again we are happy to have the opportunity of offering our good wishes for their happiness and our thanks for their support to all our readers at home and abroad—*from the Editor, Management and Staff of* SHORT WAVE MAGAZINE.

TVI-PROOF EXCITER FOR TWO METRES

Three-Stage Design Using Modern Techniques

By **W. R. JOSS (G2AJ)**

The mid-evening TV broadcast is often put forward as the reason for the lack of activity on Two Metres during that period—though it is not always clear whether this is because of watching the programme or to avoid interference with it! Here is a practical design to overcome the latter difficulty in the case of Alexandra Palace transmissions on 41.5 and 42-48 mc. Since our contributor, a well-known exponent of the art of VHF, explains how frequencies can be selected to prevent direct radiation on these channels, the same principles can be applied to arrive at suitable multiplier frequencies to clear other TV channels.—Editor.

FOR the first year of operation on two metres, the writer used the transmitter which was described in the November, 1948, issue of *Short Wave Magazine*. It may be remembered that this transmitter derived 145 mc output by means of an 815 tripling from 48 mc, and when it was first tested fingers were crossed and prayers offered that the 48 mc stage would not interfere with nearby television sets. The gods were kind and no TVI was experienced during eight months' operation in Hendon, North-West London. In April, 1949, however, the writer moved to Biggin Hill, Kent, and although high up on the North Downs where the field strength from Alexandra Palace is high, it was nevertheless not enough to prevent the 48 mc signal from disfiguring nearby television pictures. As the ability to operate during TV hours was considered desirable, an attempt was made to build an exciter which gave TV frequencies as wide a berth as possible and permitted a high-power final to operate in safety. At the same time, miniature technique was adopted, and the result is seen in accompanying photographs.

Getting There

In order to reach 144 mc, it was decided to double from 72 mc, a frequency undoubtedly safer than 48 mc! To obtain 72 mc, 36 mc could be doubled, but as this was getting near to TV frequencies, it was considered that tripling from 24 mc would be more satisfactory. Thus, the entire TV spectrum could be conveniently avoided.

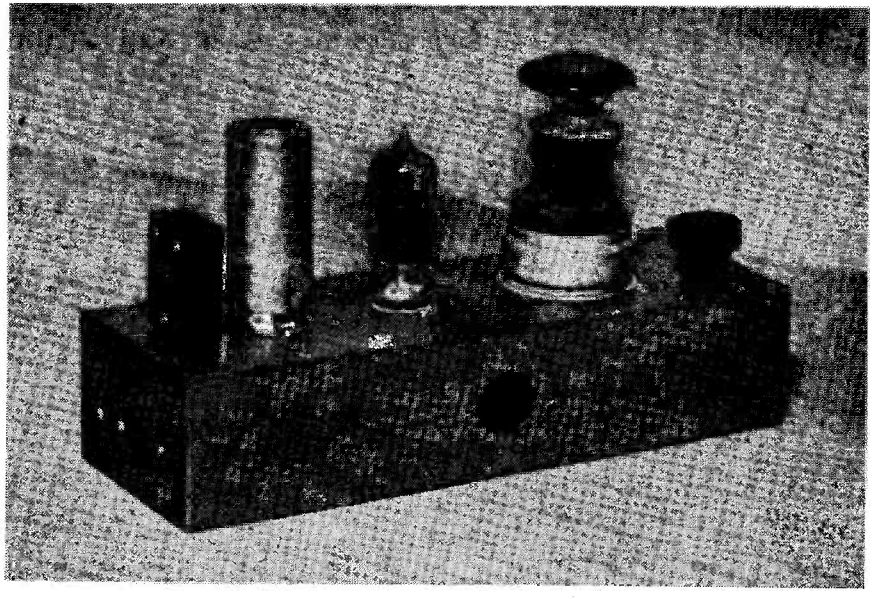
An output on 24 mc can be obtained in a number of ways—4, 6, or 8 mc crystals all being suitable and easily obtained. However, a crystal oscillator on one of these frequencies can produce harmonics inside the TV spectrum, so it was decided that, if possible, the fundamental frequency should be 24 mc. A suitable crystal could be obtained but, as it would be expensive, the "third harmonic" circuit described in *QST* some months ago was adopted. In it the crystal is made to operate on the third harmonic, which appears as the fundamental frequency.

As an added precaution, it was decided that all frequency multiplying stages should run at a very low input and thus reduce possible sources of interference still further. B7G type valves lend themselves to this requirement.

Circuit

The complete circuit diagram is shown in Fig. 1. It will be noticed that the output frequency is reached with only two valves, whilst the third valve is a buffer amplifier. Thus, the unit could be used as a complete low-power transmitter in itself. British valves are used throughout, the Mullard ECC91, EL91, and QVO4-7 being chosen. The latter valve—a tetrode—will provide sufficient drive for an 829B or 3E29 to enable it to run at 100 watts, whilst its own drive requirements are very small, being of the order of one milliamp. This drive can easily be obtained from an EL91 running as a doubler with some 200-250 volts on the anode.

The remaining stages, the crystal oscillator and tripler, can conveniently be contained in one valve. the Mullard ECC91—a double triode. A 6J6 may be used if preferred. This valve runs at a very low input, HT being in the order of 150 volts, and the resistance R6 should be adjusted to give this voltage if the HT volts are higher than specified. There is no harm in the voltage on the EL91 being slightly higher.



General-appearance photograph of the TVI-proof 145 mc driver described by G2AJ in the accompanying article.

The use of a blocking condenser C6 between plate coil and ground permits the rotor of the trimmer C7 to be grounded, thus simplifying the mounting. Series tuning was adopted for the anode circuits of V2 and V3, as this permits a higher value of inductance and, furthermore, the rotors of C11 and C15 can also be earthed. As an indication of the effect of series tuning, it will be noticed that L3 has the same number of turns as L2, in spite of operating at twice the frequency!

A word about the operation of the crystal oscillator circuit might not be out of place. Its success depends entirely on the feed-back arrangements in the coil L1, and the writer has found that the higher the frequency the more tricky it becomes. No trouble has been experienced with 5.7 mc crystals oscillating at 17 mc—a frequency which has been used in two-metre converters—but 8 mc crystals have proved a little more obstinate. According to *QST*, the correct position of the tap is approximately one-third up from the crystal end of the coil when using a 6J6. However, the writer has found that this is, in fact, a little less whether using a 6J6 or ECC91. If too much inductance is included in the feed-back portion of the coil, the circuit will oscillate at a frequency controlled by the value of C3 plus C4 rather than by the crystal. (More will be said about this later.) C3 has been padded with C4 so as to give a maximum capacity of about 70 $\mu\mu$ F, a large capacity being essential for stable operation.

Incidentally, this type of circuit can be made to oscillate at the 5th harmonic of a crystal, which suggests the possibility of reaching 144 mc with one valve! This is only worth considering for portable use, as 48 mc becomes involved again! A 9 mc crystal oscillating at the fifth harmonic would give 48 mc, whilst the second half of a 6J6 could be made to triple to 144 mc!

Construction and Wiring

The whole exciter is built on a 7 in. x 2½ in. x 1½ in. copper chassis, folded up from a piece of 20 gauge sheet. Only one internal screen is necessary, this being across the base of the QVO4-7. The finished chassis was polished and silver plated with the solution described by G6VX in the July, 1948, issue of *Short Wave Magazine*. The chassis is simplicity itself and the major dimensions are shown in Fig. 2.

Some care is necessary in wiring-up the unit, as a considerable number of components have to be accommodated in a small space. Details can be seen in the photograph. Quarter-watt resistances should be used wherever specified, and R6 should be a vitreous resistance of the 6-watt variety, as this takes up less space than the 2- or 3-watt carbon resistance which would otherwise be adequate. All .001 μF condensers are T.C.C. Type CM2ON; these again are necessary for reasons of space.

Condensers C3, C7, and C11 are all mounted on strong solder tags which are bolted to the chassis. Resistance R2 is virtually a safety measure to prevent the valve taking too much current if the crystal stops oscillating. Otherwise R4 (only ½-watt) can easily be burnt out.

The total heater current of the three valves is about one amp at 6.3 volts. The writer used two separate HT supplies, but this is not essential, and one power pack can be used with a suitable series resistance incorporated.

Testing

Any crystals in the range 8,000 to 8,111 kc may be used for the range 144 mc to 146 mc.

When the exciter is ready for test, the oscillator stage alone should be checked first. A low range milliameter may be connected in the grid of the tripler stage and C3 rotated until a reading of grid current is obtained, thus indicating oscillation. This oscillation should be checked on a calibrated receiver operating on the 24 mc range.

Table of Values

Fig. 1. Circuit of the TVI-Proof Two-Metre Exciter

C1, C2, C6, C9, C10, C13, C14, C16 = .001 μF mica
C3, C7, C11 = 3-30 μμF Mullard trimmers
C4 = 40 μμF ceramic
C5 = 10 μμF
C8, C12 = 50 μμF
C15 = 15 μμF
R1 = 5,000 ohms, ½-watt
R2 = 200 ohms, ½-watt
R3, R9 = 100,000 ohms, ½-watt
R4, R5 = 1,000 ohms, ½-watt
R6 = 10,000 ohms, 6-watt
R7 = 50,000 ohms, ½-watt
R8 = 600 ohms, ½-watt
R10 = 10,000 ohms, 1-watt
R11 = 47,000 ohms, 1-watt
L1 = 16 turns 20 SWG enam. on 5/16in. diam. former, tapped 3 turns from grid end.
L2, L3 = 5 turns 16 SWG enam. wound to 5/8in. diam., spaced one turn, self-supporting
L4 = 4 turns, as L2/L3
L5 = 1 turn insulated wire slipped between 1st and 2nd turns of L4
RFC = 40 turns 34 g. DCC wound on ¼in. diam. polystyrene rod.
V1 = ECC91, Mullard
V2 = EL91, Mullard
V3 = QQV04-7, Mullard

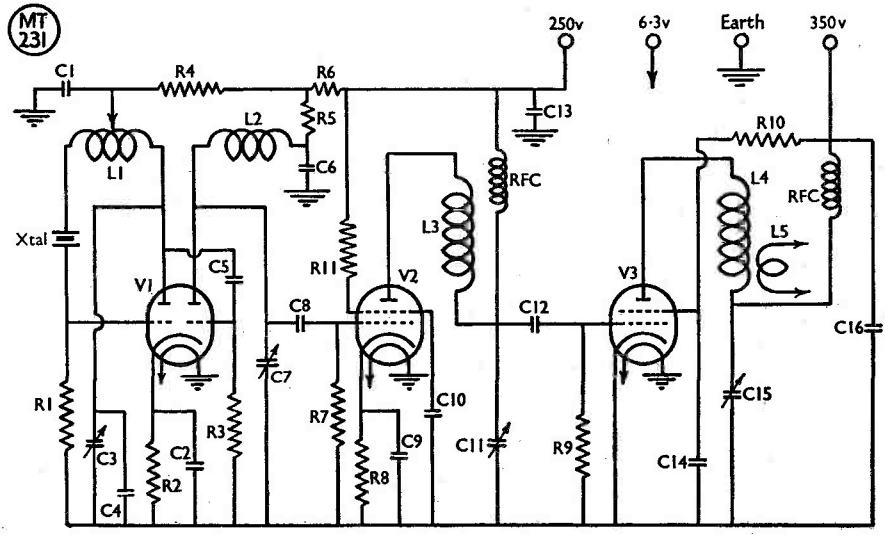


Fig. 1. Circuit complete of G2AJ's TVI-proof exciter-driver for the 145 mc band. It depends on correct choice of multiplier frequencies for the avoidance of TVI (see text).

Altering the setting of C3 should not cause any appreciable change in the frequency of the beat, and it will be found that the crystal will only oscillate over part of the range of C3 and at no other point. If the oscillator frequency shifts widely when C3 is altered, this indicates spurious oscillation, showing that the tap on L1 is too high. If the tap is too low, the ECC91 will only oscillate weakly or not at all. A point worth remembering is that pulling the crystal out of its socket is *not* a check for spurious oscillation, as the capacity of the crystal and holder constitutes part of the feed-back circuit.

With the oscillator operating correctly, HT may be applied to the remainder of the exciter. C7 should only peak at one point (72 mc), but if this point happens to be maximum capacity, then a check should be made that it is *not* 48 mc. While testing, a milliameter may be inserted in the grid of the QVO4-7, and the preceding stages peaked for maximum grid current; this should be about one milliamp. A dummy load in the shape of a 6-watt car bulb may be placed across the output link, and this should be approximately 60-70% of full brilliance with the exciter running correctly.

Operation

The exciter has been used to drive a

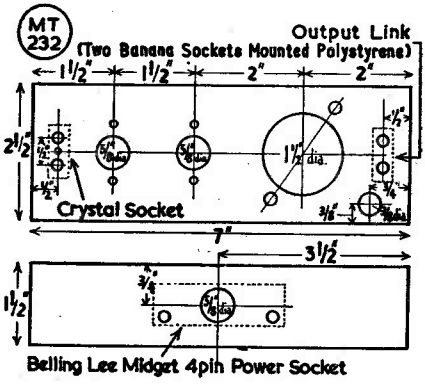
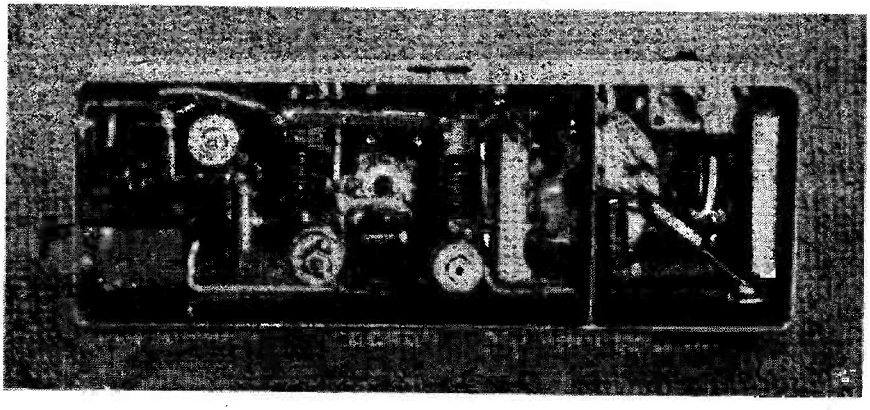


Fig. 2. Suitable chassis layout for the 145 mc Exciter.

3E29 running at a 120 watts on CW and about 90 watts on phone. Under these conditions, the grid current is of the order of 15-20 mA.

This transmitter has been used during recent 2-metre contests, and operating took place throughout television hours with no QRM. With a home-built television receiver using a "straight" vision strip running on the bench four feet away, no interference occurs and it is possible to call "CQ2" and watch the picture at the same time! 'Nough said! !



Under-chassis arrangement of G2AJ's Exciter for Two.

MORE S.640 MODIFICATIONS

Reducing IF Breakthrough, Curing Frequency Drift and Increasing Bandspread

By **E. W. BURGIS (G6FB),**
Lieut.-Cdr. (E), R.N.

In our issue for May, 1950, there appeared some useful information on desirable modifications to the Eddystone S.640 receiver. This article describes further work on the set to improve its performance.—Editor.

UNDER the Copenhagen Plan a 100-kilowatt broadcast station has commenced operation on 1602 kc, and this has given rise to breakthrough on the intermediate frequency, which is 1600 ± 2 kc. This breakthrough apparently originates from one or both of two sources.

(1) Pick up by the crystal phasing condenser spindle
(2) Aerial pick up.

In the first instance the trouble is caused by both sides of the crystal phasing condenser virtually being "up in the air"; this results in direct pick-up by that part of the spindle which projects through the receiver front panel. The strength of the spurious signal is greatly increased by the proximity of the operator's hand to the crystal phasing control knob. In the writer's case, a heterodyne of S6/7 was quite usual (with BFO switched on) during the evening hours. Obviously the phasing condenser spindle should be at low RF potential in order to reduce direct pick-up.

Modification

Inspection of the circuit diagram and the actual condenser (C38) reveals it to be connected as shown in the circuit diagram at Fig. 1. Clearly, if the connections are *reversed,* then the rotor is more nearly at ground potential—being by-passed to earth through C37 (400 $\mu\mu$F).

This modification is quite easily embodied, and the method of so doing requires no comment, except that it is necessary to remove the finger plate to gain access to the four countersunk screws securing the phasing condenser and crystal switch to the front panel. The switch and condenser must be removed in order to carry out the necessary soldering operations. It is also necessary to bend the condenser rotor connecting tag clear of the crystal switch tag to which it was directly soldered as originally fitted.

It is not claimed that this modification will entirely cure the breakthrough, but, in the writer's case, it does attenuate it from S6/7 to a level which is now entirely masked by normal receiver noise. (When using a folded dipole aerial.)

A coincidental feature of the modification is that it also very severely attenuates induced hum which can occur in the same manner as the breakthrough.

With regard to breakthrough caused by aerial pick-up, this can be minimised by the use of either (1) A screened wave trap in the aerial lead and fitted as close to the aerial terminal as possible; or (2) An aerial system using a non-resonant feeder (such as a folded dipole).

Frequency Drift

Certain receivers were orginally fitted with a 6K8GT mixer valve, which, in the writer's case, caused unacceptable frequency drift. Replacement of the 6K8GT by an ECH35 reduced the drift to completely negligible proportions. Although fitting an ECH35 involves no change of circuit constants, it is recommended that the RF circuits be "touched-up" to ensure optimum performance and to maintain calibration accuracy.

Frequently drift of the BFO can also be reduced by careful selection of the EF39 valve used in that position. Simple changing over of the various existing EF39's in the receiver should give

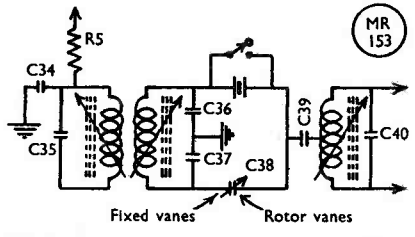


Fig. 1. The crystal phasing condenser C38 as originally connected in the receiver; by connecting C38 the other way round, the rotor vanes (and spindle) become earthy and direct pick-up at IF is minimised.

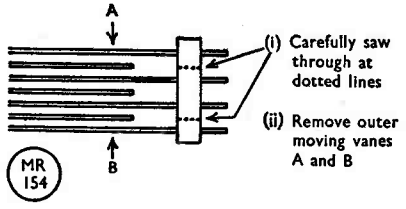


Fig. 2. The operation for improving bandspread on the S.640. The outer vanes of the bandspread condenser are removed (see text).

adequate scope for implementing this idea. The previous remarks on "touching-up" should not be necessary, except in rare instances.

Bandspread

The amount of bandspread can be increased by a simple modification to the bandspread condenser. This involves careful use of a small hacksaw blade and a pair of long-nosed pliers to remove the two outer vanes of each rotor section of the existing condenser as shown in Fig. 2. The maximum capacity is reduced from 46.2 $\mu\mu$F to approximately 31 $\mu\mu$F, and the bandspread thereby increased—a definite advantage for 28 mc operation. This modification may, in some cases, demand slight touching-up of the RF tuned circuits. The main calibration of the receiver will also be a little affected, but only to the extent of a few kc, since the change in the minimum capacity of the bandspread condenser is very small (approximately 3 $\mu\mu$F).

With the bandset pointer set to the left-hand edge of the green line (as in normal procedure), the modified bandspread coverages are approximately as follows:—

Band	No. of Scale divisions
28-30 mc	63
14.0-14.4 mc	88
7.0-7.3 mc	66
3500-3635 mc	41
3685-4000 mc	73

Separate RF and IF Gain Controls

Preliminary tests indicate that this is another worthwhile modification and one which requires very little circuit alteration. Details will be given in a future article when tests are complete.

In conclusion, the writer would be most interested to receive information on further modifications and refinements from other S.640 users, particularly the replacement of the EF39 in the RF stage by a really high-gain valve.

USEFUL HANDBOOK

Though American in its treatment and outlook, the *Radio Amateur Newcomer* can be recommended to those who require a manual dealing generally with the problems that beset the beginner in Amateur Radio. In 156 pages, under 12 chapter headings, there is a great deal which is common ground on both sides of the Atlantic. The treatment is practical and straightforward, with plenty of illustration. A few copies are available at 8s. 4d. post free, of Gage & Pollard, Publishers' Agents, 49 Victoria Street, London, S.W.1. They can supply a wide range of American radio and technical books, and also operate a sterling subscription service for those wishing to obtain American periodicals.

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G3BDG, 3DZJ, 3EWG, 3FCB, 3FDM, 3FLQ, 3FRA, 3FRK, 3GMA, 3GWI, 3GXR, 6QY, 8GL, GM3EDY, 3GJP, 3HAC, GW3GQT.

XTAL XCHANGE

A small offering this month—and for the few simple rules covering appearance in this space see p.622 of the November issue.

G2BHY, 29 Hillcrest Road, Orpington, Kent. Has 7065 and 7125 kc crystals, ½-pin spacing, no certificates. Wants any frequency 3510-3550 kc, ¾-in. mounting.

G6TG, Burniston, Scarborough, Yorks. Has Q.C.C. Type P5 8081 kc crystal. Wants similar type 8011-8022 kc.

ZB1AIS, Lt. (L) D. A. Smith, H.M.S. Ricasoli, F.M.O., Malta, G.C. Has G.E.C. 3617 kc and Q.C.C. 3725 kc crystals, both ¾-in. mounting, also S.T.C crystals about 8000 kc, B7G mounting. Wants frequencies 7020-7040 kc, ½-in. pin spacing.

TWO-ELEMENT ROTARY

The " 3MH Special "

By **G. H. PRICHARD (ZL3MH)**

In our issue for July, 1950, there appeared an article on an aerial design known as the " ZL Special," attributed to ZL3MH. In the notes below he explains the origins of this design and gives some further useful information as to construction and performance.— Editor.

HAVING read with interest the article by G2BCX in July *Short Wave Magazine* the writer would point out that he was given credit to which he is not entitled when ZL3MH was named as one of those concerned in the development of the aerial described by G2BCX. Using information given by WØGZR the writer published in *Break-In* for May 1949 an article which appears to be the source of the material for " The ZL Special." But the part played by ZL3MH was small indeed, as the present writer merely built and tested this array and then wrote it up for the benefit of fellow ZL amateurs.

Subsequently, however, he was successful in evolving a somewhat different array using the same principles and having equivalent performance, but being much simpler to construct, lighter, cheaper, and more suitable for rotation. The development of this new beam was a somewhat haphazard affair (as are so many amateur activities) and spread over quite a period. Four articles were written for *Break-In* concerning this beam and these appeared in the July, September, and December 1949 issues and further notes were published in September 1950.

It is now possible to present to readers of *Short Wave Magazine* a more tidily arranged description of the beam which is giving ZL3MH, and other ZL's, as well as some VK's and W's, excellent service for a minimum outlay. Before proceeding it should be pointed out that those requiring a fixed reversible array would find the now well known " G8PO " more convenient to operate, and on-the-air checks indicate that there is little to choose between the two beams so far as gain or front-back ratio are concerned.

Test measurements taken by W6YLO with a " 3MH Special " are :

Forward Gain 7½ dB.
Front/Back ratio: 40 dB.

Design

Briefly, the beam consists of two resonant dipoles spaced 0.1 wavelength, horizontally polarized, and connected together at centres with 0.125 wavelength of 70-ohm " beaded " coaxial cable which is transposed so that the inner conductor crosses from the left half of one element to the right half of the other. This combination is fed with any length of 300-600 ohm line through a quarter-wave matching section of 70-ohm line, which connects to the centre of one of the elements. This element becomes the " front " of the beam. (*See* Fig. 1 for detail.)

It will at once be apparent to many that this system represents no more than a compromise. There are numerous methods of modifying the design to satisfy theoretical considerations more nearly, but it is doubted if the extra effort would be worth while ; this has been borne out by the performance of these beams on both Ten and Twenty. The compromise is made necessary by the fact that an electrical one-eighth wave of most 70-ohm lines is too short to span one-eighth wave of free space. Hence the use of 0.1 spacing with 0.125 wave of phasing section, when the element spacing should be 0.125 wave also. However, the difference in electrical length of the two spacings is only nine degrees (360° = 1 wavelength) and the error has little or no deleterious effect. It would be possible to use ⅛-wave spacing with ⅛-wave of phasing line *(a)* By having elbows on the elements or *(b)* By making up an open wire 70-ohm line, but it is not thought that appreciably improved performance would result.

A further solution would be to increase the length of the phasing section to ⅛-wave *without* transposing. This was decided against on grounds of economy and appearance.

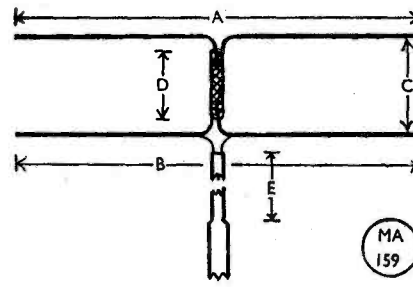
Test Results

The original version of the beam built for 28.2 mc used coaxial cable for the quarter-wave matching section, but experiments carried out by W6YLO disclosed that the horizontal pattern

obtained from an identical array was asymmetrical, the major lobe being 10-15 degrees off centre. W6YLO discovered this to be due to unbalance introduced by the coax, and when this was replaced by 70-ohm twin lead the pattern at once become symmetrical, while at the same time the SWR on the feed line was reduced to the very acceptable figure of 1.4:1. In the course of his measurements W6YLO also discovered that while the major lobe in the horizontal plane is quite sharp, the vertical pattern is fairly broad. This is borne out by results obtained on the air and is also in accord with theory.

The writer ventures to suggest that the *theoretical* polar diagram shown by G2BCX in his article is that which would be obtained from a *vertically* polarized pair of dipoles fed with equal currents 135° out of phase. Now, if these dipoles are laid on their sides it is reasonable to expect that while the horizontal polar diagram would be much as produced by G2BCX in his experiments, the pattern in the vertical plane would resemble the original cardioid, distorted to some extent due to the changed disposition of the elements to ground. The experience of both W6YLO and myself lends weight to this assumption, as it is found that short skip signals with a high angle of incidence arriving from the back of the beam are quite strong, although the 40 dB front-back ratio holds good for low angled signals.

Again, while conducting comparative tests with this beam *versus* a four-element parasitic array, W6YLO found that when conditions changed so that DX signals received on the parasitic array faded out, use of the two-element driven array made possible up to 30 minutes more contact. Under stable band conditions there was nothing to choose between the two beams!



Design of the rotary beam array discussed by the author.

Tests carried out by the writer from June 1949 on 28 mc with this type of beam have been most encouraging, and several operators including ZL's, 2AR, 2BY and 2SF are also very pleased with results on Ten. VK3QK and other Australians are using the beam on Twenty.

More recently (June 1950) a 14 mc version was finally erected at this station on a 36 foot pole, complete with prop-pitch motor. Since then enjoyment of DX'ing has increased immeasurably. ZL3MH now gets his share of DX and can even enjoy ragchews on Twenty.

Dimensions for Construction

	Key	14.2 mc.	28.2 mc
(1)	**A.** 472/f (mc)	32′ 11″	16′ 10″
	B. Same as A.	32′ 11″	16′ 10″
	C. 984/f (mc) × 0.1	6′ 11″	3′ 6″
(2)	**D.** 123/f (mc) × 0.85	7′ 4½″	3′ 8½″
(3)	**E.** 246/f (mc) × VF	14′ 8½″	7′ 5″

Note 1: This formula will prove correct for most sizes of tubing.

Note 2: These figures apply when beaded coax is used.

Note 3: Figures given are those used by ZL3MH with "beaded" coaxial cable.

Typical VF Data. Beaded Coaxial Cable: 0.85
Receiving 75 ohm twin lead: 0.68
Transmitting 75 ohm twin lead: 0.71.

APPLICATION OF SPEECH CLIPPING

Our general correspondence indicates increasing interest in this important subject, since it is coming to be understood that the principle of the system makes more modulating power available over a narrower band of frequencies, without affecting speech intelligibility. The proper application of a good speech clipping system is most marked at the receiving end. Phone operators are referred to a useful practical article on the whole subject, appearing in the May, 1950, issue of *Short Wave Magazine*. And for those who have enquired, the component values that were missed in this article are given on p.443, August.

Is Your Equipment always Safe to Handle?

ACCURATE FREQUENCY MEASUREMENT

Design for an HFM

By **J. H. JOWETT (G3CFR)**

Our contributor set out to produce for himself a heterodyne frequency meter on BC-221 principles and capable of the same order of accuracy. As he says, with care and a suitable reference standard — in this case the second harmonic of a 100 kc bar beating against the BBC transmission on 200 kc — an instrument well within the accepted limits of accuracy can easily be produced.—Editor.

THERE have been several designs offered recently on the subject of frequency meters ; most of these, however, have very complicated circuitry using four or five valves, or else they require to be used in conjunction with a calibrated receiver (or one with a dial which can be read very accurately). This latter requirement is certainly a difficulty for those who use receivers like the R1155, the frequency of which can only be set to the nearest 50 kc or so !

The meter to be described here is very similar in function to the well-known BC221, a frequency meter capable of a high order of accuracy. There is no reason why the meter described should not achieve a similar standard of accuracy ; this would depend almost entirely upon the care taken in constructing the oscillator unit, and especially the mechanical details of dial and condenser system.

Circuit

Briefly, for those unfamiliar with the idea, the arrangement is as shown in Fig. 1. A 100 kc oscillator is used as the frequency sub-standard, as these 100 kc crystals seem to be far more easily obtainable than the 1 mc type. Harmonics of this crystal oscillator are arranged to beat with harmonics of the variable frequency oscillator (in this case it is an electron coupled oscillator covering the ranges 3,200-4,100 kc and 2,250-4,100 kc approx.). The mixing takes place in a triode-hexode valve, and the beats can be amplified by means of an audio frequency amplifier. Thus, for example, if the variable frequency oscillator was tuned to 3,501 kc, then it would beat with the 35th harmonic of the crystal oscillator, to produce a 1 kc beat note. When the variable frequency oscillator is tuned exactly to 3,500 kc, it would be zero beat with this harmonic.

The circuit of the instrument is shown in Fig. 2. The crystal oscillator shown is for crystals of the series resonant type. The transformer is a 110 kc IF unit taken from an old broadcast receiver ; these should be easily available from the local junk shop. This crystal oscillator circuit may not, however, be suitable for all types of crystal, some of which are arranged to oscillate on the "correct" frequency when excited in the parallel mode. This will require a circuit such as that in Fig. 3. Another suggestion for the use of the crystal in the parallel mode is to dispense with the triode-hexode arrangement and to use two separate valves of the SP61 variety, so that one may be used as a pentode mixer, and the second as a Pierce oscillator (which, incidentally, is usually much easier to get going than a triode type crystal oscillator). A suitable circuit for this modification is shown in Fig. 4.

Setting Up

It is assumed that a receiver roughly calibrated will be available for the tuning up process. First, it is necessary to put into operation the 100 kc oscillator, and this is best done with the aid of a receiver tuned to the Light Programme on 200 kc.

With the circuit shown in Fig 2, place switch S2 to position 1, remove the crystal and short circuit the holder. Then rotate the trimmers on the IF transformer until a beat is heard on 200 kc. If this is not forthcoming, it may be

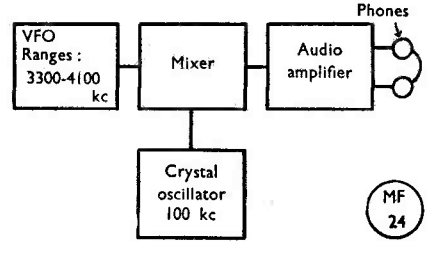


Fig. 1. Block schematic showing basic arrangement of the circuit.

necessary to change over the connections on either primary or secondary windings. When the oscillator is working nicely on 100 kc the crystal may be reinserted and the trimmers finally adjusted to give *zero beat with the 200 kc transmission.*

Other stations that may be used for calibration purposes are, of course, MSF on 5 mc and 10 mc or WWV on frequencies of 2.5, 5, 10, 15, 20 or 25 mc.

Now, the variable frequency oscillator is tuned roughly, with the aid of the receiver, to about 3,500 kc. The "correcting" trimmer may be set at about half capacity. Put the switch S2 to position 2, and a beat note should be heard in the phones. The dial can then be moved until this becomes zero beat. Once this position has been found, the receiver can be dispensed with. Tuning the variable frequency oscillator higher in frequency will then give more loud beat notes in the phones at frequencies on 3,525, 3,550, 3,575, 3,600 kc and so on. These beat notes will be louder than any others which may be present, and will be unmistakable. Their settings can then be noted on the dial and plotted on a graph.

Plotting the Graphs

It is recommended that each sheet of graph paper should cover 50 kc of range only; if this is done, not only will greater accuracy be obtained, but the three points in the range at which a strong beat note is heard will be found to lie on a straight line. The LF range

Table of Values

Fig. 2. Circuit of the Meter as described.

C1, C2	=	One half each of twin-gang tuning condenser taken from LF range of oscillator of the T1154 transmitter. (About 60$\mu\mu$F per section).
C3	=	15$\mu\mu$F correcting trimmer.
C4	=	180$\mu\mu$F mica or Ceramicon.
C5	=	100$\mu\mu$F
C6, C8	=	10$\mu\mu$F
C7, C9, C10, C12	=	0.01μF
C11, C14	=	0.1μF
C13	=	25μF
R1	=	1000,000 ohms
R2	=	5,000 ohms
R3	=	47,000 ohms
R4	=	1 megohm
R5	=	470 ohms
R6	=	47,000 ohms
R8, R10, R7	=	27,000 ohms
R9	=	5000,000 ohms
R11	=	500 ohms
RFC	=	2.5mH
Ae	=	Short pick-up wire.
S1	=	double pole 3-way Yaxley type
S2	=	single pole to change range
V1, V3	=	VR65(SP61)
V2	=	6K8, X65, ECH35
L1	=	24 turns of 24 SWG upon ½" former, tapped at 4 turns from earthing end

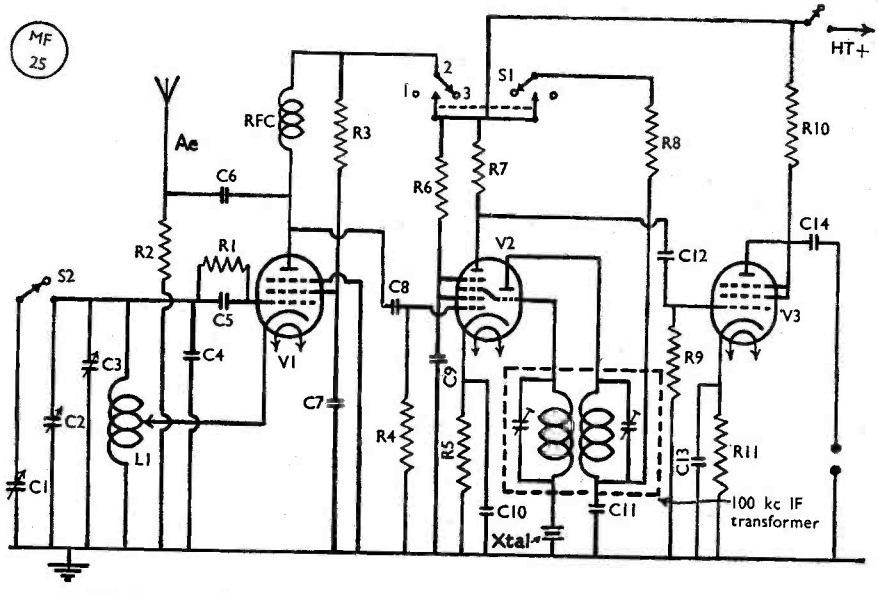


Fig. 2. Circuit of the Heterodyne Frequency Meter complete, as described by G3CFR.

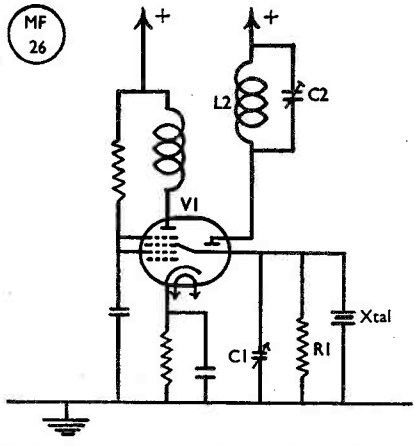


Fig. 3. G3CFR discusses the possibility of using crystals oscillating in the parallel mode; this is the circuit for it.

Table of Values

Fig. 3. CO circuit for Parallel Mode.

C1 = 3-30$\mu\mu$F trimmer
R1 = 100,000 ohms
L2, C2 = To tune to 100 kc.
V1 = 6K8, X65, etc.

of 2,250-4,100 kc is obtained by placing both sections of the recommended condenser in parallel, whilst the higher frequency range only requires one section to be in operation.

Graphs may be obtained if desired throughout the amateur bands (3,500-3,800 and harmonics) and then a gap left until the range 4,000-4,100 kc is reached; this is useful for calibrating crystals in the range 8,000-8,111 kc for 2-metre transmitter control. The LF range is also included for the calibration of 6 mc crystals for that same purpose, but is not quite so accurate as the range covered is greater.

The function of the corrector capacity is to compensate for long term variations in frequency of the variable frequency oscillator. Whenever a range is selected in which a frequency is to be measured, the switch S2 is set in position 2 and the dial rotated to the setting at which the graph indicates a check point should be heard. The corrector is then moved to give zero beat with the fixed oscillator, at this dial reading.

Operation

For measurement of a transmission frequency, the same procedure is followed; the switch S2 is turned to pos. 3, the dial rotated until the variable frequency oscillator harmonic is zero beat with the transmission, and the frequency corresponding with the dial setting is read from the graph. For reception, the oscillator can, of course, be heard on the receiver. All the ranges between 1.7 and 30 mc are covered by harmonics of either the variable frequency oscillator or of the transmitter.

This sort of frequency meter will be seen to have considerable advantages over the type relying on crystal oscillators, multi-vibrators and receiver dials. The fact that it is self-contained is itself a great advantage, as it may be made up in portable form (*e.g.*, the BC221). In practice, the dial is the item which determines the limit of accuracy (assuming the oscillator is mechanically stable), and it is suggested that such dials as the HRO or the design similar to that on the BC221 would be most suitable. The writer uses a dial which originated from ex-Service equipment, and gives a total of 1,000 degrees spread around a 2¾ in. diameter knob, for a 180 degree revolution of the condenser.

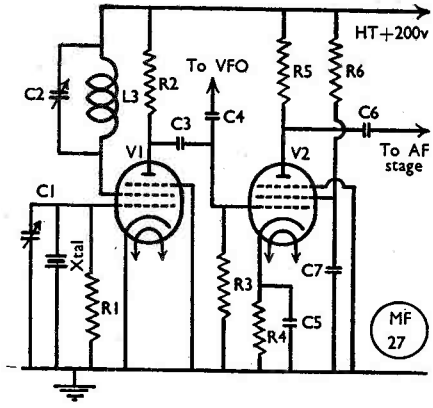


Fig. 4. Where it is desired to use two valves of the SP61 variety, as Pierce oscillator and separate mixer, the circuit can be modified as shown here; there is no particular virtue in having a combined oscillator-mixer.

It has been found that it is possible with such a meter to obtain accuracies of about 250 c.p.s. in the 3.5 mc band, which is well within the boundary set by the Post Office.

TVI SUPPRESSION

The Butler Filter

THERE are many ways in which to approach the problem of TVI. You can either watch TV yourself, or shut down during TV hours, or operate with QRP only on the bands from which you do not radiate squiggers on the TV channels—or tackle TVI as a problem to be solved.

It does not seem so many years ago that, to some of us, BCI seemed almost as insuperable a problem as television interference now appears to have become to many amateurs of the present generation, particularly those in fringe areas.

The elimination of TVI is certainly not easy—but then neither was the suppression of BCI when the offending receiver was a straight-three "melody-maker" owned by an aggressive individual a few doors up the road.

Approach

It could be done then, and it can be done now. The first thing is to make sure that the transmitter does not radiate any energy on TV channels when the aerial system is entirely disconnected, and the PA working into a fully screened dummy load. With proper choice of multiplier frequencies, complete screening and the suppression of squiggers in drive and PA circuits, it should be possible to operate a TV receiver in the same room as the transmitter without any trace of interference.

Some of the Factors

There are the usual provisos about this. The TV receiver itself must be one of those which *(a)* Does not have an IF in one of the amateur bands; *(b)* Does not produce from its own local oscillator harmonic beats in our bands; *(c)* Is itself fully screened internally; *(d)* Is not operated with an aerial feeder line at or near resonance at one of the transmitting frequencies; and *(e)* Can normally be used without having to screw the gain controls up against the stops.

If under these conditions there is no interference from the transmitter when operated with a dummy load on the desired bands, the next step is to couple up the radiating aerial proper. It is then that the (neighbour's) TV picture usually begins to follow the keying or otherwise shows the familiar signs of TVI.

Function of the Filter

And it is for this stage—between PA and aerial tuning system—that the Butler Low Pass Filter is intended. Attenuating very sharply at frequencies above 30 mc, tests show that, *providing there is no interfering signal radiated from the transmitter itself*, the Butler Filter will suppress TVI under actual radiating conditions, on any band, against any TV receiver satisfying conditions *(a)* to *(e)* above.

This Filter is designed for insertion in the low-impedance (72-ohm) feed line between transmitter tank and aerial tuning unit, which should be arranged for the usual link coupling. The primary function of the Butler Filter is to suppress any harmonics, at any frequency above about 30 mc, that may be present in the output circuit of the transmitter; obviously, it is these that can cause TVI, even if the transmitter appears (under the test conditions already enumerated) to be completely suppressed.

Full details regarding the Filter can be obtained from the manufacturers (Butler Radio, 17 Five Bells Lane, Rochester, Kent), who will also be pleased to advise users on their individual TVI suppression problems.

And we might add that there are several well-known makes of TV set that appear to be unaffected by amateur transmission on any band, at any range. On the other hand, there are several equally well-known makes which are of such poor basic design that their IF's are actually planted in one or other of our bands! No amateur should allow himself to be compelled to close down to avoid interfering with such a receiver.

USEFUL TV BOOKLET

For those possessing a commercial TV receiver, or otherwise non-technically interested in television, a new booklet entitled *Television in Your Home* is worth having. In 64 pages of seven chapters, it discusses TV strictly from the angle of the viewer who wishes to get the best results from whatever receiver he may possess (or contemplate buying) without having to learn the technicalities. The price is 2s. 2d. post free, of the Books Dept., Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.

ADAPTING RECEIVERS FOR TOUCH TUNING

Operation for the Blind

By **W. KROHN, C.S.P. (G6KJ)**

The author of this article is an active amateur who, having been blind from birth, has never actually seen any of his gear. Yet he is able to build and operate equipment with the same ease and certainty as his sighted friends—and indeed is an experienced amateur, having been licensed for well over 20 years. His article is an interesting discussion on the practical problems of adapting an SX-24 for touch tuning.—Editor.

ONE of the first problems facing a blind operator is to equip himself with a good standard communications receiver which he can use with complete independence, and after several years of comparative floundering, this was found in the famous National HRO. With its splendid slow-motion dial engraved with degree markings which can be easily *felt*, this receiver requires no adapting at all except for identification marks on the coil packs. This is achieved simply by fitting soldering tags under one of the fixing screws in the corners of the frames enclosing the grapns, putting a tag in a different position on each coil.

In spite of success with the HRO, the search has gone on for other receivers which can be easily adapted for use by a blind operator without too much mechanical complication, expense, or disfigurement. But it was not until a few months ago, when a Hallicrafter SX24 became available, that it was possible to extend these researches. This receiver also can be adapted in a reasonably simple way, and although so far the same accuracy of handling has not been achieved as with the HRO, the writer is satisfied that it is only a matter of careful operating practice to get equally satisfactory results.

The SX24 Modification

The first thing to do is to remove the existing band set and band spread dials. Take out the four self-threading screws (two at each end of the top edge of the cabinet) which secure the frame of the hinged cover, then lift out the front edge of the frame. Loosen the rotating dials on the spindles. Remove the four screws and nuts securing the band set dial cover, when by springing the panel slightly forward it should be possible to slide the cover out. The circular dial will then come out through the hole in the panel.

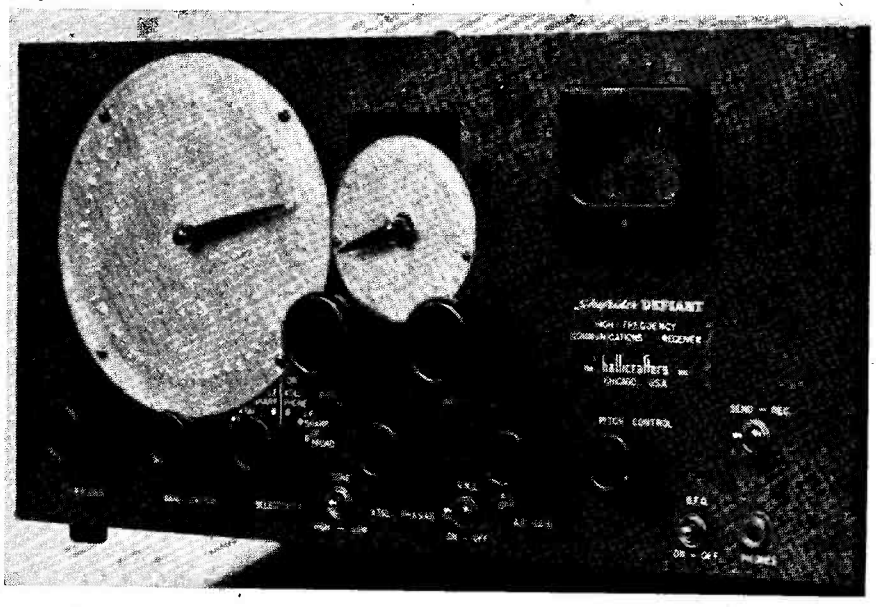
Now remove the three screws securing the band spread frame on the panel—this is a little tricky, as the bottom screws are not accessible—and then extract the band spread dial. This is the most difficult operation, as there is very little space between the end of the spindle and the back of the panel, but a little judicious "brute force" achieved it, as the object here was to try to do the job without removing the receiver from its case. Now, with a fine hacksaw blade, cut a small piece out of the panel in the bottom edge of the band spread opening to expose the spindle. Before doing this, slip a piece of stiffish folded paper between the panel and the chassis to catch as much metal as possible. This cutting can, of course, be avoided by drilling a hole accurately opposite the end of the spindle—but the cutting is easier, as the drilling of a hole at least half-an-inch in diameter in a springy panel is a difficult operation.

The Touch Dials

For the bandset dial, a 6½-in. disc of light gauge aluminium is marked with the "minutes of a clock face," embossing double dots at the points which would represent the hours; this disc is drilled half-inch at its centre and secured to the panel by four short screws and nuts.

A brass boss drilled quarter-inch to a depth of ⅝-in. is slipped through the dial on to the spindle and tapped for a grub screw. Slotted and screwed into the end of the boss is the pointer. The pointer is fitted with the main set of condensers at minimum capacity, and fixed to read "12 o'clock"; the smaller bandspread dial is fixed in the same way. Adequate clearance of the boss in the dial is most important, as any binding may cause the belt drive to slip.

In applying the same method of fitting and marking to the bandspread



The SX-24 as modified by G6KJ for tuning by touch. Himself a blind operator, he designed this system and carried out all the mechanical work entirely unaided. With the receiver modified as shown, he can get within a few kc of a given frequency on any amateur band covered by the SX-24. The large dial is bandset, and the smaller bandspread, as in the original.

dial, it was punched with two rings of markings; the conclusion since reached, however, is that this is pointless—it is, in fact, confusing to the touch to have too many markings, as any blind person will appreciate. Like using a Braille watch, it is only a matter of practice to achieve a high degree of accuracy in reading.

Operation

On the SX24 I now know that if the wave switch is on "two" and the bandset pointer at "three minutes before nine" (in other words, at 84 degrees) the bandspread covers the whole 80-metre band; similarly, with the switch at "three" and the pointer at "three-quarters of a minute before five," the bandspread covers 40 metres.

The marking out of these dials is not at all a difficult matter for a sighted person, but as the writer is stubbornly independent, a most satisfactory machine has been devised with which any dial from two to ten inches in diameter can be punched, dividing the circumference into tenths or multiples of ten, or twelfths or multiples. The markings are done with an adjustable automatic spring punch so that the embossings come out reasonably even. The fundamental idea for this marker is due to Stanley Wartenberg (W2ET), who wrote a splendid article on making Braille dials for the *Braille Technical Press*. In the writer's machine the positioning of the disc to be marked is achieved by a rachet; hence the spacing of the markings is dependent on the number of teeth on the rachet wheel and the number of notches counted between each punching. Being in the fortunate position of having a lot of useful tools, including a small power-driven lathe, it was possible to make at home every part for the marker except the gear wheels. There is no doubt that many other types of standard communications receiver could be similarly modified for accurate use by blind operators, and it is hoped to take the idea further as opportunity offers.

DX COMMENTARY

CALLS HEARD, WORKED & QSL'd

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

ANOTHER month of pretty good conditions, considering everything. The LF bands have been excellent. Ten has been very poor; Twenty has been varying from passable to very good. We find that the DX enthusiasts are in two divided camps over this business of conditions. The one goes out of its way to say that they have been excellent, spectacular, brilliant, marvellous, and all the other adjectives; we suspect this crowd of a certain amount of bravado. The others say "Not much doing, as usual," and leave it at that. The curious thing is that some of the latter seem to have worked just as much DX as some of the former. So we back out of this argument and leave it to a psychiatrist.

The fact remains that when we get a large number of stations on the air, notably for a week-end contest, conditions usually give the *appearance* of being good. The *CQ* DX Contest produced such an effect. Apart from the high level of activity, a few unusual DX stations appeared. One such was YJ1AB, who suddenly turned up among the ZL's on about 14100 kc and worked just a few G's before fading out. On other mornings, when things have been quieter, a lack of ZL and VK signals has made it worth while to listen round very carefully, and one has been rewarded, now and then, by a VR2, a ZM6, or some similarly rare specimen.

The old motto applies as much as ever: "If you don't hear it you can't work it—and you won't hear it unless you spend an awful lot of time listening." How long does *your* patience let you listen before you somehow find yourself sending "CQ DX"?

The DX on Twenty

Some of the habitual twenty-metre users have migrated to the LF bands, leaving rather more room for the remainder. But short-skip doesn't make it easy, especially when we have French and Italian phone (or should we say spitch?) working on 14030, 14050 and 14100, to say nothing of Russian commercials on 14010 and 14070 kc. At times the band has been no place for anyone wishing to retain his sanity and his nice pure habit of speech!

Many of the 'chasers managed to raise 3A2AB before he finally left Monaco. This, by the way, he did some days ahead of schedule, largely on account of his disgust (he says) at the low standard of operation. He told us that the G's were not far from the bottom of the list in this respect, and that he

would have given lots more of them a QSO if only others had had the sense to make it more snappy. As he said at the time, "Why on earth tell me the QTH, power, type of aerial and receiver, name is Fred, and all the rest, when there's a queue waiting . . . . as if I cared, anyway!"

We gave him his last QSO before he pulled the big switch for good, and were thrilled to hear him come on phone with Leon Deloy, the original F8AB, at the mike. F8AB, famous for his 25-cycle raw AC in the very first Trans-atlantic tests of nearly 30 years ago, has been out of radio for a long time, but now lives in Monaco. We gathered that this was Leon's very first phone QSO!

Then there has been an FI8BK on the band; whether he is genuine we don't yet know. VU8AL is said to be with a Himalayas expedition in Bhutan; FG8AL has been on from Guadeloupe, and FG8AC is also reported; furthermore, we hear that W4LVV is going there and hopes for an FG8 call. VK9QK and VK1YG have brought joy to a good many hearts, and YJ1AB we have already mentioned. ZS8MK has been on the LF end from time to time, but woe betide the lid who calls him when he is in QSO with someone else; we heard one or two getting some rough treatment! (This, we may add, caused us much pleasure.)

Two "funnies" we heard during the Contest were DP4CC and DP4CG; does anyone know more? We assumed they were just a couple of unlicensed Germans.

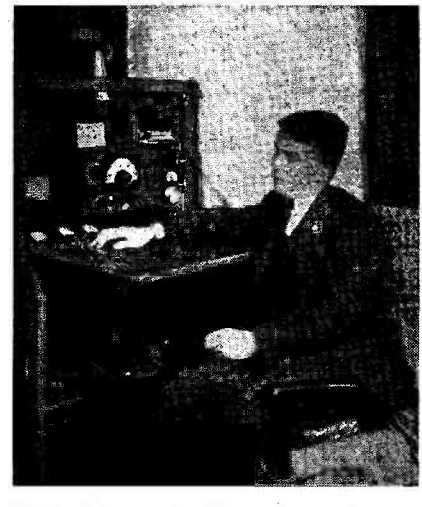
G6BB (London, S.W.2) raised F9QV/FC, 3A2AB and ZE3JO for new ones. G2BBI (Westcliff) found EA6AS and EA6AT on phone. G6AT (Hampton Hill) says he is an expert at picking the dud times on the band—and there certainly are plenty to choose from.

New ones for G5FA (London, N.11) were 3A2AB and FQ8AB; other DX included KH6, KR6, KL7, VU, VQ4, VS6 (all on CW) plus TI2HP, VP6, EA8, MT2, EA6 on phone. G3FGT (Birmingham) managed to work VK1YG, ET9X, and also KG6, KH6, VS6, VQ2 and 4, as well as a lot of the less difficult stuff.

G3GUM (Formby) is a man to watch; after three months on the air he is in the table with a score of 33Z and 82C. New ones for him during the month were FY7YB, VQ9AA, ET9X, VP1AA, ZA1A, 3A2AB, and a good many others. The nicest one missed was W6RGD/HL1, heard working KG6 several mornings. 'GUM is aiming at the Century before December 31, and, at the present rate of progress, should get there with some to spare. He asks what now happens to WAZ, with AC4YN and AC4RF presumably off the air? One can only hope that things will settle down and that they will possibly start up again, but it does seem unlikely. Even if some C8's come on, it will take a long time to find whether they are genuine, and probably the QSL situation will be impossible.

G3ATU (Roker) thinks there are now three HV1A's on the band—one on phone, one T9 and the other T6 and calling himself "Don Guiseppe"! (We have, since last month, had a letter direct from Vatican City Radio, which makes it quite clear that no HV's have *ever* been licensed.) Nice new ones for 'ATU were VR1C (1900), VQ8CB (1600), 3A2AB and ET9X. Others of interest were VR2BU (0800 on a "dead" band), VK9QK and VK1YG (1630). Another one heard was EAØAB, Spanish Guinea, on 14080 at 2000 GMT.

G2HKU (Sheerness) has come up against some of G1BF's pals, his CQ's having been replied to by both FO1OL



G8UN of Prestwich, Manchester, believes in taking his radio in comfort. Though licensed since 1938, he has never gone QRO and the main interest still is phone on Twenty with 10 watts to an 807. The Tx is VFO controlled, the aerial a folded dipole fed with 300-ohm ribbon, and the whole outfit is relay controlled. And when the top and two lower doors of the operating desk are closed, none of the gear is visible—an ideal living-room layout.

FOUR BAND DX

Station	Total Score	3.5 mc	7 mc	14 mc	28 mc	Countries
W2QHH	445	73	72	196	104	197
G6QB	442	41	81	187	133	210
G3ATU	408	27	87	194	100	202
G2VD	362	29	68	164	101	171
G2WW	349	21	53	170	105	181
G2AJ	337	21	54	169	93	185
G5FA	327	21	97	137	72	150
G2AVP	297	28	73	164	32	171
G3FNJ	290	24	53	120	93	150
G6BB	274	30	69	121	54	136
G8PW	253	20	60	115	58	129
G2BJY	249	4	25	115	105	150
G3FGT	239	33	42	110	54	129
ZB1AR	233	31	45	113	44	120
G8VG	226	27	61	112	26	128
G2YS	214	24	33	117	40	130
G3ABG	212	22	62	121	7	127
C6QX	208	19	35	108	46	123
G2FYT	197	5	35	126	31	133
G3FXB	188	21	48	88	31	101
G2VJ	173	4	13	100	56	116
G6TC	173	11	45	99	18	107
G2HKU	168	1	42	111	14	120
G6AT	160	21	46	92	1	97
GM3EST	158	20	23	113	2	117
G2DHV	146	22	20	92	12	96

and UR1BF. The former gave his QTH as "Twitti," which sounds just about right. G2VJ (London, S.E.22), on phone, has worked YI3ECU, PK4DA, VS1DZ, XZ2SY, EA6AF and 3A2AB.

G2BJY (West Bromwich) has at last gone QRO and is now using 150 watts. But he *did* make DXCC and EDXC with 25 watts, which was well worth doing and none too easy. Before leaving his QRP he worked three new ones—VK1YG, VS2CP and ZD6EF. Others on 14 mc were CR7, KP4, KH6, ZA, VQ2 and 4, and ZE.

Forty-Metre DX

Carrying right on with G2BJY, but now on Forty, he has been surprised by the way the DX has rolled in. Not only working W's (including 6's), ZL's and 4X4BX, he has heard FM7WF at 2200. G2HKU was delighted to raise a W1 in Vermont, after searching for one on 14 mc for years. He, too, has worked ZL, VE and W's, and has heard VE8AD (at 0630).

G6TC (Wolverhampton) finds the W6's quite easy to raise around 0700, and on some evenings he has worked other W's as early as 2000. (No one yet has reported a W6, *via* the long path, in the afternoons.)

G3ATU found a good one—LB9AC on Hope Island, Spitzbergen. Others of interest were CX1FY, HP2RO, FM7WF, VS7KR and VP8AK—yes, all on 7 mc! G6BB raised UN1AE, VS7KR, ZS2TK (at 0650), M1C, EK1AO and some less usual Europeans. G3FGT worked two 4X4's, MF2AB, innumerable W and VE, and heard VP8AJ, 8AK, VS7NG and VU2EC.

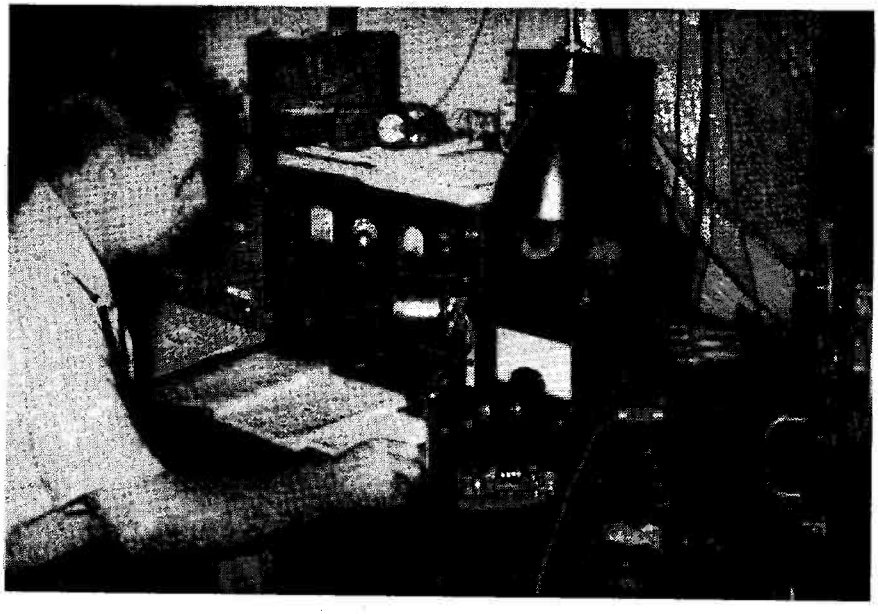
G5FA collected ZD4AB and UN1AE for new ones, plus HZ, MD7, KP4, FA, CN, 4X and 9S, as well as all W districts.

G2AVP (Debden) has returned to the fold after a long absence due to some hard work on a course. He has been mainly on 7 mc, and has accounted for 18 new countries since October 22. Among them are UN1, UL7, KP4, EA6, HK, ZD4, FM, VP9, CO, CT3. He has noted several South American breakthroughs and says that sometimes, at 2200, the band is full of LU, PY, HK and CE at S6-9. Some very nice stuff has been *heard* on the band, such as VK1RF, KH6, VP8, HH, KZ5, YV, CX, VU, VQ4, VQ3, KV4, VP1 and EL. (No one yet seems to have mentioned PK4DA, who came roaring through during the Contest.)

G3COJ doesn't like the band much, chiefly owing to "endless CQ DX calls by G stations, who should know better." He heard VS7KR at 0100, FM7WF at 2330, plus the usual VP8's, ZL's and the rest. G8VG (Dartford) worked TI2PZ, SVØWM, ZL, 4X and W5, and also heard FM8AD (0335), ZC4TF, ZD4AB, CM8CM (0520) and HC2IH (0545). But he finds broadcast and spitch growing steadily worse, making it more and more difficult to dig them out.

The Month on Ten

G3EHY (Banwell), who is a well-known VHF operator, sends interesting



One of the keenest and most successful exponents of DX working on 7 mc is G5FA, New Southgate London, N.11. He finds the stuff in spite of Spanish BC, Russian jamming and BBC harmonics.

news of an "Aurora opening" on 28 mc. On October 28, after the band had been dead for some time, weak signals began to come in from the North. Suddenly GM's, GI's and stations in the North of England were heard working each other, all with beams looking North, and 'EHY had a solid QSO with GI6VU—S9 with flutter. LA8AB and SM3WL were also heard, but they were working each other and not aware of the Aurora.

G3COJ has found a great improvement in the band, with most parts of the world audible, though erratically. He even heard an XE on 28 mc CW—a DX piece which a lot of people have long been coveting. G2BJY found conditions poor on the whole, but good for South Africa, although all the activity was on phone. G2BBI worked CR4AD on phone.

New ones for G5FA were ZD4AB, HZ1KE and KS4AC. He also worked TA, ZE and a few W's.

G2HIF (Wantage) has not written since the close of the last 28 mc season, and, as he says, "What a difference!" But he managed a WAC, on phone, in 3½ hours, with the W the hardest to get. He finds things most unreliable now, as even an S9 contact is liable to peter out suddenly. 'HIF is in the middle of big trouble with TV; in a "double-fringe" area, within a few hundred yards he has eight sets on Sutton Coldfield and about the same number on London, which doesn't make suppression problems any simpler.

Eighty-Metre DX

There has been a surprising lack of DX activity on 3.5 mc, although the band is always pretty crowded. G6QX (Hornchurch) has, however, been working W's as nearly as 2230, with W1BOR, 1DHD and 1IZQ outstanding. He got 579x back from them too. G6BB raised YO6CA, YU2DGL and LX1JW for new ones. G3FGT worked ZC1DG—a very nice Asian if genuine! — and also UA3HS, who, he says, was in great demand. He, too, raised LX1JW.

We happen to know that the ZL's are there almost any morning, and many other nice pieces of DX are possible. The stumbling-block to a quick WAC on 3.5 mc seems to be Asia; but every time we think of that we look up at ZC8PM's card on the wall (for two years ago) and smile a seraphic smile. [Over

G3GUM tells us that G3ATO, nearby, with 6 watts and one crystal on 3527, worked ZL2CQ one morning. Fine work!

Top Band Topics

Apart from the terrifically high level of activity which "MCC" seems to have stirred up this year, there is no shortage of Top Band DX. DL2QM, for instance, told us that he was hearing dozens of G's at *mid-day* on a recent Sunday, but most of them were too engrossed with locals to take any notice of his calls (QRM was probably the real trouble).

G6AB (Holland-on-Sea) broke fresh ice by working UR2AA (Tallinn) at 2345 on October 21. UR2AA told him that he would be on at midnight on Saturdays in future, round about 1910 kc. This was probably the first G/UR contact—any other claimants?

G2NJ (Peterborough) worked OK1AWA (Prague) at 0045 on November 4; the OK was using 50 watts. 'NJ also heard DL2QM at 579, as early as 1625 GMT, and the DL told him he thought DL2DV and 2OZ would be on the band soon.

Then, during MCC, we heard stations working OK1AJB and others calling I1ATS. Whether the latter is genuine we don't know; there hasn't been an I on the band since the days of G6ZO/I in 1946, so far as we are aware.

G3FGT has been doing some infra-QRP work, and with half-a-watt to a 6J5 he achieved DL and OK and also had a cross-band with PAØJA, who was on 3.5 mc. Nice going for flea-power.

The other Top Band news is, of course, the series of *Short Wave Magazine* Transatlantic Tests that begin early in the New Year. Full details are repeated in the accompanying panel. There are several important points to note, so we will emphasize them here: Synchronise your clocks and call at the right times (0505-0510, 0515-0520, and so on); *Do Not* call W's on their own frequency or anywhere above 1800 kc; and, preferably, do not call "CQ W/VE" above 1775 kc. You have the whole area of 1715-1775 kc in which to call CQ; leave 1775-1795 for answering W's and (we hope) working them.

It would be the height of absurdity if the W/VE periods were all occupied by W's and VE's calling CQ Europe, and the European periods by ourselves calling CQ W/VE; someone has got to reply to someone else sooner or later. So listen *more* and call CQ *less*. And remember, it is a Test and not a Contest.

ZONES WORKED LISTING

POST WAR

Station	Z	C	Station	Z	C
Phone and CW			**Phone and CW**		
G6ZO	WAZ	227	G8PW	38	129
G6RH	WAZ	224			
G6QB	WAZ	210	G3ABG	37	127
G3ATU	WAZ	202	ZB1AR	37	120
G2FSR	WAZ	196	GM3EST	37	117
G4CP	WAZ	195	G2GM	37	110
G3DO	WAZ	191			
G8IG	WAZ	181	G2FYT	36	133
G5YV	WAZ	172	G2YS	36	130
G2VD	WAZ	171			
G3BI	WAZ	162	G6QX	35	122
G3TK	WAZ	157	G2HKU	35	120
G3AAM	WAZ	154	G6TC	35	107
G2IO	WAZ	152			
G3YF	WAZ	152	G3FGT	34	129
G3AZ	WAZ	133	G6AT	34	97
G8IP	WAZ	132	G2DHV	34	96
G5BJ	WAZ	126			
G5VU	WAZ	124	GM3CVZ	33	103
			G3GUM	33	82
G2AJ	40	185			
G2WW	40	181	G2BBI	30	100
G3FNJ	40	150			
G6BB	40	136	**Phone only**		
G3BNE	40	128			
G5MR	40	125	G2AJ	38	153
G3DCU	39	159	G3DO	37	154
GM3CSM	39	158	G6WX	37	128
G5FA	39	150			
G8VB	39	149	G8QX	36	139
G3CVG	39	145	G3COJ	36	132
G3BDQ	39	138	G2WW	36	121
G3COJ	38	153	G2VJ	34	116
G2BJY	38	150			
G3AIM	38	130	G2BBI	30	97

The Overseas Mail

VS6BW/G3AQZ writes from Hong Kong with some nice QTH's which appear in the box herewith. VS6AC also writes, to say that he will be on 7 mc this winter and hopes to work G's. To show that it's possible, he has been listening and has logged the following on 7 mc: G2ASY, 2BTX, 2HFO, 3AAG, 3BTA, 3DMG, 3DRY, 3EDW, 3ESA, 3FBN, 3FSK, 3GPP, 3GVQ, 4XC, 5UI, 8KP. He also logged GW4CZ, R4 and S6, the only signal audible on phone.

VS2CP (Kedah) says 14 mc conditions have been very poor and wonders whether to have a serious crack at the LF bands. We certainly hope he does. The VS1's and 2's have to observe tolerances at the band-edges, amounting to a loss of 7 kc at each end on 1.7 and 3.5 mc, 12 kc on 7 mc, 20 kc on 14 mc, and 35 kc on 28 mc! At all events, it does give them space to look for DX without any local QRM, but they probably don't look on it like that. VS3, he

tells us, is definitely non-existent now. VS2CP has now managed his rebuild and is running 150 watts on 14050 and 14100.

HZ1KE at Taif, Saudi Arabia, is still very interested in the Top Band and will co-operate in contests and the like. But he says that a portion *must* be set aside for DX stations. He has heard and called many stations but only worked one—G5LP. HZ1KE has very efficient gear available for all bands from Two to One-Sixty—plus time and enthusiasm—but pleads for some good planning at this end.

YI2UW is now home again, and at RAF Innsworth, Gloucester. He hopes to be on with an /A call soon. W2QHH (Hamilton, N.Y.) continues his phenomenal climb up the Four-Band ladder (not that he has very far to climb!) and is looking forward to the winter season on 3.5 mc very keenly. His present score of 73C on that band is pretty terrific, but he is always on the beat for more.

A real live QSL card from MD9AA confirms that he was in Yemen and adds the welcome information that he will be there again during December. He is very much under cover but perfectly genuine.

DX Miscellany

G3COJ's aerial "score" is now 35 different types. We really must try to count our own attempts one day! 'COJ has, at present, an 8-element on Two, a 3-element on Ten, a 3-element and another beam on Twenty, plus a ZL Special and a dipole.

G3ABG (Cannock) had his YA2B card returned from Box 25, Kabul; but his DXCC arrived, which cheered him up. He worked a nice lot of DX on 7 mc during the *CQ* Contest and is now on the Top Band, hoping that TA3FAS will show up. G6DN (Manchester) tells us that the former SVØAM has had his call changed to SVØAN, and will send cards to all who worked him with the old call.

The former G3CDR has had to "lend" his call to the GPO again during a second period in the Far East. He hopes to visit VS6AC and make some contacts from there. Meanwhile, he asks the gang to keep an ear open for him from ZB2, ZB1, VS9, VS7, VS1 and finally VS6!

G5YH (London, W.4) wants to register a violent protest against the shocking quality of too many G signals on CW. He says most of them wouldn't have been tolerated in 1930. In particular, he flays the practice of keying the oscillator stage. He says he heard G5— calling CQ at 8 w.p.m. with a note like an old man with bronchitis, and then G3— apparently using raw AC. 'YH has had a burst of CW on 28 mc and has raised XE1PJ, VK6RU, ZS3K and some KS4's.

G3DCU (London, N.W.11) made 213 QSO's during the *CQ* Contest, giving him a score only slightly higher than that of last year, when he worked 28 mc only. He enquires about "M1AS" on 14 mc, who sounds mighty fishy to us.

SU1UU is O.K.! We have had a QSL-cum-Christmas card from him. He says his QSL's *will* arrive in time; he is under cover but genuine, with 25 watts.

The latest certificate for hunters of such is a "WXBAS," of all things. To translate, "Worked Ten Bruges Amateur Stations." It will be awarded

TOP BAND TRANSATLANTIC TESTS, 1951

The dates already fixed with W1BB, who is organising the American side of the tests, are as follows:

Jan. 14 and 28, 1951: 0500-0800 GMT
Feb. 11 and 25, 1951: 0500-0800 GMT
Mar. 11, 1951 : 0500-0800 GMT

It is also suggested that the late evening period is worth a trial, so that it has been decided to run two such tests as follows:

Jan. 20-21, 1951 : 2200-0200 GMT
Feb. 17-18, 1951 : 2200-0200 GMT

Please make a careful note of the following arrangements.

TIMES

W and VE stations will call from 0500 to 0505, 0510 to 0515, 0520 to 0525, and so on.

European stations will call from 0505 to 0510, 0515 to 0520, 0525 to 0530, and so on.

FREQUENCIES

W and VE stations will call between 1800 and 1825 kc. *European stations should not use these frequencies at all.*

European stations should call specific W or VE stations between 1775 and 1795 kc, but should not call CQ between those limits. CQ calls should be made *below* **1775 kc.**

LOG SHEETS

Log Sheets will be available by January 6, 1951 from 53 Victoria Street, London, S.W.1. It is desirable that they should be used by everyone participating in order that we may collect the same amount of data from every station.

It is hoped that many stations on the other side of the Atlantic will be co-operating, and the times and frequencies are being given similar publicity over there.

It is therefore essential to cut "free-lance" activity on this side to the bare minimum. Everyone interested will stand a better chance of working the DX if he adheres to the suggested rules, although this is *not* **a Contest.**

to anyone submitting proof of working ten of them after January 1, 1951. This, we think, is going a bit too far; what will happen when every town tries to do the same? (Worked 500 Londoners, worked All Ashby-de-la Zouche, and so on *ad infinitum).*

GM3FBA (Helensburgh) is working in Portsmouth and hopes to be G3FBA/A when down there. We are interested to note than *he* heard UB5BP when he was working GW3FFE on the Top Band last year; we didn't know that anyone else had noticed him.

Last month VQ6BFC was mentioned in connection with G3ATU. 'ATU asks us to state that the VQ6 worked a VQ4, at the end of which he sent "CL" firmly three times and has never been heard of since.

1951 Four-Band Marathon

We have decided that the Four-Band table gives an unfair advantage to those who were able to work 28 mc in the palmy days of 1946—witness our own 28 mc score, which has hardly increased in the last three years. Just to keep everybody awake on all bands, we propose to run the table in the form of a 1951 Marathon, starting (not unnaturaally) on January 1. So, after that date, get cracking, keep your log nice and neat, and you will have no tróuble in putting in your 1951 scores month by month. The placing on the ladder will be, as now, by the figure representing the total of the different figures for each of the four bands—*not* the number of different countries worked.

So that gives you a chance to derive a small thrill from working an OZ, ON or OK on 3.5 mc, or even a DL2 on 28 mc! And we should like to appeal to *everyone* to join in this one, which should be fast and furious for the first four or five months, anyway. Some of those high-scorers who are too modest to report will now have a chance to begin at the bottom again. Send your first report in mid-January so that we can start the new table in the February issue. Who will be the first away to a flying start?

Pirates

In response to numerous appeals not to waste any more space on this unsavoury subject, we have decided to drop it. (We never did like it, anyway.) Seeing that these pleas have come from places as far apart as ZL and OZ, we are glad to oblige. Your piracy worries should be forwarded to the GPO, please, not to us. And please read the paragraph on the subject on p.621 of the November issue, which explains much.

This is the last time we shall be seeing you all before Christmas, so we must take this opportunity of wishing you a Merry Christmas and a Happy New Year. Let us hope that 1951 will mean working W's and VE's on Top Band, WAC on Eighty, and all the other thrills you can mention. And those wishes go for I. McLott and Arabackle, too.

Deadline for next issue is **first post on December 14,** and, for the following month, January 15. So 73, BCNU and "Mri Xmas."

DX QTH's

C3KS, C3MC	Box 1, Tanshui, Formosa.
C9AA	Box 508, Talienwan, Manchuria.
EQ3FM	APO 205, c/o Postmaster, N.Y.C.
ET9X	QSL via W2SN (*Stn. at Addis Ababa*).
FK8AH	Robert Garbe, Tontouta Airfield, New Caledonia.
FQ8AC	Box 175, Bangui, French Equatorial Africa.
KC6WC	Civ. Ad., Unit 3054, c/o F.P.O., San Francisco.
KR6ET, KR6FE	APO 239, c/o Postmaster, San Francisco.
KR6CF, KR6EP	APO 331, c/o Postmaster, San Francisco.
MI3VG	Box 513, Asmara, Eritrea.
VK9QK	Govt. Aerodrome, Lae, New Guinea.
W6RMG/HLI	Box 743, Spring Valley, Calif. (*Stn. at Pusan, South Korea*).
ZA1A	Box 55, Tirana, Albania.

MINIATURE GEAR

Some interesting designs have recently been published of transmitting equipment devised to pack the maximum efficiency into the minimum space—in fact, portable transmitters have become, in general, smaller, lighter and more compact than the receivers with which they are operated. This prompts us to ask whether there are any readers who have been equally successful with miniature receivers, either straight or superhet, on the same lines and designed for normal amateur band operation. If so, we would very much like to hear from them, if possible with a photograph of the set.

FIRST CLASS OPERATORS' CLUB

The winner of the Marathon Contest for 1950 is announced as G3BDQ (St. Leonards, Sussex), and the silver cup—one of the Club trophies—was presented to him by the President at the FOC Dinner on November 25. During the Marathon, open only to members of the Club, the best contact was that between SM5DZ and KV4AA. The DX contest, another Club event which has now been "run off," will be reported in the February issue, as logs are not due in till after these notes appear.

Progress

With this issue of *Short Wave Magazine*, the FOC completes it fourth year of post-war activity. Membership has increased steadily till it now stands at over 300, in 31 countries—and be it noted that all these members are qualified at the high standards demanded by the rules. It has never been the object to enrol as many members as possible; rather, the intention has been, and still remains, to attract into the FOC those amateurs who can not only qualify at the operating standards laid down, but are also imbued with the spirit of Amateur Radio in the best and widest meaning of that term. The result is a happy, well-knit and smooth-running organisation, characterised by a "mateyness" not always found in bodies covering such a wide range of diverse types as go to make up the membership of the FOC.

And with this it is well to pause a moment to remember G2ZQ and G5BW, the original founders of the First Class Operators' Club, who strove so hard in pre-war years to make it the success it has become. They have both passed on long since, but we may believe that they would approve the outcome of their pioneer hopes and aspirations.

The world of Amateur Radio also mourns the passing, quite recently, of VK4RC, who was an FOC member and a well-known enthusiast for many a DX Contest; his callsign rang round the world.

FOC Committee

As more nominations for the 1951 Committee were received than there were vacancies, a ballot became necessary, and the result will be announced in Circular Letter No. 41 dated December. A copy of this is being posted to every member individually, the rota system being dropped for this one issue. Any member who does not receive C/L 41 is asked to write G2ZC.

The Club Dinner

This took place on the evening of Saturday, November 25, at the Aldwych Brasserie, London, and was attended by 66 members, with the President, G2NM, in the chair. We were glad to welcome 2 overseas members and to see so many old-timer G's who are members of the Club. As in previous years, the evening was a joyous and successful occasion, organised as a "get-together" rather than as a formal meeting—though indeed it is the only annual meeting that the Club holds. A full account of the Dinner will appear in the next C/L.

Election Notice

In accordance with the Rules of the Club, the following are declared elected to the active membership list of the First Class Operators' Club:—

J. Christie, GM3FXM (Burntisland); A. Bertemes, F3NB (Citè de l'Air, Athis-Mons); T. Holbart, G3DXJ (Reading); B. Farleigh, G4RJ (Kingswear); and G. N. Roberts, G3ENY (Walton-on-Thames).

All communications respecting the First Class Operators' Club should be addressed direct to: Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey. *(Tel.: Farnham Surrey* 6067).

TRANSMITTER FOR TEN

Three-Stage Job Designed for the Band

By **W. J. CRAWLEY (G2IQ)**

There can be no doubt that while it is entirely possible to arrive at a reasonable compromise for gear to cover the bands 3.5 to 14 mc effectively, the change in frequency from Twenty to Ten is such as to demand quite separate equipment for satisfactory operation on the 28 mc band. Our well-known contributor discusses this matter with particular reference to 10-metre transmission and the present trend for "table-top" units.—Editor.

THE conventional rack-and-panel outfit which has been in vogue for nearly two decades appears to be giving way to the small table-top type of transmitter. The new trend has several advantages from the amateur point of view. Generally speaking, the rack transmitter is an unwieldy affair, and any amateur who has had to replace a burnt-out bleeder resistor underneath the main power pack chassis will agree that servicing a rack-built job is a physical effort as well as a mental feat. The first feature, then, that commends the smaller rig to the amateur is its accessibility, and so the ease with which adjustments both above and below the chassis can be made. If something has to be done, it is much simpler merely to turn the whole assembly on its side than it is to remove it from the rack and re-assemble it once again on the work bench.

Improved Efficiency of a One-Band Transmitter

Another point where this new trend scores is the better average efficiency that it is possible to obtain from the smaller rig. In view of the twitching eyebrows that will probably greet this contention, the writer had better explain what is in his mind. The majority of amateurs today seem content to specialise in certain aspects of their hobby. For example, there is the VHF man who is experimentally-minded; the DX man, who works mostly on Ten and Twenty and sometimes on Forty; the phone-only enthusiast, usually to be found on Eighty. It will be agreed that the number of amateurs who actually work on *all* bands is very small and that most specialise on two or three bands only.

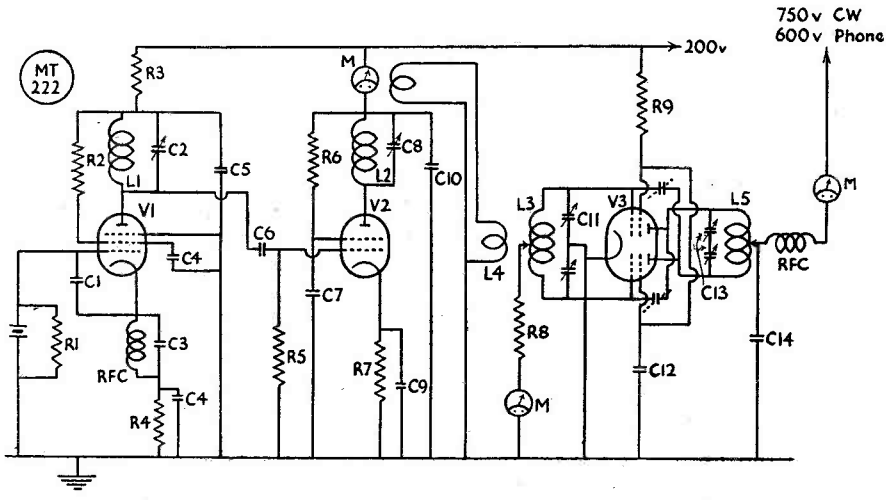
In the majority of cases, the need for a rack-built band-switched transmitter with its undeniably lower efficiency would therefore appear to be small. Nobody will deny that there is a loss of efficiency in a band-switched rig. Apart from RF losses in switching and long leads, there is the question of valves. Take for example the popular 813, a very useful valve up to 20 mc—but there are much more efficient valves for 30 mc. There must unquestionably be a loss of efficiency in a combined 7, 14, 28 mc transmitter which uses an 813 in the final. With competition so keen on the bands today, it is only common sense to use as efficient a transmitter as possible for a given input. Amateurs in countries where the 150-watt maximum does not apply do not have to be so particular, and a hundred or so watts lost in waste inductance need not worry them! But it is well worth while from our point of view to run the final at as high an efficiency as possible, and the small table-top one-band type of rig is the logical means of obtaining this.

It should be clear to the reader by now that the writer has in mind a separate small final stage for each of the bands worked. The main advantages may be summarised as: (1) Ease of construction and accessibility for adjustment and service, (2) Higher efficiency because each PA is a specialist on one particular band, (3) Less floor space, (4) Easier screening against TVI.

Objections may be raised to the idea of separate transmitters for each band on the score of cost. However, this need not be much higher than the complete rack-and-panel job, when the amount saved on ironmongery is accounted for!

Design for Ten

The small transmitter to be described is for use on 28-30 mc only and all the stages, including the PA which runs at the full 150 watts on CW and 120 watts on phone, are contained in the midget receiver type chassis measuring 10in. x



With a 7 mc crystal, it is possible to get full output on 28 mc using this circuit, as described in the text. The meters are for V2 plate (0-50 mA), V3 grid (0-25 mA), and V3 plate (0-250 mA).

5in. x 2in. It is not claimed that this small rig is the acme of constructional perfection, but its efficiency is high and its small dimensions may help to sell the writer's contention that power output and bulk need not be synonymous.

The transmitter is built around the type 829B valve, which is obtainable in the surplus market at a very reasonable price and is a really excellent final amplifier. It consists of two similar tetrodes in the same envelope with a pressed glass base, and is eminently suitable for the push-pull mode of connection, being capable of a power efficiency of around 80% at well over 100 mc. It requires very little drive, and, like most tetrodes, is said to be quite stable without neutralisation owing to its low plate-to-grid capacity. The writer, however, is rather cynical on the subject of neutralised tetrodes and has heard enough of the transmissions emitted by PA's using tetrodes without external neutralising to convince him that, generally speaking, neutralising *is* a necessity.

Line up of the Midget Transmitter

There are three valves only in the rig: a Pierce harmonic crystal oscillator using a 6AG7 type valve; a simple frequency doubler stage with a 6V6 driving the final to full grid current; and this 829B PA.

Table of Values

Circuit of the Tx for Ten

C1 = 15 $\mu\mu$F mica
C3 = 50 $\mu\mu$F mica
C6 = 100 $\mu\mu$F mica
C4, C5, C7, C9, C10, C12 = .01 μF mica
C14 = .005 μF mica, 1,000 v.w.
C2 = 50 $\mu\mu$F variable
C8 = 25 $\mu\mu$F variable
C11 = 25 × 25 $\mu\mu$F butterfly
C13 = 25 × 25 $\mu\mu$F split-stator
R1, R2 = 47,000 ohms, ½ watt
R3 = 2,000 ohms, 5 watt
R4, R7 = 500 ohms, 1 watt
R5 = 39,000 ohms, ½ watt
R6 = 33,000 ohms, ½ watt
R8 = 5,600 ohms, 2 watt
R9 = 500 ohms, 1 watt
L1 = 12 turns 18 SWG enamelled 1¼" former
L2 = 6 turns 18 SWG, enamelled 1¼" former
L4 = 1 turn link
L3 = 16 turns, 22SWG, C.T., ½" former
L5 = 12 SWG (*see text*)
V1 = 6AG7
V2 = 6V6GT
V3 = 829B

The Pierce harmonic oscillator does not appear to have gained the same popularity in this country as in America, and the tritet is still the most popular oscillator here. The Pierce circuit is simpler, easier on crystals and less likely to "take off" than the tritet. It may also be used straight through on the fundamental frequency

without damage to the crystal. The output is slightly less than that of the tritet, but there is more than enough for our purpose in this application. A 6AG7 valve is used with the suppressor earthed, as a valve with the suppressor brought out separately is preferable in this oscillator to one with the connection made internally to the cathode. Output at 14 mc is taken from the oscillator plate circuit, which is tuned by meaus of a midget 50 $\mu\mu$F variable condenser. The frequency multiplier is conventional and consists of a 6V6 GT using a combination of grid and cathode bias. Another midget variable takes care of the tuning of this stage, the output of which is link-coupled to the grid of the final amplifier. With but 200 volts on the 6V6 there is ample drive, and no difficulty should be experienced in this direction.

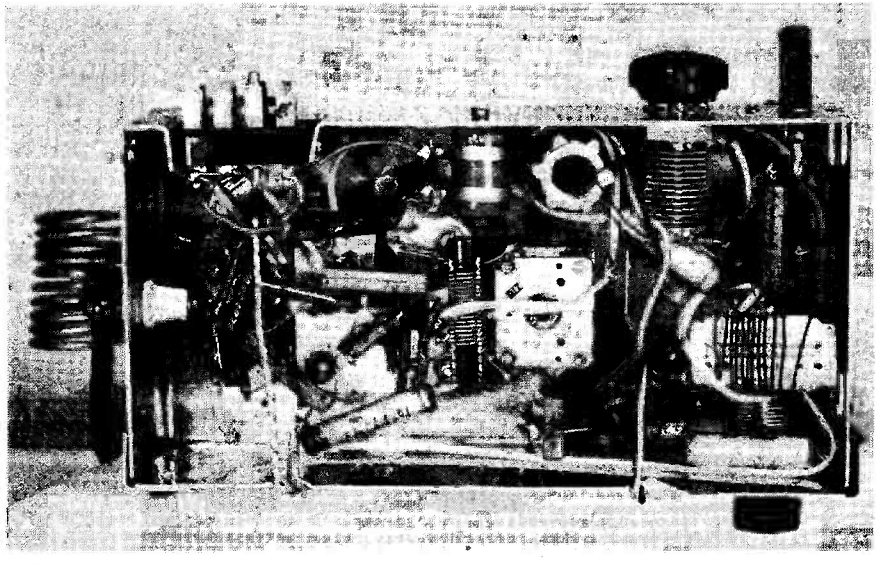
The Final Amplifier

The valve holder for the 829B is mounted one inch below the chassis, so that the internal screen of the valve is flush with the chassis. All earth connections are taken to one of the metal posts supporting this holder. The neutralising capacities are rather unconventional and consist of two pieces of bared coaxial cable, two inches long. Holes are drilled in the chassis very slightly less in diameter than the coaxial and adjacent to each plate of the 829B. The coax. is then pushed firmly through the holes so that about one inch protrudes above the chassis: the grid wires of the valve are then crossed over beneath the chassis and connected to the coax. under the chassis. The amount of neutralising capacity required may then be very effectively found by altering the amount of coax. protruding above the chassis. The valve is not too fussy about this, and one inch of 72-ohm cable will be found to be correct.

The plate coil has ten turns, centre-tapped, of 12 SWG copper wire, 2 inches inside diameter, and the ends are firmly attached to the lugs of the split-stator condenser and then well soldered. The leads to the plate tags of the 829B should be flexible to allow for expansion as the valve warms up.

Operation

The initial tuning should be done with the HT supply to screen and plate of the 829B disconnected. If the coil and condenser values have been adhered to, no trouble should be experienced in hitting resonance. The crystal stage runs at about 15 milliamps and the doubler at 30/35 mA. The grid current



Under chassis view of the ten-metre Tx described by G2IQ. A single-turn link couples the FD into the grid of the PA.

rating of the 829B is 12 mA, through a 5,000-ohm grid leak, but for Class-C phone operation slightly increased efficiency results from increasing this to 15 milliamps. With the grid current meter registering the correct current, the plate condenser should be swung slowly through resonance and the neutralising stubs moved up and down until there is no movement of the grid meter. The applied bias on the valve may then be read by means of a suitable voltmeter between the top end of R8 and chassis. This should indicate at least 65 volts negative, depending upon the amount of grid current. The plate and screen voltages may now be applied in that order, and the final loaded up to the aerial by whatever means is favoured at the operator's station. For phone work, the final ambles along at 600 volts 180 mA, whilst for CW 200 mA at 750 volts can be taken. The 829B is a particularly robust valve, and the writer has had one particular specimen in use on Ten (and Two Metres) for over two years, and, despite considerable use, it is still as good as new.

Conclusion

It is hoped that the foregoing will lead to some new trends in amateur transmitter design. The rig described can certainly be improved upon from the artistic point of view, and it is to be hoped that some who pride themselves on turning out really beautiful work will put their hands to the design of smaller transmitters. The point is that there is really no need for the ugly, clumsy rack-and-panel affair. Two or three small rigs similar to the one briefly described would be more efficient, less cumbersome and more easily de-bugged against TVI. That is the writer's opinion, anyway, so perhaps you'll think it over.

CARBON MICROPHONE GREMLIN

Chased Out

By **W. FARRAR, B.Sc. (G3ESP)**

THE job on hand at G3ESP was the construction of a low-power phone transmitter as a standby outfit on 40 metres and as an exciter for a higher power amplifier. It was plate and screen modulated, using a carbon microphone in the cathode of the first speech stage.

Having got the thing built, it was found that there was an unpleasant roughness on the speech as monitored in a nearby receiver. Surely it could not be the microphone! This was an ex-Air Ministry stand type (similar to a GPO telephone), and the signals from G2--, who uses a similar type, are not at all bad. So everything in the rig was checked, bias values changed, grid leaks changed, but the speech still stayed rough. Finally, it was decided to look into the microphone itself.

On hand were two other carbon microphones, one an ex-Service power-microphone insert, and the other a "home broadcaster." The former was very slightly rough, but much better than the GPO type; the home broadcaster, however, produced no traces of roughness at all. So it *was* the mike after all.

Examination showed that the GPO type and the home broadcaster had similarly made inserts, so the h-b insert was put into the GPO holder. Lo and behold, roughness was still there, though not so much as before.

The Solution

Now, the home broadcaster had just a wire mesh in front of the insert, whereas the GPO type had the usual mouthpiece. On removing this mouthpiece, and speaking at the bare insert, everything was fine, with no apparent roughness or distortion. At first it was thought that pressure might be exerted on the insert when the mouthpiece was locked on, thereby causing physical distortion. However, even if the mouthpiece was just hung over the capsule, it still caused distortion.

Finally then, the funnel mouthpiece was cut off with a hacksaw, and the hole enlarged as far as possible by means of a fretsaw, so that almost all the mike insert was exposed when the mouthpiece (if it can now be called that) was locked on. Result—good quality.

These ex-Air Ministry stand microphones have been widely advertised, and no doubt many amateurs are using them. If roughness in the speech is noticeable, don't say "Usual carbon quality!" then throw it away in favour of a crystal mike.

VHF BANDS

By E. J. WILLIAMS, B.Sc. (G2XC)

Contest Pre-View—

Activity and Conditions—

Seventycem Reports—

The Achievement Tables—

YOUR conductor is writing this offering of "VHF Bands" confronted by a pile of Contest Logs, and as there are still some days left for further entries to come in, there is every possibility of a record number being received. Entries have already arrived from ON, PA and even DL, and a quick check on the British logs shows that something like 170 G stations were active during the week-end. As a point of interest, over half of these were heard at G2XC, and that shows well how unevenly the activity was distributed over the country.

Under such circumstances, it is quite impossible to produce a scoring system fair to all. Amongst the claims so far received are three for more than 300 points; one of these comes from South London, one from the Midlands, and the third from the South-West of the country. This seems to indicate that the system adopted for these contests is as near the ideal as can reasonably be achieved. It is doubtful whether a scheme which will seem satisfactory to isolated groups, such as those in the Newcastle area, will ever be evolved and your conductor is not going to attempt to devise a handicap system, such as has been suggested by some competitors! It is quite generally realised that we cannot all start level. So many factors enter into the problem. Height-above-sea-level is not the only thing that matters. A man at sea-level but surrounded by flat country may be far better placed than the man at 300 feet, surrounded by still higher ground or screened in, say, the London direction. If allowances were made for that, the next claim for consideration would come from the flat-dweller who cannot erect a good aerial system; and after that the man who cannot operate on Saturday afternoon, or the church-goer who finds Sunday activity difficult. Indeed, it would need a stronger man than your conductor even to attempt to satisfy all these handicaps. We are absolutely certain that to try to produce any system of handicaps would result in a pile of complaints even higher than the pile of Contest logs at present on our desk.

Fortunately, the great majority of entrants recognise the practical impossibility of working out a scoring system guaranteed to give everyone a level chance. Those who happen to be badly placed if conditions are disappointing take part in a good sporting spirit, not necessarily with the idea of winning the Contest, but to enjoy it as an event and to make QSO's.

At the same time, let us assure entrants in Lancashire, Yorkshire and still further North that the difficulties under which they compete, especially if conditions are poor, are well realised. The only real remedy appears to be to produce more activity in those areas. But how to do that is, of course, quite another problem!

Comments from the Entries

As there is a scarcity of news other than that included in the Contest reports, it is thought that some extracts from competitors' impressions of the Contest may be of general interest, and perhaps provide food for thought.

No attempt has been made to place the following in any particular order; they are just as they were drawn out of the pile.

"The standard of operating was high, with the usual exceptions. One station was heard to send CQ thirty-five times

TWO-METRE ACTIVITY BY ZONES AND COUNTIES

(Based on reports for current issue only)

Zone A (144.0 to 144.2 mc)
Nil.

Zone C (144.2 to 144.4 mc)

Cumberland : G3BW
Durham : G2FO, G4WB
Lancashire : G2DCI, G2OI, G3AGS, G3AOO, G3AYI, G3BPJ, G3BY, G3CSC, G3ELT, G5VN/A
Northumberland : G3CYY, G4LX
Yorkshire : G2HNL, G2IQ, G3COJ, G3DMK, G4BP, G5QU, G6OS, G6PJ, G6TG, G8GL

Zone D (145.8 to 146 mc)
Nil.

Zone E (144.4 to 144.65 mc)

Cheshire : G2CYN, G3ATZ, G3AYT, G3BOC, G3FMI, G4OS, G5CP
Derbyshire : G2DLJ/A, G3EMJ, G5RW
Leicestershire : G2FNW, G3ENS
Lincolnshire : G3DRG/A, G6LI
Nottinghamshire : G2XS, G3APY, G6CW, G8UZ
Warwickshire : G2ATK, G2BFT, G3ABA, G3BVJ, G4DJQ, G3EVC, G3FPO, G3IS, G4NB, G5JU, G5SK, G6CI

Zone F (145.65 to 145.8 mc)

Flintshire : GW3DNN
Montgomeryshire : GW2ADZ

Zone G (144.65 to 144.85 mc)

Bedfordshire : G3CGQ
Buckinghamshire : G3GBO, G3MI, G6JK, G6NB, G6PR
Cambridgeshire : G2AIQ, G2UQ, G2XV, G3AEP, G3BK, G3CJY, G3GGJ, G3WW, G3MW, G5IG
Hertfordshire : G3FD, G3GDR, G3GRA, G5UM
Huntingdonshire : G3AKU, G3AVO/A
Norfolk : G3VM, G5UD
Northamptonshire : G2HCG, G3BA
Suffolk : G2CPL

Zone H (145.25 to 145.5 mc)

Berkshire : G3EJL, G5HN, G5RP, G6OH, G8LG
Dorset : G3ABH
Gloucestershire : G2AOK/A, G3MA, G3YH, G5BM
Hampshire : G2DGB, G2XC, G3ARL, G3BHS, G3BNC, G3CGE, G3DEP, G3FAN, G3GAV, G3GOP, G6TS, G6XM
Oxfordshire : G5TP, G6KB
Wiltshire : G8IL

Zone I (145.5 to 145.65 mc)

Cornwall : G3AGA
Devon : G2BMZ, G3AUS, G3AVF, G3CQC, G3GAO, G3WS, G5BY
Somerset : G3EHY, G3FIH, G3FMO, G3FUM, G4RX

Zone J (144.85 to 145.25 mc)

Essex : G2CIW, G3CNF, G3ECA
Kent : G2AOL, G2AJ, G2KF, G2UJ, G2WS, G3BOB, G3CAZ, G3DAH, G3FMK, G4FB, G6PA, G6PG, G6VX

London County : G2DTO, G3BUN, G3EIW, G3FXG, G4AU, G4DC, G5LI, G5PY, G6WU, G8LN, G8KZ

Middlesex : G2AHP, G2BMI, G2DD, G2FMF, G2YC, G2ZY, G3CKX, G3CWW, G3FYR, G3GSE, G3SM, G4HT, G4KD, G5LQ, G6HG, G6UH, G8IP

Surrey : G2ANT, G2MV, G2YL, G2BN, G3BLP, G4CG, G4CI, G5DS, G5MA, G5NF, G5US, G5WP, G6CB, G6LK, G6LX, G6NF, G6SC

Sussex : G2MC, G2NM, G3DIV/A, G3BEX, G3EBW, G5RO

Note : *The frequency areas given above are in accordance with the Two-Metre Zone Plan, as accepted by the majority of VHF operators. A few stations are not conforming.*

before signing his call! Another came back to me giving my call eight times after he had been given a report of 589." (G4CI) . . . "After 3 months off the band I find the only difference is the more general use of BCNU, which I always think is rather a frightful expression, though I suppose it's useful in Contests!" (G2YL) . . . "One-way traffic in evidence on the Saturday night —many stations called, only one replied" (G5JU) . . . "It was going great guns until just after 2000, when the PA power pack blew up. To my mind, the contest was won or lost by the operating on the Saturday evening, and it would appear that once again one of the London boys had the contest in his pocket" (G3ABA) . . . "My only grouse is that I could have made more points if only phone stations would come back to my CW calls" (G3SM). . . . "My chief impression is of those who got away, *viz.*, GW2ADZ, G3APY and G2IQ, to mention but a few worth quite a lot of points had they been landed. The band was open and it was shut, and at no time was it void of signals" (G3CGQ) . . . "Activity was low and, if it shows no signs of bucking up in the near future, then I shall be the next to QSY to the long waves" (G3CAZ) . . . "Operating was pretty slick and competent by all"

TWO METRES
ALL-TIME COUNTIES WORKED LIST
Starting Figure, 14
From Fixed QTH only

Worked	Station
49	G2OI (150)
46	G3BLP (330)
45	G3EHY (213)
43	G2AJ (304), G3COJ (133), G5WP, G6NB
41	G2NH (283), G3ABA (178), G5MA
39	G6XM (208)
38	G2IQ, G3WW, G4HT, G5BY
36	G2XC, G3CGQ, G3CXD
35	G4LU, G6LK
34	G3VM, G4AU (201), G4DC, G5BM, G8SB
33	G2XS, (147), G3DMU (115), G5JU
32	G3BK, G8WV
31	G2CIW, G2CPL (168)
30	G3BOB, G4CI (181), G8IL, G8SM (172)
29	G5NF, G8IP (207)
28	G6VC
27	G3DAH, G8QY
26	G2ADR, G2FNW, G3BW, G3BHS, G3FIJ, G6UH (212), G8QC, (126)
25	G6WT
24	G2AIQ, G3FXG, G3AKU, G8KL
23	G2NM, G3AVO/A, G3GSE, G4NB, G5PY, G6CI
22	G3GBO (165), G4RK, G5DS
21	G2FMF
20	G2ANT, G3AEP, G8KZ
19	G5SK, G6CB
18	G3CAZ, G8VR, GM3OL
17	G3ANB, GM3BDA
16	G2AOL, G4LX, G5LI (121), G5LQ, G5MR, GW5SA
15	G2AVR, G4RX, G4MR
14	G2AHP (125), G2HDZ

NOTE : Figures in brackets after call are number of different stations worked : Starting figure, 100.

(G3BOB) . . . "The contest was very much more interesting than previous 2-metre contests, because we were favoured with somewhat better conditions, which meant the contest did not die on one around the middle of Sunday afternoon" (G3BLP) . . . "The best contest I have taken part in" (G6PR). . . . "Conditions excellent on Saturday afternoon but deteriorated after dark. On Sunday conditions average to poor. Severe congestion in vicinity of 145 mc, with very few stations operating below 144.5 and none heard above 145.55 mc" (G2UJ) . . . "English stations nothing. Condition not zo good" (PAØRK) . . . "I did not start building the converter until two days before the contest. I expect to be bottom of the list as regards score, but, after all, someone has to be there" (G3EMJ) . . . "Considering the low barometer, torrential rain and continual gales, results were surprisingly good" (G5BY) . . . "It was a pity that so many stations were using phone and frequently in DX parts of the band" (G5PY) . . . "A relay stuck at about 1030. This was fixed, and then I found the beam rotating gear had jammed during the night. This was undoubtedly gremlins, as it was perfectly all right when I went to bed. It was put right with some brute force and much profanity, and then while working G3EJL the modulator quietly faded away. Anyway, it was a very enjoyable week-end" (G5RP) . . .

"Worked everyone I heard (two stations)!" (G6TG) . . . "Too much phone on the band with long-winded contacts by some operators who don't read CW. How did they get a licence?" (G6LI) . . . "Had an excellent time. Great fun, for which many thanks!" (G3FD) . . . "At five minutes to twelve on Saturday the band was dead. At 12 noon it was chaos. With the six pips of Greenwich going, G2XC was heard to burst into life, accompanied by dozens of other stations. Never in my life have I heard so many CQ's called all at once by so many on so small a wavelength!" (G2AIQ) . . . "G3DAH was coming through during the 36 hours even when calling due West. He was called by everybody in the Midlands, but NG" (G6CW) . . . "I spent almost the whole of Sunday on the band. Only a handful of signals were heard, and even these I could not raise, in spite of repeated calls" (G3FIH) . . . "Am now gargling a sore throat and massaging a swollen wrist after the activity last week-end. The annual event brought

forth many almost forgotten callsigns" (G3GBO) . . . "On Saturday afternoon QRM from the road was at its peak, and I offer apologies to those stations who called me. Think the method of scoring needs drastic overhaul, but I realise the difficulties. Too many points are given for long distances" (G6CB). . . . "After 1300 GMT several G's calling me with phone, but why did these fellows not use the key? We were in a contest, not a tea-party from grandmothers" (PAØPN) . . . "If the Channel would not be, it would be easier to contact G's on Two" (DL3FM) . . .

"My shack is 18 feet *below* sea level" (PAØJOB) . . . "I feel it was unfortunate the date fixed was Armistice Sunday, and the contest might have been earlier in the year instead of at the mercy of changeable weather" (G3WW). . . . "No signs of any Shropshire or Yorkshire stations, although watch kept for them all day Sunday. No GI's or GM's heard" (G2OI) . . . "This entry will save someone else from being bottom of the list. I was only able to spend 5½ hours on the band" (G8IP). . . . "Contest thoroughly enjoyed, in spite of poor conditions and lack of activity" (G3BOC) . . . "Regret the unfortunate clash with MCC on Top Band" (G3CWW) . . . "My first experience of 2 metres is pleasure that operators come back with slow sending to slow call" (G3GRA) . . . "Not enough activity in the North. Worked every station heard!" (G4LX) . . . "Can anyone explain why, on 2 metres, you can frantically call a chap and never raise him, later to be called by him with the assertion that he'd called you many times before?" (G5UM) . . . "A number of well-known stations conspicuous by their absence. Thoroughly enjoyable contest for G3ABH" (G3ABH) . . . "If Saturday's conditions could have lasted throughout the contest, it would have made a very enjoyable event more so" (G3ENS). . . . "If only the band was always so active, I might be tempted to have a go at 70 cms!" (G5DS) . . . "I am beginning to think there ought to be a pledge signed by all participants to continue the same activity *after* the contest ends" (G2CIW) . . .

"An additional Summer contest would be of interest and value" (G8IL). . . . "These contests do not give one a dog's chance of winning unless you are situated in a place like London, where there is a hive of activity on the band" (G2OI) . . . "Because conditions were so poor, some stations changed their minds during the Contest and suddenly decided they were not in it after all!" (G3BOC).

Before leaving this selection of words of wisdom from your letters, your conductor would like to add some that he overheard while eavesdropping on a Contest QSO on the Sunday morning. It went like this: "You're very lucky to get this QSO with me, as I don't usually search the part of the band you are in!" No callsigns this time! One other point: The views expressed above have not been chosen because they are also those of your conductor, or of the *Short Wave Magazine*. We may or may not agree!

Other News

G3WW (Wimblington) sends a list of counties he still wants. As well as the more remote ones, he would like Essex and Lancashire for the "yearly" table. He gives October 15, 16 and 19 as best days of the past month. G2CIW (Romford) found the October 18-20 period a good spell; due to work, he was unable to participate fully in the Contest. G3GBO (Denham) thinks he will have to go QRO to work the Devon stations. However, he has had some success with new counties to the north of him, G3ABA, G3AKU and G3ENS being welcome contacts. G3AKU (St. Ives) had receiver trouble during the Contest, which restricted his activity; he says he is active on all bands and so misses some of the good spells on Two. G3AVO is reported to be shifting to

PAØFB, The Hague, is one of the active VHF men over there. When this shot was taken, PY2JU (right) was visiting.

Benson in Oxfordshire. G5PY (Clapham Park) has built an 829 PA, to be driven from his 522 and run at 75 watts; it will also be used as a driver for 435 mc work. G5LI (N.W. London) has also been trying out higher power to an 829B, but is not sure that it has helped much; he also hopes to have the beam rotatable from the operating position before long. Apologies to G3BOB for dropping him 7 places down the Counties Table last month. He should have been up at the 30 level. G3CAZ (Gillingham) asks if a contact on 2 metres and 70 cm with the same station counts as two separate QSO's for the VHF CC. The answer is Yes, provided you get two cards! On that subject, G3CAZ comments that old-timers promise them and don't send them, and it gets them a bad name. G2AJ (Biggin Hill) has been inactive due to a mishap to the feeder to his beam; this is now remedied, thanks to some assistance from G6VX. G8LN (Plumstead) has been doing well (at least as well as activity would permit) with 5 watts to an SCR522 and a 4-element beam. He has heard a number of 2-metre stations operating also on Top Band and asks why folks prefer a band cluttered with QRM when they have another band on which they can chat without any disturbance. G3AEP (Whittlesey) warns against pulling out an 832 by its anode pins, because the glass envelope is too hot to hold. Apparently it is a sure way of making the band open up, but the 832 will not be in a condition to take advantage of it!

A newcomer to the band in Hampshire is G6TS (Bournemouth), using an SCR522 with 13 watts, and an RF27 converter; at present a rotary dipole serves as aerial. He is on 145.26 mc. G5BY (Bolt Tail) worked ON4BZ on October 24, and has been entertaining ZS1AX (one of the 50 mc ZS men). G3FIH (Radstock) has been consistently active and mentions that G3FKO and G8DX in Bath are preparing for 2-metre work. G3EHY (Banwell) considered recent conditions as being better than at any time in the summer;

TWO-METRE ACTIVITY REPORT

G5DS, Surbiton, Surrey.

WORKED: G2AIQ, 2FNW, 2IQ, 2OI, 2XC, 2XV, 3ABA, 3AEP, 3AKU, 3APY, 3EHY, 3ENS, 3WW, 4MW, 5UD, 8DM/A, 8IL, GW2ADZ, ON4BZ.
HEARD: G2AIH, 2CPL, 2WJ, 3ABH, 3AUS, 3DIV/A, 3DVQ, 3FAN, 4GR, 5BD, 5DT, 5UF, 6LI
(*October* 10 *to November* 10).

G4LX, Newcastle.

HEARD: G2OI, 3ABA, 3BPJ, 3DEP, 3ENS, 6LI, DL3FM, ON4BZ.

G3FIH, Radstock, Somerset.

WORKED: G3BLP, 3BOB, 3DEP 3EHY, 5BY, 6LK, 6NB, 6XM, 8IL.
HEARD: G2CIW, 2UJ, 3ABH, 3BHS, 3BVA, 3CGE, 3FUM, 3FYR, 3GBO, 3GHI, 3SM, 3YH, 4AU, 4CI, 4GR, 4HT, 5LI, 5MA, 5MA/P, 5NF, 5RO, 5RP, 5UF, 5US, 6AG, 6GK, 6JK, 6KB, 6VX, 8KZ.
(*October* 12 *to November* 12).

G2CIW, Romford, Essex.

WORKED: F8OB, G2CPL, 2FQP, 2IQ, 2XC, 5BY, 5UF, 8IL.
HEARD: F8GH, 9MX, G3AUS, 3EHY, ON4BZ.

G2UJ, Tunbridge Wells, Kent.

WORKED: G2CPL, 2DTO, 2FMF 2KF, 2MV, 2NH, 2XC, 2XV, 3ABA, 3BHS, 3BLP, 3BUN, 3CAZ, 3CGQ, 3DAH, 3DVQ, 3FD, 3FMK, 3FXG, 3FYR, 3GBO 3GDR, 3GSE, 3SM, 4AU, 4CI, 4HT, 5BY, 5DS, 5HN, 5LI, 5MA, 5NF, 5RO, 5RP, 6CB, 6LK, 6NB, 6PG, 6PR, 6UH, 6XM, 8IL, 8VR.
HEARD: G2AHP, 2AIQ, 2AJ, 2AOL, 2CIW, 2WS, 2YL, 3ABH, 3BOB, 3DIV/A, 3EBW, 3ECA, 3ENS, 3GHS, 3MI, 4CG, 4FB, 4MW, 4NB, 5LQ, 5PY, 5RD, 5TP, 5UM, 5WP, 6JK, 6SC, 8IP, 8KZ, 8SM.

G2AIQ, Histon, Cambs.

WORKED: G2BVW, 2HCG, 2IQ, 2MV, 2UQ, 2XC, 3ABH, 3AEP, 3AKU, 3BK, 3BOB, 3CGQ, 3CJY, 3DIV/A, 3EBW, 3EHY, 3EYV, 3FQP, 3FYR, 3WW, 4HT, 4MW, 5BY, 5DS, 5LN, 5MA, 5RW, 5UD, 5UM, 6CB, 6CW, 6LI, 6LL, 6XM, 6YO, G8IL, 8SY, 8UZ, GW2ADZ.
HEARD: G2FO, 2XV, 3APY, 3BLP, 3COJ, 3EBW, 3ENS, 3FAN, 3FOD, 5BD, 5DS, 5IB, 5NF, 5PS, 8IC.
(*October* 1 *to October* 31, 1950).

G3WW, Wimblington, Cambs.

WORKED: G2ADZ, 2AIQ, 2AJ, 2ANT, 2AOK/A, 2ATK, 2AVR, 2CPL, 2DLJ/A, 2FNW, 2FQP, 2HCG, 2MV, 2NH, 2UQ, 2XC, 2XV, 3ABA, 3AEP, 3AKU, 3APY, 3AVO/A, 3BA, 3BLP, 3BK, 3BOB 3CGQ, 3DAH, 3DMU, 3DRG/A, 3EHY, 3ENS, 3FAN, 3FD, 3FXG, 3FXK, 3FYR, 3GBO, 3GDR, 3GGJ, 3GHI, 3GSE, 4CI, 4FB, 4GR, 4HT, 4MW, 4PV, 5DS, 5IG, 5LN, 5MA, 5RW, 5UD 5UF, 5UM 5WP, 6CW, 6JK, 6KB, 6LI, 6NB 6VX, 6XM, 8GL, 8IL, 8KZ, 8QY, 8UZ, 8VR.
HEARD: G2IQ, 3VM, 4GR 5BY, 5NF, 6LL.
(*October* 9 *to November* 12).

G6CI, Kenilworth, Warwickshire.

WORKED: G2AOK/A, 2ATK, 2BFT, 2HCG, 3ABA, 3ABA/P, 3AEP, 3BA, 3BLP, 3BVJ, 3ENS, 3GA, 4NB, 4RK, 5JU, 5PP, 5SK, 8QK.
(*August* 13 *to October* 11).

G3EHY, Banwell, Somerset.

WORKED: G2AIQ, 2ATK, 2CIW, 2CPL, 2DCI, 2FNW, 2FO, 2OI, 2WJ, 2XS, 2XV, 3ABA, 3ABA/P, 3AEP, 3AGA, 3AHB, 3AKU, 3ATZ, 3BK, 3BPL, 3BVA, 3BVJ, 3DUP, 3ENI, 3EYV, 3FD, 3FHI, 3FYR, 3GBO, 3GDR, 3GEN, 3GHI, 3MA, 3VM, 3YH, 4CI, 4HT, 4KD, 4MW, 4OS, 5DS, 5LI, 5MA/P, 5RD, 5UD, 6AG, 6JK, 6KB, 6LK, 6NB, 6UH, 6WU, 6XM, 6YP, 8GL, 8KZ, 8SB, 8VR, GW2ADZ.
HEARD: G2MA, 3EBW, ON4PZ.
(*October* 15 *to November* 11).

70 cm Activity Report

G3ELT, Salford, Lancs. (NGR 33/785993).

WORKED: G2OI, G3AYT.

G2CIW, Romford, Essex.

WORKED: G2FKZ, 3EIW, 3FP, 4CG, 5PY, 5TP.
HEARD: G2DD, 2WJ, 3CU 5BY, 6LK, 2QY.

G2FO (Stockton) was worked on October 18. Auroral reflections were noticed on October 28 from 2010 to 2100.

G2XS, now in Mansfield, Notts., reports active once again; his new location is 500 feet a.s.l., so he has hopes of getting out well. G3EMJ (Derby) has 18 watts to a BC522 on 144.45 mc; a G2IQ-type converter and a 3-element Yagi complete the line-up. G6TG (Scarborough) would welcome reports and would like to know of anyone using a ZB2 adapter on 2 metres. G3COJ (Hull) repaired 8 elements of his beam after the gale wrecked it in September and worked ON4BZ and heard DL3FM on October 21; G3FAN was heard on October 24. G8GL (Northallerton) is on 2 metres only. A crystal-controlled converter is being built to feed into a BC455. G4LX (Newcastle) found the period October 18-25 good, and received G3DEP and DL3FM, amongst others. G3BOC (Heswall), who has been on 144 mc for about 3 months, operates an SCR522 on 144.55 mc; his only DX so far has been G3BLP, but he is active most evenings from 1830 to 1930 and after 2200 GMT. G3BOC considers location *does* play an important part in the propagation of 2-metre signals.

PAØLU reports good 2-metre conditions in that country on October 19, when he worked DL4XS.

Seventycems

The reception of 70 cm signals from G5BY by G2CIW (Romford), reported in last month's "stop press" note, was, in fact, a cross-band contact, with G2CIW transmitting on 2 metres. Between October 16 and 21, G5BY and G6LK had *nine* two-way contacts. G2ANT (Godalming) has worked G2DD, G2XC and G6LK on 70 cm. There are hills up to 900 ft. between G2ANT and G2XC, and the distance is around 30 miles. G2ANT has an 832 tripler, a G3EJL converter and an 11-ele. Yagi.

G2CIW, whose RF vanished at the critical moment when he was trying to push a signal down to G5BY on 435 mc, has now added a wire mesh reflector to his 8-element stack. It is matched with Q-bars into the 80-ohm coax, and has a balun on the receiver side. In the receiver, fundamental injection is now being used with improved results. G3GTS (Gillingham Transmitting Society) are preparing for operation on 70 cm, and G2AOL (Otford) has the Lecher lines ready for his converter.

TWO METRES
COUNTIES WORKED SINCE SEPTEMBER 1, 1950
Starting Figure, 14

Worked	Station
31	G3EHY
30	G3ABA
29	G3WW
26	G4HT
24	G2AIQ, G2AJ
23	G2OI
21	G3AKU, G3BOB, G3COJ
20	G2XC, G3AEP, G3FD, G3GBO
18	G2CIW, G6CW
17	G2ANT

Note: This Table will run for one year to August 31, 1951.

G3BOB (Hayes) is under way with a 24-ele. beam for the band. G5PY (Clapham Park) is intending to drive his 105 tripler with his new 829 145 mc PA.

G3HAZ is the callsign now granted to R. Rew, whose excellent article on the conversion of the ASB8 appeared in *Short Wave Magazine* last month; he will be active on 70 cm from Birmingham on Sundays from 1600 to 2130 GMT. And G3HBW is the new call of A. L. Mynett (Wembley), whose reception of G5BY on 70 cm was reported last month.

G3ELT (Salford) reports reduced 70 cm activity in Lancashire, but hopes it is only temporary. Nightly tests are still made between G2OI and G3ELT and have resulted in considerable improvements. G3ELT puts out a call to the South most evenings at 2130; he is on 432.7 mc, with about 4 watts output from the Tx. The receiver is a valve diode mixer with push-pull RL18's as oscillator. Both G2OI and G3ELT are still trying to get some gain out of an RF stage.

G2QY (Pinner) keeps the schedule with G2DD, and has heard only G5PY and G5TP—with the inevitable G4HT harmonic! G2QY corrects us in regard to the reception of G2XC on October 19; it was not G2DD, but G2QY himself who received your conductor on 70 cm;

there was a suggestion of a signal from the Portsmouth end again on November 14.

From PAØLU we learn that DL4XS is ready for 70 cm operation, and that PAØDT is also on the band. PAØLU and PAØZQ have had excellent contacts with PAØPN over a path in excess of 50 miles.

Still Higher Frequencies

PAØZQ has a 13 cm oscillator ready using CV90, and G3APY and G3ENS/P had a QSO on 3 cm over a distance of 27 miles. Locations were on Broomriggs Hill, near Loughborough, and Alport Height, near Ambergate; signals were S9 plus with no fading or static, but much time was needed to get the parabolas lined up. G2QY has gear in hand for 2450 mc, and asks if anyone is sufficiently interested to join him.

Sayings of the Month

"My station is in existence since 1928—so you can see the old are still going strong—in spite of what some may say" (PAØFB) . . . "Woe is he that attempts to acquire VHF CC these days. He might as well try to grow rose-scented cauliflowers" (G3CAZ) . . .

"Will G2XC please publish details of the filter he uses in his Rx to be able to give G—— T9!" (G2ANT) . . . "What greater joy can there be than sitting back and listening to your friends working the DX?" (G3AEP) . . . "This data is not generally known, so please forget where you got it from." (——). . . . "I have worked more counties (5) on 70 cm than on 2 metres. Is this a record, or something?" (G2QY).

The Clubs

Fiveband Club members will be glad to know that G3BLP has consented to take over the duties of representative for the London area. G3BLP has been a consistent operator on the VHF's for many years and has held a number of records. His call is well-known all over the country, and we are very grateful to him for accepting this task. He is hoping to organise a Club Dinner in London in early March, and details of this will be given, if possible, in next month's issue of *Short Wave Magazine*.

Congratulations to G3AEX and G8IL, both of whom have become members of the VHF Century Club during the past month. Membership is now on the 80-mark.

In Conclusion

Next month's "VHF Bands" will be chiefly devoted to the results of the Contest. In addition to the main table of placings, it is hoped to show the winners in the various Zones, with the Continental winners, and also to present a table showing what the result would have been if local contacts had been barred. Reports of the month's activities should reach the usual address—E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1—**by December 13 latest.** Finally, your conductor would like to wish you all a very happy Christmas, and a prosperous 1951, with plenty of DX and new records on 144, 420 and the higher frequencies.

★ ★ ★

LINES OF THOUGHT

It is often suggested—in our view, quite wrongly—that there is now nothing much left for the amateur in the way of technical development. This ignores the vast new field which we can expect eventually to be opened to us when amateurs in this country are allowed to use pulse transmitting techniques on VHF, when amateur TV transmission is permitted, and when we can use enough power to make moon reflection a practical method of DX communication on the VHF bands. Though there is nothing very original about any of these ideas in the technical sense, they do suggest the tremendous scope there is for the development of Amateur Radio in fields of endeavour which would be quite new to us *as amateurs*.

★ ★ ★

LIGHT CONTROLLED CIRCUITS

A new Mullard booklet called *Industrial Photocells*, very well produced and easy to read in the technical sense, will be of considerable interest to all electronic engineers concerned with the design and application of photo-electric equipment. It is, in fact, astonishing what a wide scope there is for light-control circuitry, of which the photo-electric cell is the heart. A glance through *Industrial Photocells* set us thinking about quite a number of possible applications in the Amateur Radio field—we must think some more.

NEW QTH's

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

EI3B S. M. Meidhre, B.Sc., B.E., 26 Pearse Road, Sligo, Eire.

GW2DXQ J. Burton, 2 Bodhyfryd Road, Llandudno, N. Wales.

G2UW S/Ldr. A. J. S. Wilson (*ex-YI2UW*), Officers' Mess, R.A.F. Station, Innsworth, Gloucester.

G3CSH H. Sear, 4 Hailey Field Estate, Chipping Norton, Oxon.

GI3FTT W. Brennan, 71 Bishop Street, Derry, N. Ireland.

G3GCV J. H. Johnson, 2 West Street, Rotherham, Yorkshire.

G3GKQ A. Roberts, 23 Mytton View, Clitheroe, Lancs.

G3GNM A. C. W. Biddell, 114 Kingshill Avenue, Kenton, Harrow, Middlesex.

G3GTS Gillingham Telecommunications Society, Medway Technical College, Gardiner Street, Gillingham, Kent. (*QSL to C. E. Pellatt, G2FAQ*, 101 *Boundary Road, Chatham, Kent*).

G3GVV R. J. Hughes, Beech Hanger Court, Caterham, Surrey.

G3GXD J. E. Burnitt, 10 Dee Way, Rise Park, Romford, Essex.

G3GXG F. J. Lee, 13 Fircroft Road, Hook Rise, Surbiton, Surrey.

G3GXJ W. Hudson, 25 Clark Road, Pontefract Lane, Leeds, 9, Yorkshire.

GW3GXL J. Baker, 14 Carlisle Street, Splott, Cardiff.

G3GXT A. Oven, 14 Greenhill Road, Timperley, Altrincham, Cheshire.

G3GXX W. S. Horsfall, 33 Clarence Avenue, Cleveleys, Lancs. (*Tel.* 2355).

G3GYA J. F. Lee, 64 Northfield Road, Hinckley, Leics.

G3GYG J. M. Mortimer, 7 Carter Avenue, Exmouth, Devon.

G3GYI J. F. Coulter, Freen Court, Sandwich Road, Whitfield, nr. Dover, Kent.

G3GYL Miss Nina Barrett, 64a Fitzjohns Avenue, London, N.W.3.

G3GYR J. H. Woodward, 6 Council Houses, Rode Heath, Stoke-on-Trent, Staffs.

G3GYT R. B. Swift, 70 Penny Lane, Liverpool, 18. (*Tel. Sefton Park* 2743).

G3GYV J. Speakman, Davyhulme Cottage, Dark Lane, Whitley, nr. Warrington, Lancs. (*Tel. Norcott Brook* 257).

G3GYX J. J. Wilson, 1 Abbott Street, Long Eaton, Notts.

G3GYZ W. G. Wooller, 7 Neptune House, Neptune Street, London, S.E.16.

G3GZA D. J. West, 9 Novers Park Drive, Novers Park, Bristol, 4, Somerset.

G3GZK L. G. Chastey, Bridestowe, Okehampton, Devon.

G3GZQ W. J. H. Roberts, Bretteville, Timbers Road, Buckfastleigh, S. Devon.

G3GZT R. Moores, 31 John Street, Brighton, 7, Sussex. (*Tel. Brighton* 22585).

G3GZU A. Molyneaux, 30 Cumberland Street, Warrington, Lancs.

G3GZY Catford Central School Radio Club, Brownhill Road, Catford, London, S.E.6.

G3HAF D. M. Heaps, 28 Toll Gavel, Beverley, East Yorkshire.

GI3HAJ J. R. O'Neill, 23 Beverley Hills, Bangor Co. Down.

G3HAK H. L. Pilkington, 41 Wood Waye, Woodley, Reading, Berks.

G3HAN M. J. Hitchman, 69 Mere Road, Wigston Magna, Leics.

GW3HAW E. W. Jones, Lamorna, Westbourne Road, Penarth, Glam.

G3HAW/A E. W. Jones, c/o The Firs, Cainscross Road, Stroud, Glos.

G3HAY Maj. I. McAnsh (*ex-XABU/MB9BO/MD5BU/MD2BU*), Royal Signals, H.Q. Mess, Messines Lines, Catterick Camp, Yorkshire.

G3HAZ R. Rew, 15 Stennels Avenue, Quinton, Birmingham, 32.

G3HBG K. M. Bearcroft, 1 Buxton Cottage, The Colony, Lingfield, Surrey.

G3HBN J. R. Bolton, 37 Elmwood Avenue, Kenton, Harrow, Middlesex.

G3HBR B. Hummerstone, 70 Minehead Road, South Harrow, Middlesex.

G3HBV D. T. Jennings, 113 Merryhills Drive, Enfield, Middlesex. (*Tel. ENF* 5625).

G3HBZ N. E. A. Rush, 143 Chapter Road, Willesden Green, London, N.W.2.

G3HLS A. W. Woolven, 21 Park Avenue, Farnborough Park, Kent.

G3HVG A. P. W. Windle, 121 Laburnum Avenue, Dartford, Kent.

G5YC City & Guilds (Engineering) College Radio Society, Exhibition Road, South Kensington, London, S.W.7.

G8MM Dr. W. D. Martin, 188 Headstone Lane, Harrow, Middlesex.

CHANGE OF ADDRESS

GM2DRB G. H. Heppel, South Head, Wick, Caithness.

G2FJR G. W. Fortnam, Kendleby, New Road, Sutton Bridge, nr. Spalding, Lincs.

G2HHB H. Dodd, 19 Castlegate Drive, Cockermouth, Cumberland.

G2XS H. W. Sadler, 13 Lichfield Avenue, Mansfield, Notts.

G3AAZ G. Gibbs, Chesilbank, Hertford Road, Digswell, Welwyn, Herts. (*Tel. Welwyn* 78).

GM3BLQ T. Harper, 45 Longhaugh Terrace, by Dundee, Angus.

GW3DDY J. E. Sketch, 30 Dan-yr-Heol, Cardiff, Glams.

G3DER F/Lt. J. P. Wilson, Officers' Mess, R.A.F. Station, Innsworth, Gloucester.

G3EBU K. C. Woodman, 10 Meath Street, Battersea Park, London, S.W.11.

G3EKF J. A. Slater, 79 Newhouse Road, Blackpool, Lancs.

GI3FOB W. H. Kerr, 197 Princes Park, Garden Village, Whiteabbey, Co. Antrim.

GW3FWH S. G. Stephen, (*ex-G3FWH*), 34 MacDonald Road, Ely, Cardiff, S. Wales.

G3GDO A. N. Ianson, 1 Trinity Terrace, Ventnor, Isle of Wight.

G3GGO C. N. Wridgway, Edge View, Paddock Hill, Mobberley, Cheshire. (*Tel. Alderley* 3238).

G3GHQ D. Metcalf, 39 Nightingale Road, Southsea, Hants.

G3WY R. V. Beekar, 14 Boycott Road, Saint Martins, Hereford, Herefordshire.

G4XC J. Browne, 48 Roberts Street, Grimsby, Lincs.

G5BG J. B. Kaye, Wappenham, Towcester, Northants.

G5DW H. Bollands, Pinewood, Cob Moor, Billinge, Wigan.

G5HU R. S. Holden (*ex-GI5HU*), 35 Botham Street, Grimesthorpe, Sheffield.

Here and There

Handsome Present

This is the time when many of us are casting about for suitable gifts for friends and relations, and it may be the problem is to think of something for an overseas contact. For anyone with an interest in Amateur Radio, may we suggest that there could hardly be a more acceptable present than a year's subscription to *Short Wave Magazine*—this costs but 20s. home, or 22s. overseas, and would be a monthly reminder of your thoughtfulness. Send your instructions, with remittance, to The Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1. And you might even consider treating yourself to a present of the same kind!

Echo from Zone 23

On p.410 of our issue for August last we mentioned that AC4RF was at Chamdo, an outpost town on the Tibetan border. It is now reported that he was "detained by Chinese Communists" on October 10, when Chamdo fell to the forces invading Tibet. At the moment of writing, there is no definite news of the other British amateur, AC4YN, who was at Lhasa, far to the west of Chamdo. Both operators were employed on radio duties by the Tibetan Government.

E.M.I. Scholarship Scheme

To meet the need for increasing numbers of highly trained electronic engineers in their research and design organisations, the great firm of Electric & Musical Industries, Ltd., is offering, through E.M.I. Institutes, a scholarship scheme in connection with a special four-year course in Electronics. The Course consists of three years' full-time study at E.M.I. Institutes, with one year's practical experience in the factories and workships of E.M.I. Engineering Development, Ltd. Candidates should be in the age group 16-18 years, and preferably of higher school certificate standard in science.

The normal fee for this Course is £400, payable at the rate of £100 a year. But successful applicants for a scholarship will receive a grant from E.M.I. at the rate of £50 a year in respect of fees and additionally, in suitable cases, a maintenance grant of at least £50 per annum. The whole scheme provides a fine opportunity for an intelligent youth wishing to make a career with one of the world's leading electronic organisations, and is a good example of the valuable educational facilities now provided by enlightened private industry. The Course will commence on January 17, 1951, and those interested should make *immediate* application for entry forms to the Principal, E.M.I. Institutes, Ltd., 10 Pembridge Square, London, W.2. Interviews for selection will be given between December 17 and 21, by arrangement with candidates.

The Amateur Radio Exhibition

A total of 24 exhibitors were showing at the Royal Hotel, W.C.1, during the period November 22-25. This year there were more of those firms whose products are not usually considered to be of direct interest in the strictly Amateur Radio field. On the other hand, this indicates the interest of the firms concerned in the amateur market. Though the attendance was somewhat down on previous years, the youthful element—on which the future of Amateur Radio depends—was much in evidence. For us, it was a great pleasure to meet so many readers, many of them for the third or fourth year, and our visitors' book was filled with many pages of signatures.

"Economical Three-Band Transmitter"

In the article appearing in our September issue, a slight error crept into the opening paragraphs, regarding the input to which the PA can be driven under the conditions stated—this should be 20-25 watts, and not as given. On p.472, Lines 8-9 in the first paragraph should read L2 and not L3; this is evident from the circuit.

New Catalogue

We are glad to draw readers' attention to an excellent catalogue of surplus bargains now available from the firm of Lyons Radio, Ltd., 3 Goldhawk Road, Shepherds Bush, London, W.12.

The Month with the Clubs

FROM REPORTS RECEIVED

Many Clubs found their November activities centring around the *Magazine* Club Contest, which was still in full swing at the time reports were being sent in. Activity appeared to be well up to, if not above, the average for this event, and a great battle was being waged every evening between 5 p.m. and 11 p.m.

Notwithstanding this small degree of disruption, we have received reports for the month from 40 Clubs, all of which appear to be in a flourishing condition with useful and interesting programmes planned for the winter session.

Club Secretaries are asked *not* to send in routine reports next month, as this space will be devoted to the usual annual account of MCC, complete with the full results and analysis tables showing how all the participators fared. Closing date for Clubs' scores and remarks on the Contest was December 1, so that they should all be in hand before publication of these notes.

The next date for routine Club reports will be **January 15,** for the February issue, addressed "Club Secretary," *Short Wave Magazine,* 53 Victoria Street, London, S.W.1.

Kingston and District Amateur Radio Society.—In November this club held its first Exhibition and Social, which was very popular, not only with members, but also with the general public. Exhibits included a variety of gear built by members, a show of QSL cards, a wide selection of valves, and "Thirty-Eight Years of Ham Radio," by G2LP. Membership is still increasing and has now passed the 50 mark.

Reading Radio Society.—Recent events were a discussion and Junk Sale, and an evening devoted to a talk and Film Show on the Electricity Supply. Other items arranged are a "C & G Quiz," an evening "In Lighter Vein" and a meeting of the instructional section. All gatherings are held at Abbey Gateway.

Clifton Amateur Radio Society.—Members have recently held an SWL Contest (won by R. Brooker) and had discussions and talks on Microphones, Valves and Colour Television. Forthcoming attractions include a visit to the Exhibition, a Film Show and a Grand Xmas Party. Five more members have recently received their tickets, and membership now numbers about 50.

East Surrey Radio Club.—The Club recently met in the shack of G2AJS at Caterham School and saw some interesting demonstrations of Physics and Radio. On November 2 the New Zealand Govt. Public Relations Officer gave a talk and film show on Life in New Zealand. Two more members have passed the RAE and await their licences.

Stoke-on-Trent Amateur Radio Society.—Weekly meetings continue at the Club HQ (Cottage Inn, Oakhill), every Thursday at 8 p.m. November meetings included talks on Test Meters, Television Transmitters, A Double Superhet, Super Modulation, and Impedance Matching — a very thorough cross section of technical topics. The Club Tx, G3GUB, is said to be on the air every Thursday on "3540 mc," but we rather think this is a multiplication by 1,000!

Oxford and District Amateur Radio Society.—At the recent AGM all officers were re-elected. During the past year membership has increased by 50 per cent. Activities include a Basic Radio Course and a D-F Contest is in full swing, with three cash prizes. There are 80 members, 15 of them licensed.

Warrington and District Radio Society.—At the Annual Dinner (November 28) the "George Richards Trophy" will be presented to G3BOC, of Wirral, who won the inter-club contest. SWL F. E. Loxham won the listening contest. The club meets on every first and third Monday, 7.30 p.m. at 30 Queens Avenue, Warrington.

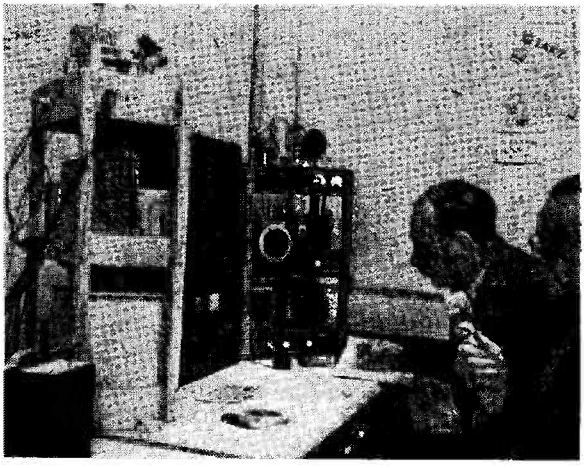
Gravesend Amateur Radio Society.—This club recently held a birthday party, visited by the Mayor of Gravesend. The birthday cake was made from VK ingredients! Other events have been talks by G3EJK and G6BQ, whose discussion on the use of tables of LC products was particularly well received.

North West Kent Amateur Radio Society.—Recent events were the AGM and a lecture on Single Sideband Reception. It is hoped to publish a regular News Letter shortly. Meetings are held on the first Friday, 7.30 p.m. at The Shortlands Tavern, Station Road, Shortlands; new members and visitors will be cordially welcomed.

Coventry Amateur Radio Society.—At the AGM the officers and committee were re-elected, and are now preparing for the new session. Fortnightly meetings continue at the BTH Social Club on alternate Mondays, 7.30 p.m. Next after publication is on December 18, which takes the form of a Junior Ops' Party—XYL's and YL's invited, with a guarantee of no washing-up! The "Sausage-and-Mashed Supper" will be held on January 1, and a Top-Band Demonstration on January 15.

Dunfermline Radio Society.—The AGM was held recently, and the new committee elected. It is hoped that the present membership of 20 will be greatly increased and that premises can be found for a club station. Meetings are held at the Public Baths, Pilmuir Street, Dunfermline; see pane for Secretary's address.

Chester and District Amateur Radio Society.—An interesting series of lectures, films, junk sales and so on has been arranged for well into the winter, and meetings will begin at 7.30 (or 6.30 for the Morse enthusiast!). The Club Tx, G3GIZ, is on the air, mainly on 3.5 mc, and reports are welcomed. Note new Secretary's QTH, in panel.



During last September, Derby & District Amateur Radio Society was represented at a local exhibition. Here are G3EMJ and G5YY operating the Society's station G3ERD in the 7 mc band ; numerous contacts were made.

Edgware and District Radio Society. — This club's second Annual Two-Metre Contest was held in October, a transmitter being hidden on Stanmore Common. Transmissions were made at intervals of twenty minutes, and the winners arrived after a two-hour search. Weather was kind, and a cine-film record was made of the event. Edgware is believed to be the first club to run a contest of this kind, and others might well follow suit. The Annual Dinner has been fixed for January 27.

Midland Amateur Radio Society.—A recent lecture covered the subject of Radio Controlled Models, and proved to be of absorbing interest. Members look forward to further details in connection with P-E cells. Meetings take place on the third Tuesday, at Imperial Hotel, Birmingham.

Spen Valley Radio and Television Society.—December events are a demonstration of the BRT 400 receiver, on the 13th, and the Annual Dinner on the 27th. The latter is to take place at the Star Inn, Roberttown. The dates of the January meetings are the 10th and 24th.

South West Essex Radio Society.—This club now meets every Wednesday at 8 p.m., and the winter programme of talks and demonstrations is in full swing. Full constructional facilities are available to members, and a slow Morse class is held each week. More members will be heartily welcomed by this (as yet) small club.

Harrogate Radio Society.—New premises have recently been acquired and activity has started again after a break of nine months. Talks and demonstrations have been promised on Microgroove Recording, Television, RF and IF stages, and Tape Recorders. Newcomers will be welcomed and a course on basic theory will be run if the demand warrants it. The club holds the call G3HRS and hopes to be on the air soon.

Richmond and District Radio Society.—At the last meeting, which was well attended, an informal lecture on Radio Valves was given. At the forthcoming meeting a talk, illustrated by slides, will be given on "Early Amateur Radio Personalities." Future activities will include regular Morse classes.

Malvern and District Radio Society.—The winter session is in full swing and lectures are given at 7.45 p.m. on the first Wednesday of the month, at the Foley Arms Hotel. The subject for November was Solar and Cosmic Radiations ; for December it will be Microphones and Loud Speakers, and for January, Service Communication Equipment. A visit to Sutton Coldfield was much enjoyed by members and more outings will be arranged for the future.

West Middlesex Amateur Club.—Recent meetings have been devoted to lectures on Airborne Radar, Aerial Problems, a Home-Built CRO, and also a Junk Sale. A coming event is a general discussion in which members will be persuaded to talk about their own interests in radio, and there will also be an exhibition of home-built equipment. Meetings are on the second and fourth Wednesdays, 7.30 p.m. at the Labour Hall, Uxbridge Road, Southall. Morse class at 7 p.m.

Wirral Amateur Radio Society.—Future meetings take the form of a lecture (Propagation, Pt. II), a general discussion, and the club's annual constructional contest. G3BOC won the Warrington and District Clubs' Top Band Contest for Wirral. Forthcoming meetings will be on December 6 and 20, January 10 and 24, all at the YMCA, Whetstone Lane, Birkenhead. Note new Secretary's QTH, in panel.

Eccles and District Radio Society.—This club now has a low-powered transmitter running on the Top Band with the call G3GXI. Meetings continue to be held every Monday at 7 p.m.

Dorking and District Radio Society.—Forthcoming events include lectures on December 12 and 19, and the AGM on January 2. Morse instruction is given at every meeting—7.45 p.m. The Headquarters are at 5 London Road, Dorking, where visitors will be welcomed any Tuesday evening between 7.30 and 10.30 p.m.

Sheffield Amateur Radio Club.—Members are asked to note that the date of the December meeting has been changed to Wednesday the 20th. This is also the closing date for ticket applications for the first Annual Dinner, to be held on January 10, 1951.

Barnet Amateur Radio Society.—The AGM took place in November after a very successful year, including some excellent lectures and demonstrations by prominent personalities. Membership has steadily increased. The next meeting will be on December 16, 7.30 at Bunny's Restaurant, Station Road, New Barnet, and will take the form of a social evening. Barnet's two radio groups amalgamate on this occasion.

Lincoln Short Wave Club.—In November G6TV, from Cranwell, lectured on Balance in Feeder and Transmission Lines, and it proved to be the club's most interesting evening. The annual dinner is being held at the Bridge Hotel, Saxilby, and the AGM will be on December 20. It is hoped that members will attend in force to elect their new committee.

Portsmouth and District Radio Society.—Much interest was shown in the club's exhibit at a local hobbies exhibition, when the club Tx, G3D1T/A, was operated daily. Meetings have been well attended and recent lectures were on Television and Radar. Another junk sale will take place shortly. Membership stands at 49, but *there is room for more.*

Edinburgh Amateur Radio Club.—The season progresses with lectures and demonstrations, and every fortnight the club Tx, GM3HAM, is on the air on 80-metre CW. Coming events include a Brains Trust, a UHF lecture and a visit to the local Police radio station.

Shefford and District Radio Society.—This club made the headlines in the local Press when it supported Shefford Industries Fair and transmitted during the three days of the show. The club room was thrown open to visitors and much interest was shown in the wide array of home-built equipment on view. A special attraction to the public was the wire recorder built by G2DUS, on which visitors were allowed to record.

The new club-room of the Salisbury & District Short Wave Club was opened in the grounds of Wilton House on the evening of September 26 by the Earl of Pembroke (speaking).

Barnet and District Radio Club.—After reorganising, this club started the winter season with a Film Show and a Junk Sale with "lucky dip" parcels. The club station G3FFA is being rebuilt and the phone ticket is awaited. Meetings are on Wednesdays, 8 p.m., at Hopedene, The Avenue, Barnet.

Ravensbourne Amateur Radio Club.—They now meet every Wednesday and Thursday, 7 p.m. at Childeric Road School, S.E.14 (Room F, Top Floor). A transmitter and receiver are being built. G2DHV is Chairman and G3DSC is the Instructor. All local SWL's and beginners are welcomed to the meeting.

NAMES AND ADDRESSES OF CLUB SECRETARIES

BARNET (Amateur Radio Society): M. R. Jenkins, G3EIM, 1193a High Road, Whetstone, London, N.20.
BARNET (Radio Club): C. J. Spencer, 31 Byng Road, Barnet.
BELFAST: S. H. Foster, GI3GAL, 31 Belmont Park, Belfast.
BRADFORD: V. W. Sowen, G2BYC, Rushwood, Grange Park Drive, Cottingley, Bingley.
BRIGHTON: L. Hobden, 17 Hartington Road, Brighton.
CHESTER: W. Lloyd, 124 Tarvin Road, Chester.
CLIFTON: W. A. Martin, G3FVG, 21 Brixton Hill, London, S.W.2.
COVENTRY: K. Lines, G3FOH, 142 Shorncliffe Road, Coventry.
DORKING: J. Greenwell, G3AEZ, 7 Sondes Place Drive, Dorking.
DUNFERMLINE: D. Leah, GM3FGH, 14 Hillwood Terrace, Rosyth.
EAST SURREY: L. Knight, G5LK, Radiohme, Madeira Walk, Reigate.
ECCLES: E. Rayson, 11 Hartington Road, Winton, Lancs.
EDGWARE: R. H. Newland, G3VW, 3 Albany Court, Montrose Avenue, Edgware.
EDINBURGH: D. A. E. Samson, GM3EQY, 56 Elm Row, Edinburgh 7.
FORFAR: A. F. Ferguson, 3 Osnaburg Street, Forfar.
GRAVESEND: R. Appleton, 23 Laurel Avenue, Gravesend, Kent.
HARROGATE: F. Walker, 99 East Parade, Harrogate.
HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
KENILWORTH: T. Davis, 8 Lower Ladyes Hills, Kenilworth, Warwicks.
KINGSTON: R. S. Babbs, 28 Grove Lane, Kingston, Surrey.
LINCOLN: G. C. Newby, G3EBH, 10 Addison Drive, St. Giles, Lincoln.
MALVERN: E. Dandy, G3BJB, 213 Pickersleigh Road, Malvern.
MIDLAND: H. B. Bligh, 52 Norman Road, Birmingham 31.
NORTH WEST KENT: M. J. Frost, G3GNL, 15 Northbourne, Hayes, Bromley.
OXFORD: J. Hickling, G3GCS, 47 Banbury Road, Oxford.
PAISLEY: J. MacArthur, 9 East Buchanan Street, Paisley.
PORTSMOUTH: R. Short, G3AFF, 76 Roman Grove, Portchester.
RAVENSBOURNE: Mr. Wilshaw, 4 Station Road, Bromley, Kent.
READING: L. Hensford, G2BHS, 30 Boston Avenue, Reading.
RICHMOND: W. Crossland, 1 Spring Grove Road, Richmond, Surrey.
SHEFFIELD: E. Walker, G2LT, 11a Welwyn Close, Intake, Sheffield.
SHEFFORD: N. A. Eaton, 25 Stanford Road, Shefford, Beds.
SOUTH WEST ESSEX: L. G. Barratt, 367 Rush Green Road, Romford, Essex.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, near Leeds.
STOKE-ON-TRENT: J. R. Brindley, G3DML, Elston, Albany Road, Harpfields, Stoke-on-Trent.
TYNESDIE: L. Bergna, G3EIE, 121 Addycombe Terrace, Heaton, Newcastle-on-Tyne, 6.
WARRINGTON: J. Speakman, G3GYV, Davyhulme Cottage, Whitley, Warrington.
WEST MIDDLESEX: P. F. Blomfield, 213 Harrow View, Harrow.
WIRRAL: A. H. Watts, G3FXC, 38 Sandymount Drive, Wallasey.
WORTHING: R. Forge, G3FRG, 2 The Plantation, Worthing.

Bradford Amateur Radio Society.—On December 19 G6KU will lecture on Radio Receivers—the first of a series for junior members and beginners. On January 2 G2BOO will talk about Electrolytic Condensers. Morse classes will be held from 7.30 to 8 p.m. before each meeting. Visitors welcome.

City of Belfast YMCA Radio Club.—A winter programme of lectures and so on has been arranged, and two Morse classes are now active on Wednesday and Thursday. A visit was recently paid to the BBC Headquarters in Belfast, and two competitions for SWL members have been organised. A monthly news bulletin is now published for members.

Worthing and District Amateur Radio Club.—Meetings are on the second Monday of the month at 7.30, and are held at the Adult Education Centre, Worthing. During November the club is giving a dinner to G4JH, who is leaving the district for London.

Paisley Short Wave Club.—This club is now very active and is enrolling new members. On Saturday nights the members are busy working DX from GM3FDN, which now has a TU5B VFO installed. Prospective members are asked to contact the Hon. Sec.

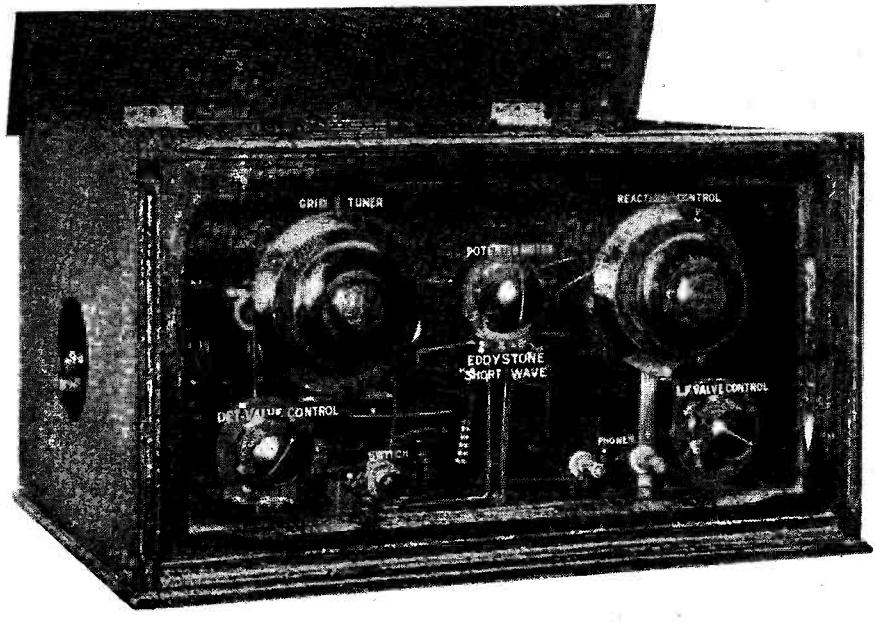
Kenilworth Radio and Television Society.—This club's transmitter, G3HAD, is now active on all bands from 1.7 to 14 mc. Members are busy improving their Morse and it is hoped that some more call-signs will appear shortly. It is hoped to show a series of films of interest to amateurs at forthcoming meetings.

Forfar and District Amateur Radio Club.—At the recent AGM the new season's officers were elected. GM3EAK is President, GM2HIK Vice-President, and Mr. A. F. Ferguson Secretary, as before. The clubroom is at 168 East High Street, Forfar.

Brighton and District Radio Club.—Recent events which have been popular and successful were the local Hamfest and the Club Stand at the Home Hobbies Exhibition. The club Tx, G3EVE/A, was operated from the latter. Activity now returns to normal, with weekly meetings on Tuesdays, at which talks and demonstrations will be given.

Radio Society of Harrow.—Meetings have been changed from Thursday to Friday evenings, beginning on December 8, and will be held in the Eastcote Lane Seconday School, South Harrow. Membership increases at every meeting. Forthcoming events: December 8, Constructional Competition; 15th and 19th, Practical Nights; 22nd Junk Sale.

Tyneside Radio Society.—Formed only on 15 September last, one of their principal objects is to operate in Contests. A permanent Hq has already been found, which will be occupied early in December, and regular meetings will commence as soon as possible thereafter. It was hoped to enter the club in MCC.



Many years ago, the firm of Stratton & Co. produced one of their first short wave receivers, made in the old factory in Bromsgrove Street, Birmingham. The model shown here was actually built in 1925, and is still in full working order. One of the features of this set, which was 0-V-1, was the glass panel—no doubt it was that which helped so much to get the tuning range down to 15 metres, considered an extraordinary low wavelength in 1925!

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

WANTED: BC-610 Hallicrafter transmitters, SX-28's, AR-88's, receivers and spare parts for above. Best prices. Write Box 854, c/o Spiers Service, 69 Fleet Street, E.C.4.

WANTED: Junction boxes for Hallicrafter transmitters JB-70A, also Antennae tuning units BC-729-A or BC-939-A and T-50 microphones. PCA Radio, The Arches, Cambridge Grove, W.6. Tel. (*RIV.* 3279).

WANTED: RCA speech amplifiers Type MI-11220J or K and Telephones Type EE8. Offers, stating quantity and price, to Box 855 c/o Spiers Service, 69 Fleet Street, E.C.4.

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HALLICRAFTER BC614 speech amplifiers. Complete with valves, £18/0/0 delivered. Bendix Frequency Meters, Type BC221, new, perfect, £25/0/0. Tuning Units from the BC375. Types TU6 TU7/8/9/10 and TU26B, all new with covers, 12/6. BC348 Receivers, reconditioned and perfect, with valves, £28/0/0 each. Spares for Hallicrafters BC610, RCA ET4336, Transmitters. American Transmitting Valves in stock. McElroy Adams Mfg. Group, Ltd., 46 Greyhound Road, London, W.6. (*Phone: Fulham* 1802, *Cables:* HALLICRAFTER, LONDON).

TAYLOR 30A Oscilloscope, £18. Avo capacity-resistance bridge, £7. Hunts CRB capacity/resistance bridge, £6/10/0. Hallicrafter "Skyrider," 5-10 metres, £12. Heavy duty mains transformers, standard primaries:— 4v 4A × 3, 16/-. 350-0-350v 180mA, 4v 4A, £1. Chokes 20H 250mA 12/-. 7H 250mA, 10/-. HF chokes, pile wound, 1.5 mH, 250mA, 9d. each, 8/- per dozen. Condensers, 4mF 1500v 3/-. 4mF 500v, 2/-. 25mmF 5KV, 50mmF 3kV, 100mmF 5kv, 2/- each. All in perfect condition. 1 Bridgefield Road, Gatacre, Liverpool.

SCR 522 T/R ARB released—Quantities. Connectors and Sockets for SCR 522. R. GILFILLAN & CO., 52 SOUTH STREET, WORTHING. (*Tel.* 3127).

FLASH. FB report from ETHIOPIA. Black crackle all the rage offset pallor due to rainy season. Your rig would look good too. Dead easy air or oven dried. Sample 2/-. Large tin 5/- post free. Full instructions. Geoff. Wheatley, G8QB, 80 Millmead Road, Margate.

WANTED. 2 AR88D and 2 AR88LF Receivers. State condition and price. Will buy separately. Box No. 856.

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WANTED: HRO Senior bandspread coils, power pack. P. H. Askew, 96 Main Street, Sedbergh, Yorks.

144 mc converter (4 valves), £5. Eddystone preselector, 7-14-28 mc, new £7/0/0. Peak Preselector, £2/10/0. Vitavox microphone, £5/0/0. 10 7 mc crystals and holders, £5/0/0 the lot. G8TY, 92 Arlington Road, Southgate, N.14.

SALE. TS47/APR test oscillator, 40-500 mc, 230v AC. RF26 unit, BC453, BC455, modified 12v AC as *Short Wave Magazine*. Class D Mk.I wavemeter 6v AC. Pullin Series 100 meter. Q-Max cutters; ⅝", 1⅛", 1½" Valves, etc. Offers? H. Bayliss, 35 Buckingham Road, Liverpool 9.

HRO Model MX. New condition. Superb in every way. Nine coils in boxes, including all bandspread. National power pack 230v AC, £34 plus carriage. G2AC, Sleepy Hollow, Headley, Borden, Hants.

144 mc transmitter for sale. As described in November 1948 *Short Wave Magazine*, including xtal and valves, less 829B. Offers? P25 receiver £3. ZB2 unit 12/6. Crackle speaker cabinet, 12/6. "Trophy Three" receiver, £4. Siemens High Speed Relay, 10/-. Eidson Xtal Holders, 5/- each. 6 assorted xtals, 25/- the lot. Valves HY40's 42/- per pair; 1625 7/6. 6J7 3/6. 6K7 3/6. 3B24 10/-. 832 20/-. 6B7G 7/6. 6C6 5/-. 42 5/-. G2AJ, Pine Crest, Lebanon Gardens, Biggin Hill, Kent.

EDDYSTONE rack, 3-tier, unused, complete, 70/-. EMCRI, complete, £5. CRT's, VCR138, new 15/-. G2FRC, 491 Rayners Lane, Pinner, Middx.

COLLINS TCS6 Rx with power pack, covers 160, 80, 40 bands, good condition, £7/10/0, delivered. RF24 unit, new, 10/-. Woden UM1 modulation transformer, new, boxed, 50/-. G3DJJ, 167 Cranbourne Road, Kingstanding, Birmingham.

FURTHER ITEMS BELONGING TO THE LATE G6SB, Pinner. This is all good gear, unpriced for offers. Items (1) 300-watt Tx, p/p 35T's, range believed 3.5-30 mc, plug-in coils, cabinet approx. 36" × 21" × 18", on standard panels; (2) Avominor; (3) STC Ball microphone on table stand; (4) New Labgear Converter, 14-21-28-56 mc; (5) Receiver CR100, requires attention; (6) 6-ft. rack, 18" deep, with standard panels; (7) Valves RK-34, TVO3-10, 32 new Rx valves EF39, 6H6, 6SG7, EBC33, RV12P2000; (8) Woden Type UM3 modulation xformer; (9) Odd transformers, unknown ratings, useful for laminations or test. Offers and Enquiries to: G. P. Anderson, G2QY, 16 Latimer Gardens, Pinner, Middlesex.

SNIP! 3 vols. *Modern Practical Radio and Television*. Absolute brand new condition, £3. or offer? G3GGD, 9 Snakes Hill Cottages, Navestock-side, Brentwood, Essex.

XTALS for sale, 7, 3.5 and 1.7 mc. S.A.E. for details. 5 Station Road, Teynham, Nr. Sittingbourne, Kent.

VFO cathode follower, modified from TU5B, 3-4 mc RF output, with built-in power supply, very stable, keys perfectly, bargain £8/10/0. Universal Avominor, in leather case, perfect, £2/15/0. G3DXC, 130 Priory Lane, Roehampton, S.W.15.

WANTED: S-meter for AR88D. Must be complete with fixing plate. Perfect condition essential. G3FWI, Park Villas, Whalley, Blackburn, Lancs.

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READERS'—*continued*

BC348R, 230v AC pack, S-meter, 6AG5 1st RF, xtal phasing, extra audio stage, 10-metre converter, £16. R.1155, 230v AC, audio output, £8. Both realigned, excellent condition. Loe, 30 Bridge Avenue, Upminster.

HALLICRAFTERS S36 for sale. Shockproof base, just unboxed, mint condition 27-143 mc. Exceptional condition. Cost £86. Offer wanted London Area. Box 842.

WANTED: Handbook for American test oscilloscope Type TS/34AP; also handbook for Du Pont 3" oscilloscope Type 224; also valves Types 884 and 6Q5G, good prices. Box 845.

OFFERS, G.E.C. 60w amplifier, parallel/push-pull KT66's, with power pack, revalved. Also pair power Selsyns, 230v 50 cycle, very powerful. Also straight midget Rx A.C. Box 844.

HALLICRAFTER Super Skyrider, with makers' matched 10" speaker, in streamlined cabinet. 13 valves, S-meter, xtal phasing, electrical bandspread, 6 bands 545 kc-62 mc, beautiful condition. Real bargain for quick sale. £22/0/0. G3EIM, 1193A High Road, Whetstone, London, N.20.

WIRE recorder (Wireway Portable) incorporating gramophone for ten- or twelve-inch records. Records direct from mike, or by attachment to radio speaker system will record programmes. Can be used as Public Address Unit. Will also record two-way telephone conversations. Good supply wire. Illustrated folder and book of instructions on receipt of deposit £1, returnable. Price £65. Lomax, 37 Lethbridge Road, Southport.

SALE B2 minor (Type A Mk3) transmitter/receiver, 10 watts, 80 and 40 metres, complete case, spare valves, phones, key, £6. Box 843.

TRANSFORMER 1200-0-1200v 250mA, 4v 6a impregnated 200-230v primary, £3. R.G.D. Type 37 Oscillator, 20-80 mc, complete as new, £7. 20H 250mA choke, 12/0. Clapp 3 stage 3.5 mc VFO, with AC power pack in metal cabinet, calibrated, £8. A. Roberts, 23 Beta Close, New Ferry, Wirral, Cheshire.

DENCO DCR 19—brand new. Delivery coincided with overseas posting. Offers to: Cheesley, 42 AMQ, R.A.F. Middleton-St. George, Darlington, Co. Durham.

R9'er Millen, brand new, offers? Will exchange for quantity new condition EF50 valves, also AR88LF £35 delivered. Eddystone 750, now increased to £59, used week only, selling for Ham called up, £42 delivered. Jones, 84 Embankment Road, Plymouth.

FOR Sale—Amateur surplus. Transmitting and Receiving componenets—coils, condensers, valves, Q.C.C. crystals, etc. Benson 7" vernier slide gauge. G2FCA, 26 Northolme Gardens, Edgware, Middx.

TX Radiocraft Type 44 with valves, coils, 80, 40, 20, £6/0/0. RF24 converted 20 metres, £1/0/0. Good condition. Easton, 40 Hereward Gardens, Palmers Green, London, N.13.

BC348 unmodified—operate it yourself. Perfect, external power supply, £18/10/0. or offer? Box. No. 853.

AR88 in first class condition wanted by amateur. Collection arranged. Details and lowest price to Box No. 848.

FOR Sale. AR88D 500 kc-32 mc, 250v AC, in case, first-class all round, first offer £35/0/0. Hallicrafter S27c UHF 120-240 mc, 14 valves, 250v AC, S-meter, AMFM, etc., £20/0/0 cheap, good order. Echophone Rx 500 kc-30 mc, 7 valves, 115v AC-DC, nice order, crystal filter, etc. £9/0/0. No callers. S.A.E. Gabriel, 10 Abbotsford Place Glasgow, C.5.

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HAMBANDER for sale. Three weeks old. Used five hours. Great bargain at £20/0/0. Box 847.

R.208, set spare valves, pair Brown's "F" type phones, £10/0/0. R.1116A, HT Elim/Trickle charger, £8/10/0. Both in good condition. Carriage paid. Box No. 846.

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TWO 19 sets Tx/Rx 2-8 mc × 235 mc, complete with power pack, mike, phones, etc., £8 each, or two £15. 1132A Rx, 100-124 mc, £3. Power Unit for 1132A £4. BC.610 Tx cabinet, good condition, £2. Buyer collects. Set of BC.610 xtals; 70 xtals two of each freq., £5. 15w amplifier 6J7-6J7-6V6-6V6-5U4G O/P xformer and meter, £6. Parmeko tracking recording unit, £4. Wave form generator, test set 87, 230v power pack, 150-300 mc, £3. 30" rack with 3" oscilloscope and C & R bridge, needs attention, £8. R107, modified with S-meter, £8. BC.454 3-6 mc, £2. BC453, 200-550 kc, £2. Valve voltmeter in case, diode probe, £3. 5CP1 CRT, 30/-. VCR31 12" CRT, electrostatic, £3. R.1585 Rx, ten midget valves UHF, £2. RF25 and RF27 units on panel, £2. Power unit HT No. 1 Mk.II, £1. Tx Type 7AD, £2. Responsor unit Type W4790B, £2. VCR97 with sundry resistors and condensers, etc. originally TV, £2. 12 mc IF strip for TV, 4 VR65, 1 D1, 1 6V6, £2. Resonant lines Tx, two VR135, 100 mc, £1. 3" C.R.T. 10/-. 12v battery charger driven by 60 c.c. engine, complete with spares, 12v 6A, £6. Sundry odd xformer, chassis, etc., etc. Can be seen any time. Shepherd, Gostrode Farm, Chiddingfold, Surrey. (*Phone:* 98).

RCA D/F loop in silver plexiglass streamlined housing with bearing indicator, as used in small boats, new, 30/-. U.S. APX1, latest 1FF set using 23 button valves, 170 mc, 18V dynamotor, control box, no valves, 17/6. Canadian No. 52 communication mains operated Receiver, 13 valves, 1.6 to 16 mc with internal speaker, 1 mc, xtal calibrator, 100 kc, 10 kc Spots, S-meter and large U.S. type manual, £10 or offers? Case for BC221, soiled, 10/-. 1 mc xtal, 7/6. BC733 VHF Rx, 10 valves and control box, 25/-. **Wanted:** 1947 edition Termans *Radio Engineering*, brand new BC966 IFF set in original carton, BC1000, BC746, and BC745 tuning unit. All carriage as decided. Box No. 851.

FOR Sale. HRO Senior, with power pack and all coils amateur bands, xtal phasing and S-meter, perfect, £30 or offer? Box 850.

SALE. Transmitter B2 complete with four B2 coils, excellent condition, WAC, £8. Roth, 72 Ashleigh Ave., Bridgwater, Som.

SALE Rx 1359, 130-520 mc, £8. Type 105, 70 cm Osc., £2. Type 26 unit, 35/-. Rx 103A, 160-80-40, £5. Must be disposed of. Gates, 67 Broad Street, Dewsbury, Yorks.

FOR Sale: Brookes electric motor (CUB) quarter HP, 220/240v × 50 c.p.s., also Buff and Grinder, hardly used, nearest £4/10/0. RF.27 converter to 2 metres, 955 osc., wants realigning, nearest £2/10/0. Frequency meter wanted. Westmoreland, 29 School Road, Langold, Worksop, Notts.

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WANTED CR300 receiver, all letters answered 69 Essex Road, Leyton, E.10.

SALE. Professionally designed transmitter up to 200 watts, comprising eight rack mounting units, will separate. Details: 13 Uplands Avenue, Wolverhampton.

AR88, as new, with speaker, £42 carriage paid. Also Hallicrafter S.20R Sky Champion, £14. 50-watt all-band Tx, Phone/CW £18 complete. Box No. 852.

S.640 with 688 speaker and 669 S-meter. Also R.A.F. Type 2 Morse practice oscillator. Both perfect. Offers to, Alker, Bank House, Thornhill, Wigan. (*Phone Wigan* 44849).

S.640 for sale. This set is a bargain, in excellent condition, only been used a few hours. £19, or near offer. Whiddett, 28 Egremont Street, Glemsford, Suffolk.

LABGEAR 150-watt plate and grid turrets, 3.5, 7, 14, 21, 28 mc. New, unused, £5 pair; B2Tx/Rx, coils, circuit, No P/P, £5. T1154N, spare valves manual, £3/10/0. R1481, unused, £3. TRI366, Tx/Rx 17-20 mc, new, circuit, £3. TR1196, control box, circuit, £2. Cross, 490 Richmond Road, Sheffield, 9. (*Phone* 37556).

HRO in FB condition with speaker and four coils, *viz.* bandspread 20, bandspread 10. GC 160-80 inc. GC 80-40 inc. Less P.P. Offers over £20. Box No. 854.

T1131 transmitter 3.5-30 mc, consisting 6L6-KT8-TZ40 exciter, P/P TZ40's PA, £40 or nearest. Buyer collects. New BC221, black crackle cabinet, with built-in power supply, £12. HRO rack mounting, with power pack and 5 coils covering amateur bands. Nearest offer £15. Wilson, 57 Broadway, New Moston, Manchester, 10.

AMATEUR going QRT. 200-watt Tx including VFO and control unit, 6ft. rack, broad-band exciter, real FB job, £60/0/0. Collins Rx. 1.5-12 mc, 12 volt valve No. P.P., £6/0/0. BC "Command" receiver 3-6 mc, new, £1/15/0. BC.221 Frequency Meter converted into VFO, and control unit, £15/0/0. Q-Max Grid Dip Meter, new, with all coils, £10/0/0. 10-metre T-match beam, new, £5/0/0. 2-metre 4-element beam to fit on top of 10-metre, £3/0/0. 522 Tx, almost converted with 4 crystals, £6/0/0. Hallicrafter Marine radio-phone HTIIA Tx/Rx, 1500-3000, No P/P, £15/0/0. 34 G power pack, 1200 volt, £8/0/0. TU5B VFO, £3/0/0. Army 12 Tx, as new, £20/0/0. Wave Meter, 160-220 mc, including power pack, £4/0/0. Also numerous valves, parts, crystals, etc. Send stamped envelope for further particulars. All prices plus carriage. M. Conu, 5 Orchard Gardens, Putson, Hereford. (*For appointment ring* 2177).

HRO metered receiver and power pack, 8 coils, 100kc to 30 mc, bandspread amateur bands. Sensitivity to maker's standard. New condition and appearance. £25. Box 857.

HALLICRAFTER SX24, excellent condition and appearance. Complete with speaker, 550kc-43 mc, noise limiter, variable selectivity, xtal, stabilised oscillator. £25/0/0. Evenings. 50 Addington Road, West Wickham, Kent. (*SPR.* 3831).

WELL known amateur, DXCC, WAS, BERTA, going VK, selling his equipment. Table top transmitter containing everything except final HT supply, £13. 1250-volt power pack, £3. AR77E, perfect condition, £25. Seen working London, S.W.12. (*Telephone TUL* 1930 *after* 5 *p.m.*).

COLLINS 30J TRANSMITTER 5-10-20-40 METRES, PHONE/CW. 30 TO 250 WATTS. CONDITION AS IMPORTED 1938. £115. DEMONSTRATION. BOX NO. 855.

DONT MISS THESE BARGAINS

ELECTROLYTIC CONDENSERS

4 mfd. 450 v.	1 6
8 mfd. 150 v.	1 3
8 mfd. 350 v.	1 6
8 mfd. 450 v.	1 11
8 mfd. 500 v.	2 6
16 mfd. 350 v.	1 11
16 mfd. 450 v.	2 8
16 mfd. 500 v.	3 6
32 mfd. 350 v.	2 8
32 mfd. 450 v.	3 6
10 mfd. 25 v.	10
25 mfd. 25 v.	1 0
50 mfd. 12 v.	10
8 mfd. × 8 mfd. at 450 v.	3 4
8 mfd. × 16 mfd. at 350 v.	2 6
8 mfd. × 16 mfd. at 450 v.	3 6
16 mfd. × 16 mfd. at 350 v.	3 0
16 mfd. × 16 mfd. at 450 v.	3 9
25 mfd. × 25 mfd. at 200 v.	3 11
16 mfd. × 8 mfd. at 350 v.	2 6
16 mfd. × 8 mfd. at 500 v.	4 6

LIQUIDATOR'S STOCK

Polished walnut radio cabinet size 20 × 12 × 7½in. complete with L., M. and S. dial, size 7 × 6¾in. and backplate with magic eye cutout, also with drilled chassis and hardboard back. You will find it quite a simple matter to complete this into a very handsome receiver of the £15 class. Limited quantity, price 32/6, plus 2/6 carriage for the 5 items.

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RADIOGRAM UNIT BY A VERY FAMOUS MAKER. Comprising centre drive induction motor with speed regulator, auto stop and magnetic pick up, all mounted on a full size unit plate. Brand new in manufacturer's cartons. The motors are 78 R.P.M. type, but we understand that as they are governor controlled, their speed can be reduced to 33 R.P.M. or they can be made into dual speed motor by quite a simple modification. We have no precise details of this modification at the moment, but if these come to hand we will gladly supply free of extra charge to purchasers.

Only a limited supply of these radiogram units are available at this month's Snip price of **£5 5s.** ea. (this is almost half proper price) so order by return. If not calling enclose 3/6 extra for packing and insurance.

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All have full-length spindle and are complete with fixing nuts. We stock full range of values between 2,000 ohms and 2 megohms, prices are less switch, **2/6** each ; single-pole switch **3/9** each.

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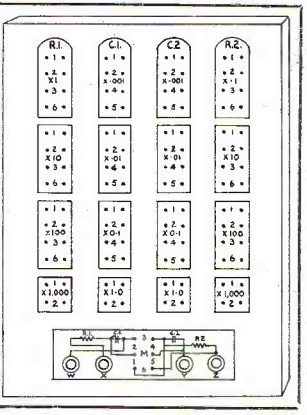
All speakers are by very famous makers such as Rola, Celestion, Goodmans, etc.

Size.	With Trans.	Less Trans.
2½in.	—	10 6
3½in.	—	10 6
5in.	12 3	10 6
6½in.	12 6	10 6
8in.	13 6	11 6
10in.	18 6	16 6
12in.	—	39 6

FOR YOUR LABORATORY

You many times have felt the need of a device which would enable you to put resistance or capacity or a combination of these two quickly into a circuit. We have a small quantity of resistances and capacity boxes which, by the simple manipulation of plugs, will enable you to do this. With these boxes you can put in 1 ohm, 2 ohms, 3 ohms, 4 ohms, and so on, in steps of 1 ohm, right up to 6,000 ohms. In a similar way capacity can be put into circuit by small amounts, thus making it simple for you to find optimum working conditions. These boxes made for Government Laboratories, are available while they last at **19/6** each, plus 1/6 post and packing. Don't delay—order by return.



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