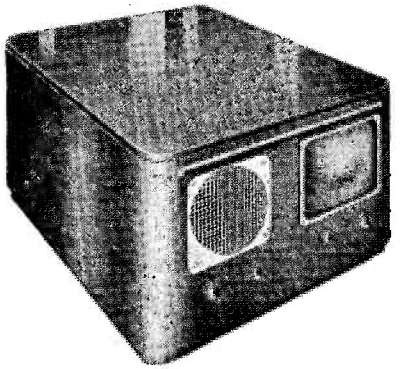
The SHORT WAVE Magazine

2/-

EXCLUSIVELY FOR THE RADIO EXPERIMENTER & TRANSMITTING AMATEUR

VOL. VII No. 8 OCTOBER 1949

TELEVISION for £15 : 5



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1LA4	7/6	6B7	10/2	6L7	7/6	12A6	6/6	39/44	8/9
1N5	8/6	6B8	6/-	6N7	10/-	12K7	8/6	32	7/6
1R5	6/6	6C5	7/6	6Q7	6/6	12K8	8/6	41	7/6
1S5	6/6	6C6	9/6	6SA7	7/6	12SH7	7/6	42	10/6
1T4	6/6	6D6	7/6	6SG7	6/6	12SK7	8/6	58	7/6
1S4	6/6	6F5	6/6	6SH7	6/6	12SQ7	8/6	80	10/-
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5V4	7/6	6H6	3/6	6SN7	6/-	18	10/6	84/6Z4	10/-
5X4	8/9	6J5	6/6	6T7	8/-	19	10/6	9001	9/-
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5Z4	7/6	6J7	7/6	6V6	7/6	25Y5	10/-	954 acorn	5/6
6A3	10/6	6K7G	7/6	6X5	6/6	25Z4	9/-	866A	15/6
6AC7	6/6	6K7GT	9/6	7A7	7/6	25Z6GT	7/6		
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THE *SHORT WAVE LISTENER* ASSOCIATED WITH THIS MAGAZINE IS SPECIALLY FOR THE RECEIVING ENTHUSIAST

EDITORIAL

Trumpet

As we write these words large issues have been decided which, notwithstanding the hopes centred on them, may belittle Britain and all she has done for the world. But since we live in times when past glories must give way to present realities, let us in this space consider some of those realities.

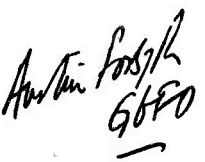
Whatever may be opinion as to its wisdom or probity at this state of our affairs, we are giving a lead to the whole world in those matters which are expressed by the term Welfare State—and England is also far ahead in the purely technical and commercial fields.

We operate the largest and fastest passenger liners afloat, the most powerful locomotives yet built, possess not only the biggest passenger aircraft in the world but also the only jet airliner yet airborne, and we still manufacture the motor-car which is accepted as the standard by which all others are judged.

In the field of radio, Britain has given the world not only commercial short-wave communication and television, but also radar, indicating nearly all its applications in war and most of its possibilities in peace. All the fundamental research on atomic energy was done in this country and we are also first in the world to show how the by-products of nuclear fission can be applied to the arts of healing and the science of industry.

It is therefore not surprising that in the relatively restricted field of Amateur Radio our supremacy as a nation still asserts itself. An analysis of the results of the world's leading amateur stations shows that British operators—in spite of the handicap of power and their numerical inferiority—are well in the forefront by any measure of DX achievement or technical ability.

As it is in the present and has been in the past, so it will be in the future. The only thing we need fear is being cowed into believing that Britain has lost her supremacy in the arts and sciences.



Voice Controlled Transmission

Practical VOR Circuits for Two-Wire Line

PART I

By **R. KNOWLES, B.A. (G3AAT)**
Instr. Lieut., R.N.

The possibility of comfortable remote control operation, particularly when the chills of winter are on us, has always been a fascinating prospect to many amateurs. This article describes in some detail an ingenious system which works well and, requiring only a two-wire line from the remote position, extends both transmitter and receiver to an ordinary telephone handset.—Ed.

BEFORE describing the control circuits in use at G3AAT/A, a brief description of the principles involved will not be out of place.

The radio room is some distance from the operator's quarters and a form of remote control was desired, preferably one as simple as possible and providing as many facilities as could be arranged. After a little preliminary work, two systems emerged, one for CW and the other for telephony.

The CW remote control uses a carrier of frequency 7,250 kc to key the 150-watt transmitter, after the manner of a radar beacon. Reception is done on a receiver at the controlling end. Apart from sideband splash from a 7 mc commercial transmitter over-modulating, which took charge of the keying, the system worked well.

The voice remote control is of greater interest. The problem solved here was that of wanting to extend *both the transmitter and receiver* over a two-wire line to a remote operator who uses a field telephone. Unless duplex operation is considered, voice operated switching is necessary and also some means of preventing received signals from triggering the Voice Operated Relay controller.

Two basic principles emerge, namely, the Hybrid Transformer and the Voice Operated Relay set (VOR for short).

A simple means of achieving both of these will be discussed in this article and Part II will deal with a more advanced VOR which gives reliable operation under adverse conditions.

The Hybrid Transformer

This is the name given to a bridge transformer which can discriminate between signals feeding a two-wire line and signals coming from a two-wire line. It is an application of the Wheatstone Bridge principle, where, it will be remembered, at balance the battery feeds no current into the galvanometer.

In Fig. 1 the only condition for balance is that the ratio of R1 to R2 is the same as the ratio of R3 to R4, for if this is so the voltages at points A and B will be identical and no current will flow through the galvanometer G. If the battery is replaced by an AF signal generator and the galvanometer by a headset phone, then no AF signal will be heard in the 'phones, but all the resistors will have an AF signal voltage developed across them.

It is not even necessary for the four arms of the bridge to be resistors—they may be complex impedances and so long as the ratios are maintained equal, then balance will exist.

In particular, the bridge could be arranged as in Fig. 2, where the R3 and R4 arms are replaced by two similar inductances L, and R1

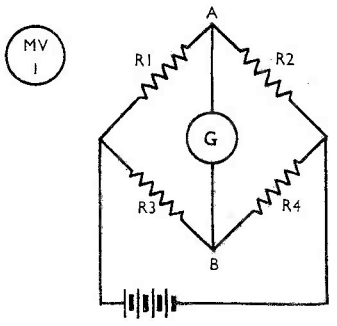


Fig. 1. Basic balance circuit, the Wheatstone bridge.

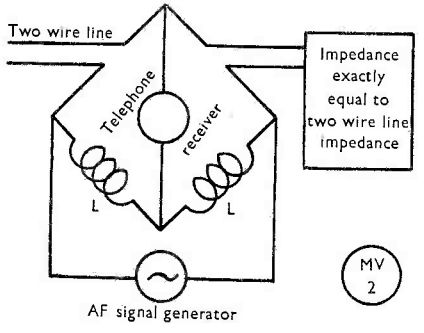
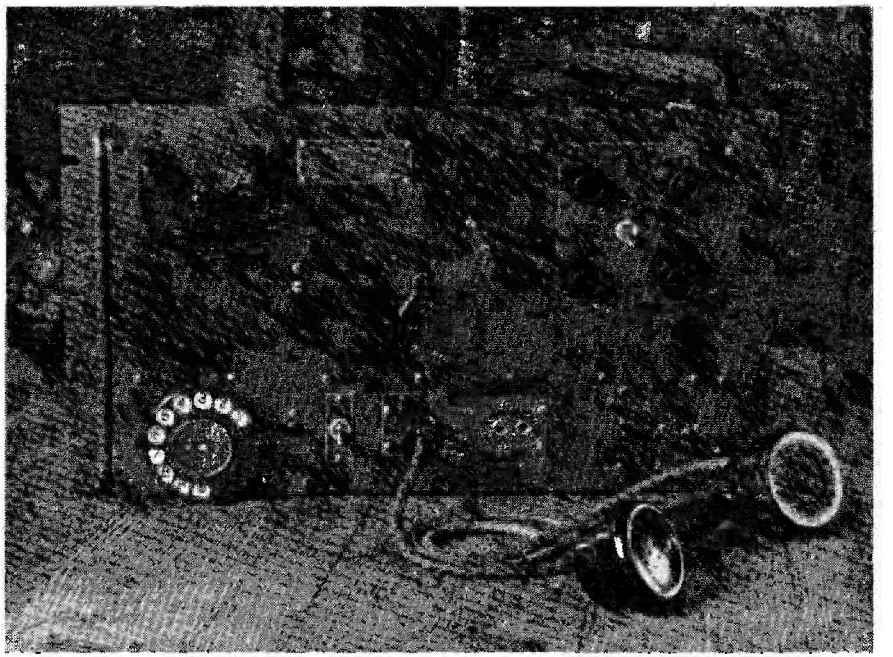


Fig. 2. An AF bridge on the same electrical principle as Fig. 1.



The control unit in the G3AAT assembly.

is replaced by the two-wire line. R2 must be replaced by an artificial line, the impedance of which is the same as that of the proper line. This makes both of the aforementioned ratios unity.

The AF generator will now feed half of its signal into line and the other half into the artificial line, none whatever going into the telephone receiver. The positions of the AF signal generator and the telephone receiver could be interchanged without affecting the argument and the coils L could be coupled to the generator (or telephone) by mutual inductance. The line, if it were to produce a signal, would cause signals to appear across both the generator and telephone receiver.

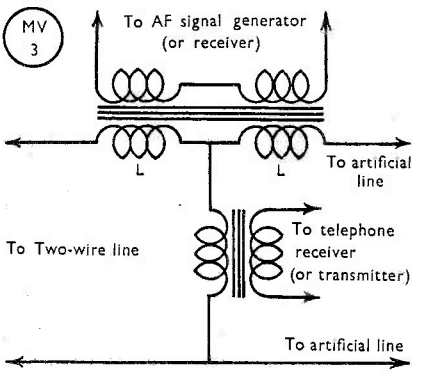


Fig. 3. The hybrid transformer, described in the text.

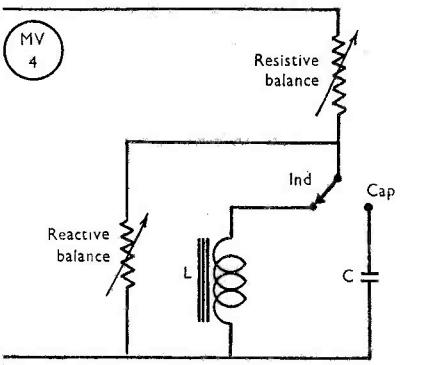


Fig. 4. The balance network, to permit both-way operation over a two-wire control line.

This gives a workable hybrid transformer, illustrated in Fig. 3. In place of the telephone receiver, the input to a radio transmitter could be used; similarly the output of a receiver could replace the AF signal generator. The transformers enable any impedance matching to be done. The only remaining problem is to simulate the control line by an artificial line having impedance as near as possible to the real line impedance over the voice frequency range, otherwise the receiver will produce a signal across the transmitter input.

A simple resistance of 600 ohms will balance a long telephone line of 600 ohms nominal impedance, but a short line terminated by a telephone needs a more complex network, which makes some provision for reactance balance. A simple and sufficiently effective one is shown in Fig. 4. Values of L and C, suitable for a 600-ohm line, are 150 mH and 0·1 μF respectively.

Neither control is independent of the other, nor is exact balance possible at all frequencies, but if it is balanced at 1,000 c/s then balance holds well enough over the ordinary speech range.

Simple Voice Operated Relay Set

Having now a means of distinguishing between signals emanating from the line and signals from the receiver, the next requirement is that the incoming line signals should operate the transmitter relays to set up the sending circuit. Many VOR systems have already been published in the *Short Wave Magazine*, all of which are suitable—indeed, some will function better than the one about to be described. The ideal VOR should switch on instantly and release after a delay which does not depend on the volume of speech operating it. Being limited initially at G3AAT/A to an HT of only 24v and one valve-holder rather limited scope for design. The one to be described is at least simple, and works.

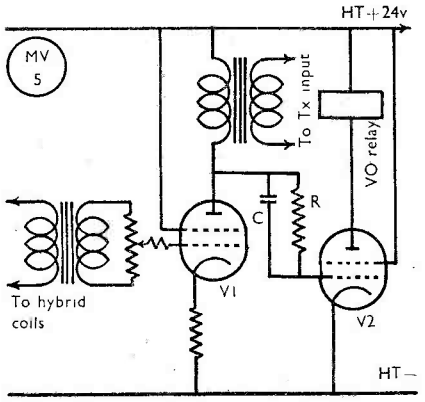


Fig. 5. Basic circuit for a simple voice operated relay (VOR).

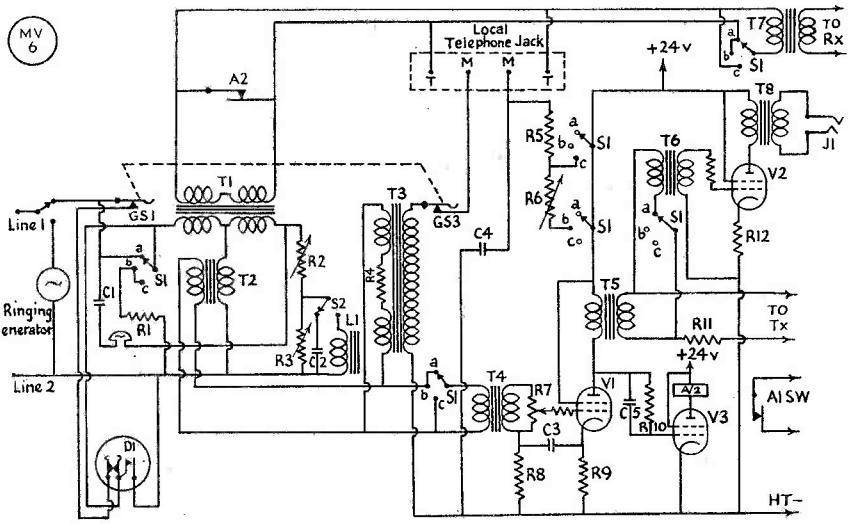
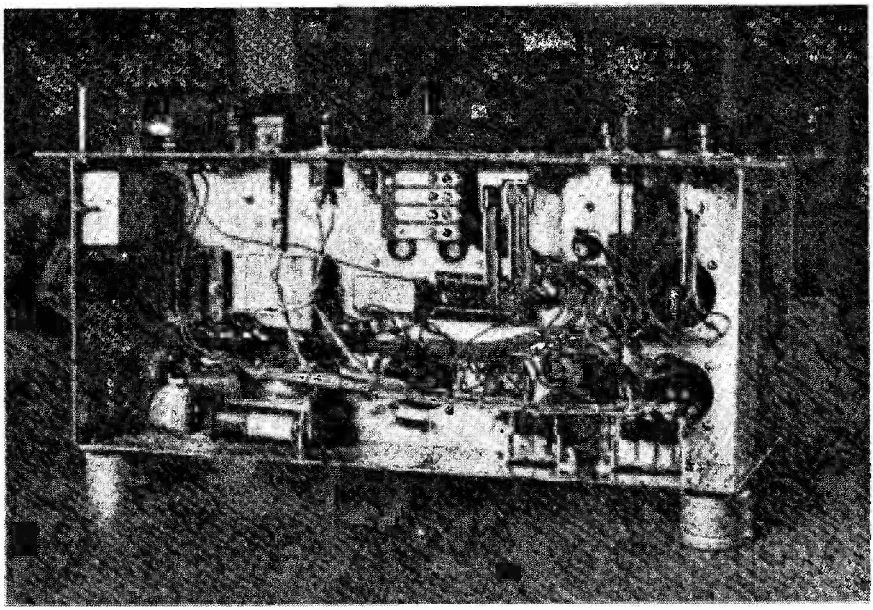


Fig. 6. The complete VOR circuit, as first used by G3AAT. Values are given in the table.



Underneath the VOR as described in the article.

A leaky grid detector with a long time-constant is used, the grid leak being returned to HT+ to overcome the effects of grid current in the switching valve. Fig. 5 illustrates the circuit. When speech voltages appear on the grid of V1, the resulting amplified signals at the anode are fed to the grid of V2, causing the condenser to charge from grid current. This so much reduces the anode current of V2 that the relay in its anode circuit releases, and the contacts operate the send-receive relays of the transmitter.

After speech has ceased, the charge on the grid side of C leaks away to HT+ at a rate determined by the time constant CR. Values of 0·01 μF and 4·7 megohms appear to be satisfactory. For such a low HT voltage, the type 6Y6 is the most desirable valve, but the writer uses a DDR2 (EF55, CV173) for V1 and 6L6 for V2. Unfortunately, the delay time does depend on speech volume to a certain extent, being short for interjections such as "Yes and Oh." (This might be considered by some to be an advantage!)

Table of Values

Fig. 6. Suitable Voice Operated Relay Circuit

C1, C3	= 2μF
C2	= 0·1 μF
C4	= 4 μF
C5	= 0·02 μF
R1, R4, R5	= 560 ohms
R2	= 1,000 ohms
R3, R6	= 5,000 ohms
R7	= 250,000 ohms
R8	= 20,000 ohms
R9, R11, R12	= 470 ohms
R10	= 4·7 megohms
T1	= Hybrid transformer
T2	= Hybrid-valve
T3	= Microphone-hybrid
T4	= Valve match
T5	= Valve-Transmitter
T6	= Valve-Monitor
T7	= Receiver-Hybrid
T8	= Monitor output
A/2	= Type 3000 relay, 2,000 ohms
D1	= Type 10 auto dial
V1	= DDR2, or 6Y6
V2, V3	= 6L6

The Complete Arrangement

The complete circuit is shown in Fig. 6, being built up from the remains of an American BC-686. This unit provided all the necessary switching for Local Control, Line-to-Radio and Line-to-Phone, together with ringing and monitoring facilities, but it used 24v. valves and 24v. H.T. The low HT is a disadvantage but is easily obtained from a selenium rectifier.

A few snags became apparent on first switching on. The first was that the particular transmitter used fed DC into its input for microphone energizing. When A1 operated, the cessation of this current caused a pulse to be transmitted through T5 to the grid of V3, A/2 was released and a cycle of events started

which only stopped when the machine was switched off! This could easily have been cured by disconnecting the microphone energizing supply, but a less destructive method was tried—inserting a 4 μF electrolytic condenser in series with R11 (Fig. 6).

The next trouble, apparent only when working in the 80-metre band, was that of RF energy reaching the grid of V3 (Fig. 6), preventing A/2 from operating. Suitable earthing of leads and screening of all control wires eliminated this trouble.

Having dealt with the electrical problems, the next difficulty was caused by acoustic coupling between the rattling transmitter relays and the local microphone, setting up a chain of manifestations similar to those caused by the microphone energizing current.

There appears to be no cure to this, other than not allowing such feed-back or using quieter relays. (The VOR described in Part II is less susceptible to this particular trouble.)

Contacts A2, across the receiver channel, prevent any break-through, which may give sufficient signal through hybrid unbalance to keep A2 released indefinitely. They also prevent excessive side-tone in the telephone.

A further refinement would be an interlock between the transmitter and receiver making it impossible for speech to operate the VOR if a signal is being received from the distant station. Positive-going AVC voltage could be applied through a diode to the grid of V3 with a normally closed contact on relay A to short the AVC when transmission is actually occurring. This has not been tried, as the signals the writer wishes to receive do not seem to be sufficiently strong to operate the AVC—whereas, of course, QRM will always do so!

In conclusion of this Part, it must be emphasised that on no account must an apparatus, as described here, be connected to GPO lines, as this would infringe both the amateur licence and the usual telephone agreements.

(Part II of this article will follow)

Signal-to-Noise Ratio and Receiver Gain

RF-Mixer Design, and the Choice of Valves

By **E. DANDY, A.M.I.R.E. (G3BJB)**

The factors and relationships discussed in this article are not always clearly understood; many amateurs rather tend to look for gain in a receiver and accept the resulting noise as a necessary evil, sometimes even mistaking it for "liveliness"! In fact, there is much yet to be done towards producing a quiet high-gain receiver, and our contributor discusses some of the problems involved in designing an efficient RF end.—Ed.

AS there appears to be some misunderstanding on the part of many amateurs as to the most important features of a good communication receiver, this article is offered in simple non-technical language in the hope that it might help to clarify matters a little. Of the many features of a receiver perhaps the two most misunderstood are signal-to-noise ratio and gain. For the purpose of this article, therefore, it is proposed to concentrate on these two factors—not only because they are the most important, but because they are the least understood.

Gain

Very often one hears it said that the more gain in a receiver the better. But it is in fact possible to have too much gain! When a receiver is designed one of the first questions to be asked is how much gain is required. Most detectors operate best when the signal input level is of the order of 1-10 volts. If, as is usual in communication receivers, we decide that a one microvolt signal is the weakest one we need hear, then to raise the gain to about two volts at the detector we require a gain of 126 dB. Suppose, however, the operator says he would like to listen to a weak DX signal of 0·10 microvolts. It would seem that all we have to do is to increase the gain by ten times (or 20 dB). Here, however, we are up against Snag No. 1, *Thermal Noise.* The first tuned circuit in the receiver will itself contribute a certain level of noise and this, together with valve noise, will decide the lowest value of signal we are likely to be able to hear.

It might be of interest at this stage to explain the cause of *thermal noise.* Briefly, all conductors contain free electrons, which are in a state of random motion. The average velocity of these free electrons is directly proportional to the absolute temperature. Each electron in motion constitutes a minute current.

These currents produce, across the ends of a conductor, voltages the frequency components of which cover an infinite band. The pass-band

of the receiver affects the noise voltage, as the wider this is the more noise-frequency components are amplified.

To go back to our receiver, we can give some idea of the magnitude of the thermal noise, based on the first tuned circuit resistance and the IF bandwidth. Typical figures would be a 250 ohms input impedance and a 2 kc bandwidth ; this would give a figure of 1 microvolt. Therefore, a 0·10 microvolt signal would give a poor signal-to-noise ratio, in fact 1-1. So we can see that there is no point in having a gain higher than that required to hear the noise generated in the first tuned circuit.

Shot Noise

However, this is not the end of the story. We have another factor to consider (Snag No. 2), namely valve-noise or, as it is also known, *Shot Noise.* This is a source of noise contributed by the RF or Mixer stage, and is perhaps best explained as follows : The anode current of a valve is not completely uniform but consists of a DC component upon which is superimposed a random fluctuating current. These random fluctuations in the anode current cause noise voltages to be set up across the anode impedance. The noise is distributed equally over the whole RF spectrum so that the amount of noise contributed by the source depends upon the receiver band-width. A convenient way of expressing shot noise is as the equivalent resistance between grid and cathode of the valve, which at room temperature would give a thermal noise voltage in the anode circuit equal to that produced by the shot noise. This method allows the relative magnitude of shot and thermal noise to be related by comparing the equivalent shot resistance with that of the input circuit.

The equivalent noise resistance of a valve is proportional to Ia/gm^2. We can, therefore, see that the best type of valve to use in the RF stage of a receiver is one with a high slope, *gm*, and a low value of Ia. Triodes give the lowest noise resistance and usually have a value of 250-500 ohms. Ordinary screened-grid types and pentodes are poor and give a resistance between 10,000-30,000 ohms ; this is mainly due to screen current and secondary emission. Frequency changers are the worst types (50,000-100,000 ohms) due to low signal gain or *gm* (conversion conductance) for a given Ia. Additionally, here a certain amount of shot noise is also introduced by the oscillator valve.

Summing up, from the practical point of view it can be said that, except at VHF, if an efficient RF stage is used, thermal noise is greater than the shot noise. If, however, the first stage is a frequency changer the reverse is usually true and shot noise predominates. Generally speaking, a receiver with a given overall gain without an RF stage has at least twice the noise voltage (thermal and shot noise), of a similar one which incorporates an RF amplifier valve.

Signal-to-Noise Ratio

Reverting to the original question, *the weakest signal we can hear*, it will now be apparent that this is a function of signal-to-noise ratio when there is adequate gain in the receiver. Thermal noise is unavoidable in practice, as the temperature is fixed. (In fact, if it were possible to reduce this to absolute zero there would be no noise produced). So the way to improve the signal-to-noise ratio of your receiver is to make the valve noise as small a proportion as possible of the total receiver noise.

In order not to fog the issue during the previous discussion, no reference has been made to the effect of connecting an aerial to the receiver. When we do this we come up against Snag No. 3, *Site Noise.* This comprises atmospheric charges and electrical interference from neighbouring machinery, over which the average operator has usually little control. This type of interference incidentally diminishes with increase in frequency. Obviously, if we have taken very great care over the reduction of thermal and valve noise in our receiver, and the instrument is used at an unfavourable location, then the site noise may be very much greater than the receiver noise.

The answer here, of course, is to locate the

". . . . Just think darling, the W's will be breaking through about now . . . ."

aerial as far as possible from the interfering source and connect it to the receiver by a screened low-impedance matched feeder. (We are assuming that the aerial is correctly matched into the receiver input circuit.) Another type of interference very prevalent on the short wave bands is caused by car ignition systems. This consists of short pulses of large amplitude which can, however, be greatly reduced by a carefully designed noise suppressor or limiter, as often described in the *Short Wave Magazine*.

To make a few helpful suggestions with reference to the most suitable type of valve to use in the RF stage of your receiver: Perhaps you are wondering why triodes are not more often found in receiver RF stages in view of their low noise figures. There are two main reasons for this, namely difficulty of neutralisation and also at frequencies below 30 mc there would usually be no advantage as site noise would predominate, and there would be no justification for the extra complication involved when a pentode would be just as satisfactory. At higher frequencies, however, there are very great advantages in the use of a low-noise triode, and this type is now being used much more frequently in radar applications and receivers on centrimetric wavelengths. It should be well worth while on the 144 mc and 420 mc amateur bands to use a low-noise miniature triode as a neutralised first RF Amplifier. (*Recent issues of the* MAGAZINE *show that this is the tendency on VHF, as several workers on these bands have independently reached the same conclusions as the author of this article.*—Editor.)

To sum up, for frequencies up to 30 mc the following rules might be followed.

(*a*) Make sure that the aerial is matched into the first tuned circuit, and that there is a step up in this circuit, to the valve grid, of the order of three to four times.

(*b*) Choose a low-noise pentode, such as a 6AK5. Look for a high slope (*gm*) valve with a low input capacity and you should achieve a gain of 10-15 times. This should ensure that the aerial circuit noise will be amplified sufficiently to over-ride the following converter valve noises; that is providing that the mixer is a low-noise high-slope pentode with a separate oscillator.

(*c*) Good circuit arrangements, short leads, a low capacity bandswitch (if used), and small stray capacities are essential.

Provided all the above requirements have been fulfilled there should be no need for more than one RF stage in the receiver unless extra preselection is a real requirement.

Above 30 mc

For frequencies above 30 mc, however, it may be an advantage to have a further RF stage. This may even be necessary, as the step-up ratio of the first tuned circuit and the first RF valve gain will not be as great at these frequencies. Therefore, two RF's will be essential to ensure that no additional noise is contributed by the mixer stage. For 144 and 420 mc working, a triode of the low-noise type (say a 6J4), properly neutralised, will be of real advantage.

The table given here to show the equivalent noise resistance, Req, of various receiving valves may be of interest in selecting the most suitable RF types.

Valve	gm (μmhos)	Req (ohms)	C input ($\mu\mu$F)
TRIODES			
6AC7	11,250	220	11·0
6AK5	6,670	385	4·0
6C4	2,200	1,140	1·8
6J4	12,000	210	2·8
PENTODES			
6AC7	9,000	720	11·0
6AG5	5,000	1,640	6·5
6AK5	5,000	1,880	4·0
6SJ7	1,650	5,840	6·0
6AB7	5,000	2,440	8·0
6SK7	2,000	10,500	6·0
CONVERTERS			
1R5	250	160,000	7·0
6SA7	450	250,000	9·5

Incidentally, the 6AC7 is not as good as it looks owing to its high input capacity.

Conclusion

Finally, just a few words about measuring signal-to-noise ratio in receivers. The generally accepted method of measuring receiver noise factors now in use is the well-known noise diode. Briefly, this consists of a saturated diode used as a noise source, which is matched into the receiver input terminals; the noise output is controlled by varying the heater volts. The noise voltage of the receiver without the diode switched on is noted by means of an output meter. The noise diode is now brought in and the heater voltage is increased until *twice* the original voltage is noted on the output meter. By using this method experiments with different input stages can be carried out, and comparison checks made for the best signal-to-noise ratio. It is quite within the scope of the average amateur to construct this type of measuring gear, and the subject was dealt with in some detail by G2IQ in his "Comparing Receiver Performance" (p. 286, *Short Wave Magazine*, June 1949), to which article reference can be made for further information.

DENCO DCR-19 RECEIVER

It had been hoped to carry a full Test Report on Denco's DCR-19 in this issue. Space considerations have, however, again delayed appearance, but it is hoped that the Report will appear in our next issue.

Practical SSB Driver

Final Details, and Reception

By H. C. WOODHEAD (G2NX)

PART III

Our contributor's discussion, published in three separate parts, will have done much to inform readers on the possibilities of SSB operation on the amateur bands. It is a subject which is new in the amateur sense, but this is only one reason why SSB transmission should be investigated by phone operators interested in the latest techniques.—Ed.

THE description so far has covered the production of a single sideband signal at 5·65 mc (nominal) and its translation by means of a frequency changer to any point in the 80-metre band.

For other bands an additional step is necessary and for working on 20 metres the switch S2 in Fig. 10 changes over the output of FC1 to Filt. 4, which selects the upper sideband in the range 7·45 to 7·85 mc, according to the setting of Osc. 2, being the sum of the frequencies of Osc. 1 and Osc. 2. This is applied to FC2, where the output of Osc. 3 is added to it to give any frequency in the range 14 to 14·4 mc. Thus, Osc. 3 is a crystal with a frequency of 6·55 mc.

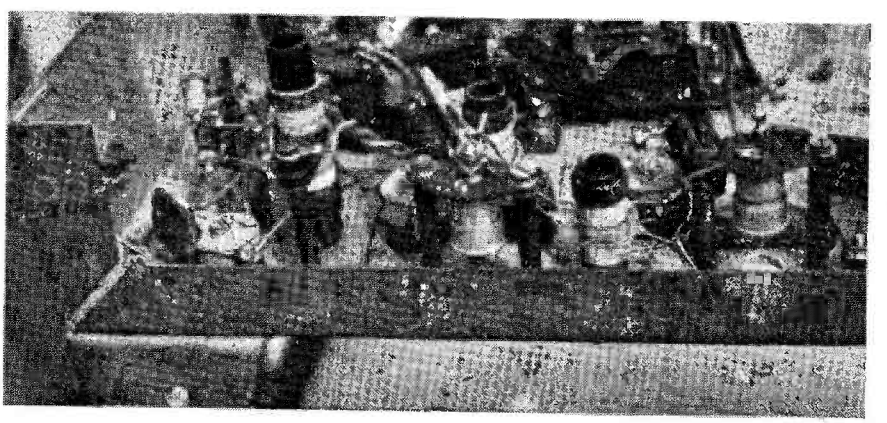
Now, in order to save space FC.2 and FC.3 are really one and the same, but were shown in Fig. 10 as two separate stages the more clearly to describe the operation. Likewise, Osc. 3 and Osc. 4 are one and the same with the HG added for working on 10 metres. In the actual unit S3 follows FC.2 and selects the input to the 20-metre or the 10-metre output stage. It can be found in the circuit diagram, Fig. 19, shown as S2c. The change from Osc. 3 to Osc. 4 is effected by plugging a different crystal into the same holder and changing over S2 of Fig. 19. When working on 10 metres, the crystal will have to be between 6·85 and 7·38 mc, such that its third harmonic when added to the SSB signal in the band 7·45 to 7·85 mc from FC.1 will cover a section 0·4 mc wide of the band between 28 and 30 mc. Thus, more than one crystal will be required for complete coverage of this band though even 0·4 mc provided by one crystal will give a certain amount of latitude for avoiding QRM.

Photographs 1, 2 and 3 show parts of the unit in its early stages of development. In No. 1 can be seen the crystal valves of the Ring Modulator on the extreme left, followed to the right by the circuits and balance condensers of the crystal filters. In the background may be seen the Carrier-reinsert Relay. Photograph No. 2 follows on from No. 1, and the first coil on the left is the input circuit to the grid of FC.1 which is slightly to the left of the centre. Following to the right are the circuits shown in Fig. 10 as Filt. 3 and Filt. 4 and on the extreme right are the circuits of Filt. 5 and Filt. 6 leading to the 10 and 20-metre output stages.

Photo No. 3 shows the base of the unit with the screening cans in position. The valves, running from left to right, are Osc. 1 (just showing), FC. 1, FC. 2 and 3 and the Output Stage.

Performance

The unit so far completed has only been



Photograph No. 1 showing the crystal valves for the Ring Modulator on the extreme left.

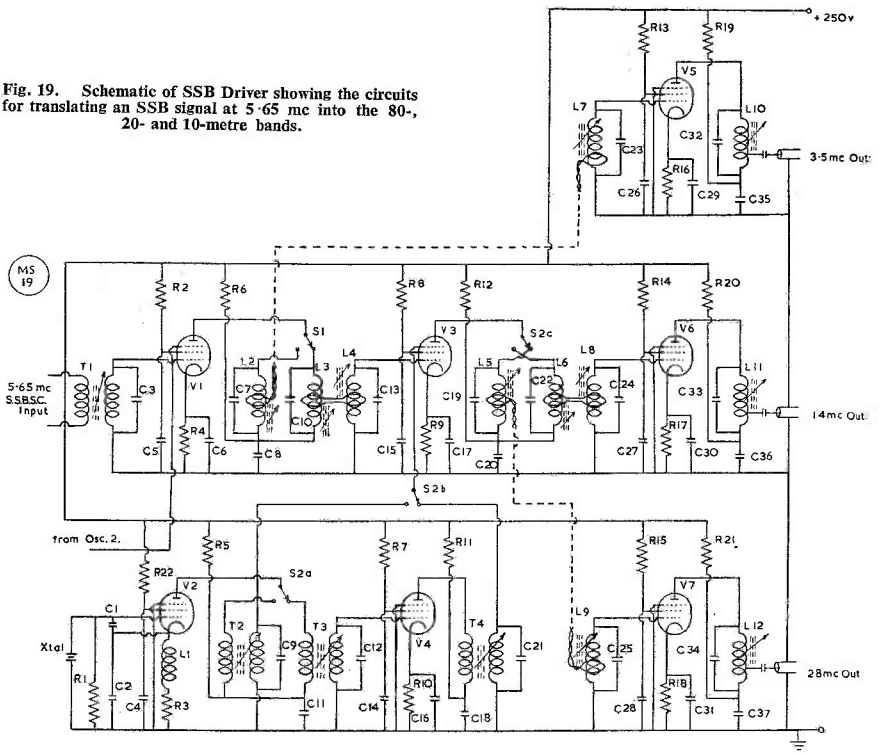
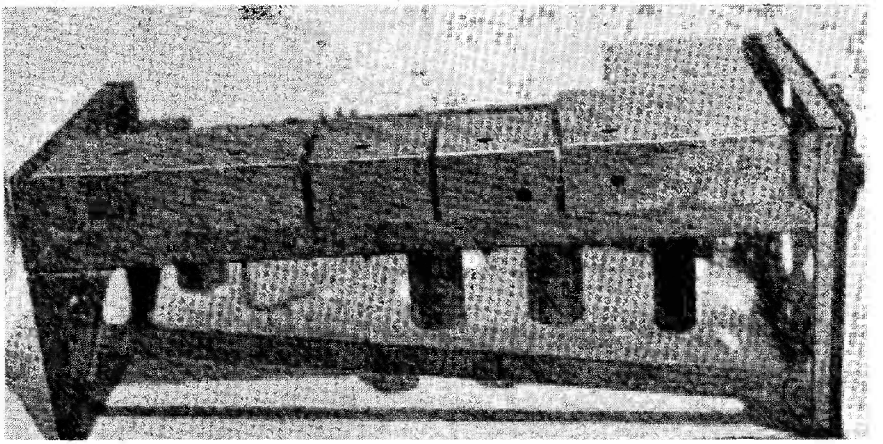


Fig. 19. Schematic of SSB Driver showing the circuits for translating an SSB signal at 5·65 mc into the 80-, 20- and 10-metre bands.

Table of Values

Fig. 19. The SSB Driver Circuit

C1 = 20 $\mu\mu$F ceramic
C2 = 100 $\mu\mu$F ceramic
C3, C9, C10, C12, C13 = 50 $\mu\mu$F mica
C4, C5, C6, C8, C11, C14, C15, C16, C17, C18, C20, C26, C27, C28, C29, C30
C31, C36, C37 = ·001 μF mica
C7, C23 = 100 $\mu\mu$F mica
C19, C25, C34 = 10 $\mu\mu$F ceramic
C21, C22, C24 = 25 $\mu\mu$F mica
C32 = 100 $\mu\mu$F ceramic
C33 = 25 $\mu\mu$F ceramic
C35 = ·01 μF mica
R1 = 1 megohm, ¼-watt
R2, R7, R8, R22 = 10,000 ohms, ½-watt
R3, R16, R17, R18 = 200 ohms, ½-watt
R4, R9, R10 = 100 ohms, ½-watt
R5, R6, R11, R12 = 1,500 ohms, ½-watt
R13, R14, R15 = 5,000 ohms, 1 watt
R19, R20, R21 = 400 ohms, ½-watt
T1 = Tuned by C3 to 5·65 mc
T2 = Tuned by C9 to 6·55 mc
T3 = Tuned by C12 to 6·85-7·38 mc
T4 = Tuned by C21 to 20-22·5 mc
L1 = HF Choke
L2 = Tuned by C7 to 3·5-3·8 mc
L3 = Tuned by C10 to 7·45-7·85 mc
L4 = Tuned by C13 to 7·45-7·85 mc
L5 = Tuned by C19 to 28-30 mc
L6 = Tuned by C22 to 14-14·4 mc
L7 = Tuned by C23 to 3·5-3·8 mc
L8 = Tuned by C24 to 14-14·4 mc
L9 = Tuned by C25 to 28-30 mc
L10 = Tuned by C32 to 3·5-3·8 mc
L11 = Tuned by C23 to 14-14·4 mc
L12 = Tuned by C34 to 28-30 mc
V1 = FC.1—EF50
V2 = Osc. 3—EF50
V3 = FC.2—EF50
V4 = HG—EF50
V5 = 3·5 mc Output—6AG7
V6 = 14 mc Output—6AG7
V7 = 28 mc Output—6AG7



Photograph No. 3. The SSB Driver Unit tidied up with the inter-stage screening cans in position.

Table of Values

Fig. 20. TCS-12 Output Stage Used in SSB Experiments

C1 = ·01μF mica
C2 = ·001 μF mica
C3, C7 = ·002 μF mica
C4, C5 = ·001 μF mica
C6 = ·01 μF mica
C8 = 100 μμF variable air-spaced
C9 = ·01 μF mica
C10 = 300 μμF variable air-spaced
C11 = 50 μμF variable air-spaced
R1 = 20,000 ohms, 1 watt
R2, R3, R6, R7 = 47,000 ohms, 2 watt
R4, R5 = 47 ohms, ½ watt
L1 = Tuned by C11 to 3·5-3·8 mc
L2, L4 = Each 8 turns wound round R4 and R5 respectively
L3, L5, L6 = RF Chokes
L7 = Closed Circuit tuned by C8
L8 = Coupling Coil
M1 = 0-200 mA
M2 = 0-1 amp RF

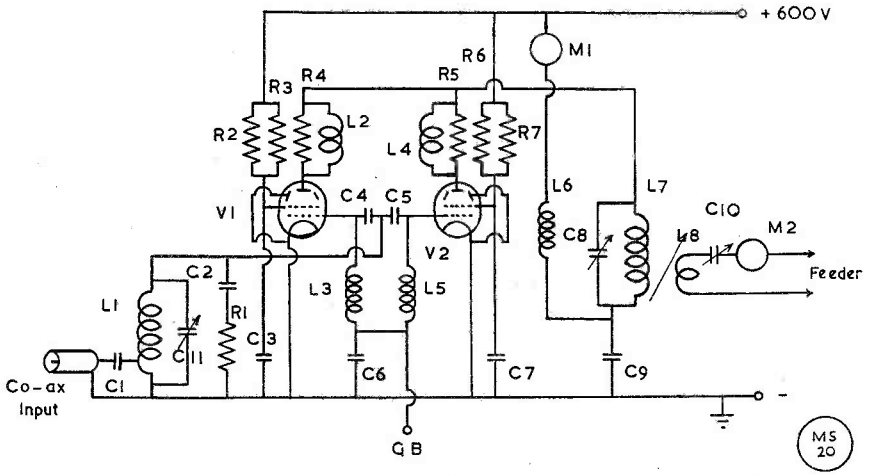


Fig. 20. For his experiments with SSB, G2NX has used a TCS-12 transmitter. For normal DSB operation L1/C1 form the plate circuit of the HG following a VFO, but L1 is provided with a 75-ohm tap for separate drive on SSB.

tried out on the 80-metre band, but the results would appear to be distinctly encouraging. The output was plugged into the co-axial input to the grid circuit of the normal transmitter PA. The output circuit of the transmitter (a modified TCS-12) is shown in Fig. 20 and no special modifications have yet been carried out to make it especially suitable for SSB, apart from the addition of the grid load R1.

With no speech the residual carrier can usually just be discerned on the 0-1 amp line meter (with a very good balance no line current can be seen at all) and is of the order of 0·05 amp. Line-up tone without running into limiting in the PA gives 0·7 amp in the feeder. A rough check on the signal emitted indicates that it is approximately as shown in Fig. 21 when using only one crystal in the first filter. Reports indicate that there is definitely an apparent increase of power over normal DSB and a reduction in QRM.

Reception

Some difficulty is usually encountered to begin with in getting the receiving station lined up on the transmitter frequency and the first reports tend to be of very poor quality, "so bad as to be almost unintelligible". When it has been explained to the recipient that it is necessary to switch off the AVC, switch on the BFO and beat the transmitter carrier to zero, he invariably manages to find the right point straight away. It is of great assistance if the full carrier is reinserted during the initial line-up as it is otherwise very easy for the listening operator to line up his receiver on a neighbouring carrier from some other station which is likely to be much heavier than the residual radiated in the SSBSC condition.

It will be realised that although SSBSC is a form of amplitude modulation, the fact that the carrier and one sideband have been removed means that there is no such thing as percentage modulation at the transmitting end and the effect of increasing the speech input level is to increase the power of the radiated sideband up to a point where limiting occurs in one of the HF stages. This level should never be reached if distortion is to be avoided.

Another important point is that when the microphone is silent, hardly any power is being transmitted and the aerial meter only reads when speech is passing. Furthermore, if all is correct at the transmitter, the percentage modulation is *decided at the receiving end by the amount of carrier that is inserted there.* If the inserted carrier is too low in level all the indications of overmodulation will be observed and the remedy is to *reduce* the level of the incoming signal by turning down the RF gain of the receiver. Therefore, it is always advisable to start with the AVC off and the manual gain control set to give the minimum audible signal consistent with comfort. The gain may subsequently be increased to near the distortion point if required. Receivers vary considerably in the amount of BFO which is injected into the second detector and may therefore be expected to give differing results for similar settings when used on SSBSC.

Since no carrier is transmitted and only a relatively narrow band of frequencies, a considerable improvement may be expected from the use of the receiver crystal filter set to a width of some 2,000 cycles or less in the case of bad QRM. When this is done it is best to tune the receiver, with the BFO off and the crystal in, to the loudest SSB signal and then switch on the BFO and beat it to zero with the residual carrier without altering the main receiver tune. Otherwise, there is a possibility that the crystal pass band may be aligned on

Photograph No. 2. The first coil on the left is the input circuit to the grid of FC1.

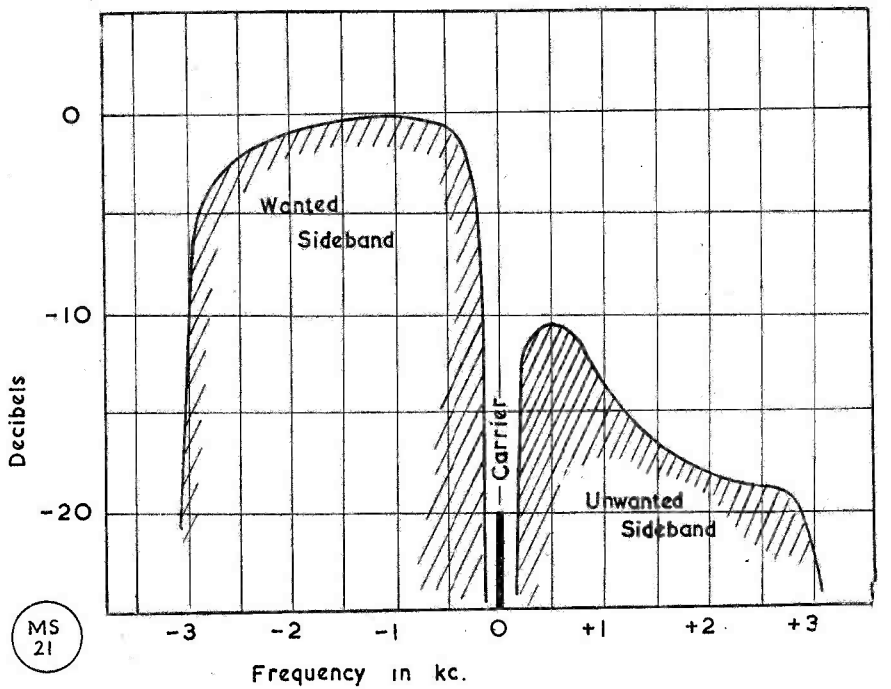


Fig. 21. Approximate shape of the SSBSC signal radiated, using only one crystal filter to separate out the unwanted sideband.

the reinserted carrier frequency rather than the incoming sideband.

No doubt the most suitable arrangement for reception would be a ring modulator circuit used as a de-modulator with the carrier supplied in balance. This would take the place of the usual second detector and if AVC were used, a separate AVC detector would be required.

The lack of AVC is a disadvantage, but it is unavoidable because there is no steady carrier to hold the signal to a constant level. Consequently, between words the sensitivity of the receiver rises to a figure limited by the residual carrier being received. An AVC circuit with a long delay might be used to tide over the intervals between words or again it is possible that a simple way of extracting the residual carrier may be evolved, using it alone to control the AVC voltage.

All this and much more must remain for the time being a matter for experiment and experience in working with this (for the amateur at any rate) new type of transmission.

It is much to be hoped that progressive amateurs, keen to make their contribution to the technique of Amateur Radio, will look into the problems of SSB transmission, which offers so much scope for experiment. In this connection, it is interesting to see the conclusions reached by G2MQ in his article in the August issue of the *Short Wave Magazine*. And as time goes on, it may be expected that we shall have many further contributions on the general subject of SSB transmission and reception.

THE CLUB CONTEST

The Fourth Annual *Short Wave Magazine* 1·7 mc Club Transmitting Contest—now known as MCC for "Magazine Club Contest"—takes place this year during the period November 12-20, when we hope for an even larger entry than in previous years. The rules for this Contest are circulated direct, with an entry form, to the secretaries of all local organisations on our Active Club Register. This is compiled from those Clubs reporting to us for publication in our " Month with the Clubs" feature during the previous six months.

All-Band Tank Circuit

Flexible System for the Single-ended PA

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

This article suggests an ingenious yet simple and entirely practicable solution to the problem of preserving a good PA tank L/C ratio in a multi-band transmitter. The four DX communication bands 3·5-28 mc can be accommodated by the method described here, the coil change automatically effecting the necessary connections.—Ed.

IT would be interesting to take a census of all the multi-band transmitters in this country, for the purpose of finding out how many of them are fitted with an all-band PA stage (neglecting the Top Band and thinking of 3·5, 7, 14 and 28 mc).

Broadly speaking, there seem to be three techniques in general use. They are :

(a) Use of a separate PA stage for each band ;
(b) Use of one PA for 3·5 and 7 mc, and another for 14 and 28 mc ;
(c) Use of the same stage for all bands.

One could argue for hours on their relative merits. Scheme (*a*) is probably ideal from the technical point of view, but requires a good deal of space. Furthermore, unless some clever switching devices are incorporated, it involves quite a lot of "haywire" for changing over drive, modulation and aerial coupling from one PA to another.

Scheme (*c*), the all-band PA, is undoubtedly the tidiest, because the drive, modulation and aerial coupling are all quite permanently tied up to a static unit, and the only haywire aspect is produced by the unwanted grid and anode coils lying about the place. As far as slickness of band-changing is concerned it probably beats scheme (*a*), because coil-changing can be made into quite a quick and well-organised business. (We speak from experience !)

Technically, however, the all-band PA may well prove troublesome, and, if not handled with a certain amount of tact, blatantly inefficient.

Only one thing *really* matters, fortunately, and that is the tank circuit itself. An all-band PA will naturally be laid out with the *highest* frequency in mind, not the lowest ; and so the layout should be good. In other words we are not confronted with the problem of a 3·5 mc PA which won't behave itself on 28 mc, because one should reason in the reverse direction—it should really be a 28 mc PA that can't help being stable on 3·5 mc.

This being so, it will almost invariably be found that the tank condenser is too small for the lower frequencies, and, very often, that it is a job to squeeze a sufficiently large coil into the layout adopted.

Without any claims for brilliance of conception or even of great originality, we offer a simple solution to this little problem, which has been in use at G6QB for roughly three years and has not yet given rise to any headaches.

Five-pin Coil Bases

The whole thing revolves round the use of one of the popular five-pin coil sockets and the sets of coil formers to match. Two pins are used for the outgoing feeder from a coupling link, and the other three pins are normally used for the two ends of the coil and a centre-tap. This scheme depends upon changing the wiring on the coil formers themselves, and makes possible three different arrangements, as shown in Fig. 1.

For 14 and 28 mc the tank circuit is of the

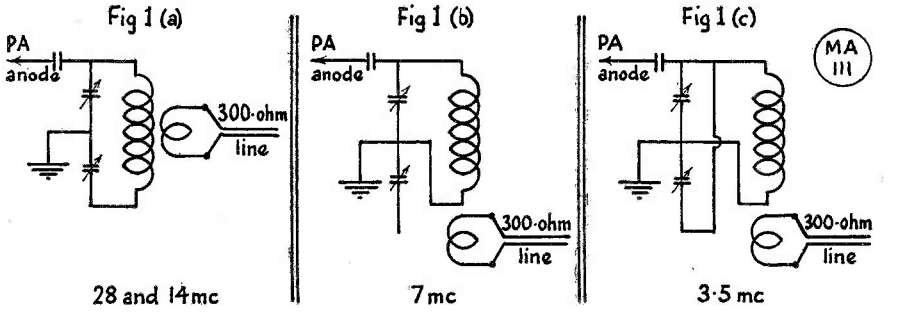


Fig. 1. The electrical arrangement of a PA tank circuit to give the correct L/C ratio on four bands.

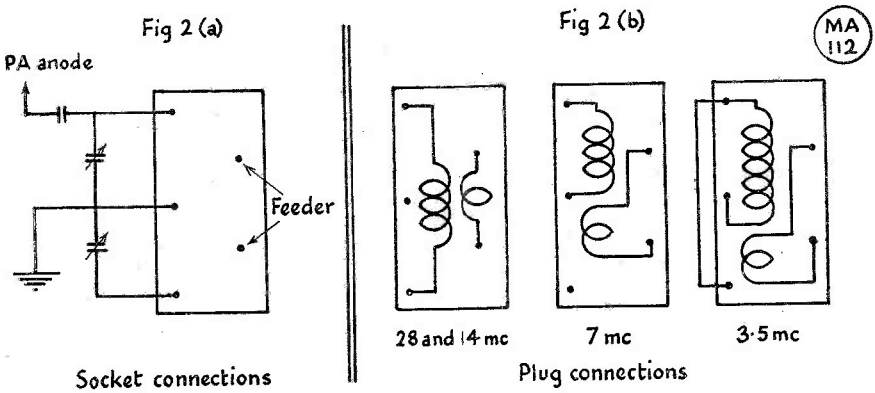


Fig. 2. How the physical connections are arranged to produce the requirements of Fig. 1.

normal centre-tapped variety, one end going to the PA anode and the other being "up in the air." The PA, by the way, is either an 813 or an 807. This scheme cannot be applied to neutralised triodes or to push-pull stages, but will serve for any single-ended PA that does not require neutralising.

So, for the 14 and 28 mc bands the link winding is over the centre of the coil, which is tuned by the two halves of a split-stator condenser in series.

The 7 mc coil is so wired that one half of the condenser tunes the coil, the other half being out of use. The bottom end of the coil now being "earthy," the link is placed there.

For 3·5 mc two pins on the coil former are connected together so that the two halves of the condenser come in parallel. The link, naturally, is again at the bottom end.

This scheme makes it possible to retain roughly the same L/C ratio on all bands, to the comfort of the PA valve and the general efficiency of the stage.

The popular formula of "one $\mu\mu$F per metre" gives a good value of Q for the circuit and can be arrived at quite easily with a split-stator condenser of 50 +50 $\mu\mu$F—the popular size normally used for final tank circuits.

For 28 mc the condenser is a little less than "half-in," giving two sections each of 20 $\mu\mu$F —effective capacity of 10 $\mu\mu$F. For 14 mc the coil is chosen so that the condenser is nearly all-in—roughly 40 $\mu\mu$F per section.

On 7 mc, where only one half is in use, the reading is exactly the same as for 14 mc—but now it is, of course, 40 $\mu\mu$F effective instead of 20. For 3·5 mc, again, the setting is practically the same, but now the two sections each of 40 $\mu\mu$F are in parallel, giving the desired 80 $\mu\mu$F.

Coil details necessary to give these conditions with the 813 in use are as follows, all coils being wound on the standard 2½-in. formers with 14-gauge wire and turns spaced roughly one diameter :—

3·5 mc	20 turns, with 4-turn link
7 mc	12 turns, with 3-turn link
14 mc	8 turns, with 2-turn link
28 mc	5 turns, with 2-turn link

Flat 300-ohm line is used for coupling the links to the aerial matching unit, chiefly because it is then possible to take it directly to a folded dipole for one band without any alterations. This is only a personal preference and, of course, any sort of feeder or coupling line can be used without upsetting the scheme.

A coil for 21 mc has recently been added to the collection, and it is found that the requisite capacity of about 14 $\mu\mu$F effective (two sections of 28 $\mu\mu$F each) will tune to resonance with a coil of six turns. The scheme used for this band, obviously, will be that adopted for the 28 and 14 mc bands.

No Centre-tap Required

When the idea was first tried, the coils for the HF bands had physical centre-taps, but it was soon found that these served no useful purpose and they were removed, earthing being achieved merely through the centre-tapped tuning condenser.

It should also be pointed out (very firmly indeed) that parallel feed is used for the tank circuit. The coupling condenser from the PA anode to the top end of the tank coil is of ·001 μF capacity, which may be rather high for 28 mc operation but is necessary to accommodate the LF bands.

Two RF chokes in series are used from the

PA anode to HT +. One is the standard "short-wave" pie-wound type, and the other is a single-layer choke of fairly large size, consisting of 70 or 80 turns on a 1-in. former. Both are mounted well up in the air so that their capacity to the chassis is not high.

The Grid Circuit

Grid coils for all bands present no problem at all; it is only necessary to use a tuning condenser of large enough capacity to cover the lowest frequency used. This condenser is actually 160 $\mu\mu$F and the coils are wound on 1-in. diameter formers (again of the five-pin variety) with their link windings brought out to two pins which go straight to a co-ax type socket at the side of the PA chassis. Two different exciters are used—one for the two lowest bands and one for the two highest. Both have lengths of co-ax from their outputs and thus either of them can be coupled through to the PA in an instant. Grid windings have been chosen so that rather a biggish amount of capacity is needed to tune them to resonance. Grid circuit Q need not be high, as there is always far more power available than is needed to drive an 813. Furthermore, one does not want to have to retune the grid circuit for relatively small frequency shifts within a given band.

All this, however, is incidental to the main scheme, which simply revolves round this one idea of using a split-stator condenser in three different conditions: both halves in series, or one half only, or both halves in parallel.

Flexible coupling from this "flexible tank" to various types of aerials is another story, and will be dealt with later.

Double Superhet for Ten

Notes on Operation, Setting Up

By **A. B. WRIGHT (G6FW)**

PART III

PLUG in the 6J6 and 6AG5, and plug the 10-metre aerial feeders into the sockets at the rear of the set.

If the front end of the receiver has been tested as previously described, no trouble should be experienced in tuning in signals on the ten-metre band on the main tuning dial. The calibration of the dial will, of course, be somewhat "out" unless the constructor is lucky, but calibration is quite a simple matter.

If there are ten-metre signals coming through, set the main dial to almost minimum capacity and adjust the 6J6 oscillator trimmer C12 until CW signals are heard at the LF end of the band. Peak up these signals on C7 and C2. The station frequency meter, if this instrument incorporates a 100/1,000 kc crystal, provides the means for calibrating the receiver accurately. Having located the LF end of the band, it becomes a simple matter to spot the 28, 29 and 30 mc signals from the meter. All that then remains to be done is to switch in the 100 kc crystal, and interpolate the remaining calibration points throughout the band.

In the absence of an accurate, crystal controlled frequency meter, calibration is a little more tiresome, involving as it does the spotting of as many crystal controlled amateur transmissions of known frequency as possible. A graph may then be prepared in the usual way and the dial calibrated from that. When the American signals are coming through, WWV on 30 mc provides an excellent marker and calibration point for the HF end of the band.

After calibrating the set, the mixer trimmer C7 and the HF trimmer C2 should be peaked up at the HF end of the band, and a check made at the LF end to ascertain whether the tuned circuits track accurately. If a drop in sensitivity occurs towards the LF end, either the inductance of the mixer and aerial coils L2 and L3 should be adjusted by varying the turns spacing, or, as the writer did, the vane spacing of the tuning condensers C1 and C6 may be adjusted. If the condenser vanes are mounted on screwed rods the latter method is perhaps the easier.

Whichever method is used, the procedure is as follows: Peak up at the HF end of the band on trimmers C2 and C7; tune to the LF end and adjust inductance or condenser vane spacing for maximum response on noise or signal generator signal. Retune to the HF end and adjust parallel trimmer again for maximum response. Repeat this procedure until good tracking is obtained throughout the band.

The job is by no means as difficult as it may seem and with a little care no difficulty will be experienced in obtaining maximum sensitivity throughout the tuning range of the receiver.

BFO

No beat frequency oscillator has been included in the original receiver, as the writer confines his CW activities to Twenty, but its incorporation will offer no difficulty to the

constructor who wishes to add one. There is adequate space on top of the 1196 chassis for a screened BFO coil and a suitable valve.

Power Supply Requirements

A separate power supply and speaker are required. The power pack should deliver 200 to 250 volts at about 80 mA, and 6·3 volts at 2 to 3 amps.

Performance

With the three-element beam used for ten-metre transmission coupled to the receiver, it has outperformed every communications set the writer has handled, both as regards sensitivity and signal-to-noise ratio, and leaves little to be desired for ten-metre reception. The set is completely stable in operation, and shows no signs of frequency drift.

The installation of a further stage of low noise pre-selection, using another 6J6 has been considered, but after using the receiver for over nine months the writer doubts whether any worthwhile improvement would result.

All components apart from the Wearite coils and associated trimmers are surplus material and are readily obtainable from the many advertisers in this *Magazine*.

If you feel that your present receiver is losing you some of that elusive DX the other chap is working but you can't hear, this simple double-super may be your answer.

Point on TVI

Check the Earth Lead

By S. E. JANES (G2FWA)

HAVING tried to eliminate TVI (unsuccessfully !) by means of the usual "traps" and complete screening of the transmitter, attention was paid to the rather lengthy earth lead. This, some 20-odd feet long, turned out to be quite a good radiator in the 1¼-wave state for any 45 mc harmonics —grounded at one end and the Tx supplying the necessary excitation at the other !

Therefore, a length of stout lead cable was substituted for the existing wire. The actual measurement chosen was 20 feet, this being one complete wavelength at the vision frequency. (It is appreciated that the resonant length will be somewhat reduced owing to proximity effects, but will suffice for this purpose.) With the earthy end of the lead covering grounded by means of a short stout wire to a separate spike it follows that possibility of resonance at 45 mc will be reduced to the minimum. This condition can be brought about by making the screened cable any even multiple of a quarter-wave, *e.g.*, 10, 20, 30 feet, and so on. It is necessary, however, to make sure that the Tx end of the outer screening is left floating.

The centre core can then be used as the normal earth lead, and here it is well worth while to dig deeply to ensure a really good ground connection !

These simple steps have made all the difference at the writer's station, and it is now possible to operate the 80-metre transmitter within a few feet of the television receiver. Experiments have now to be carried out on the other Tx for 40 and 20 metres.

XTAL XCHANGE

Quite a small offering this time—any that we received after September 16 will appear in our next issue. Set out your notice in the form shown below and head it "Xtal Xchange—Free Insertion."

G3BRT, 20 Redland Park, Bristol, 6.

Has QCC Type P5 1760 kc crystal, certificated ; also 3513 and 3567 kc without certificates. Wants 7150-7160 kc crystals, or offers of 7 mc frequencies.

G8HX, 116 Westfield Lane, Mansfield, Notts.

Has ex-Service 3520, 3595, 3610 and 3640 kc crystals, ¾-in. pin spacing, no certificates. Wants frequencies 1825-1890 kc and 3500-3515 kc, similar type.

SWL, 31 Byng Road, Barnet, Herts.

Has ex-Service 1000 kc bar, holdered. Wants crystal for 1·7 mc or LF end 3·5 mc.

SWL, Rhoslwyn, Llanybyther, Carms., S. Wales.

Has American 7014 kc crystal. Wants frequency in phone section 7 mc band.

PHOTOGRAPHS

As previously mentioned, we are always glad to see photographs of Amateur Radio interest—either equipment, personalities or Club doings. Photographs can be any size, print or negative, but *must* be clear and sharp to ensure good reproduction. All photographs should be identified on the back (light marking with a soft pencil so as not to spoil the face of the print), with an accompanying note to cover the subject. Photographs accepted are paid for on appearance at good rates, and can be returned if required. The block-making process involves no damage to the face. As we necessarily hold a number of prints for use as opportunity offers, appearance is not always immediate.

DX COMMENTARY

CALLS HEARD, WORKED & QSL'd

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

WHILE waiting for someone to sign after calling CQ thirty-five times we recently fell into deep thought—an unusual but quite rewarding procedure. What we thought about was, chiefly, the *raison d'etre* (if any) of this monthly feature. From that we fell to thinking "Why DX, anyway?" Quite a lot of people despise the DX worker, and quite a lot of DX workers despise the others—both of which are Bad Things.

But then we came into focus and thought about the competitive aspect of the whole thing, and realised that the answer is there. This feature deals chiefly with two sides of Amateur Radio—the working of DX and the whole technique of operating. It is the competitive side that brings these two together. And it is the competitive business that, all through the history of Amateur Radio, has pushed development along and brought out new ideas, new techniques and new possibilities.

It must be 20 years since it was first said "It is always an amateur who achieves the impossible, because, being an amateur, he doesn't know it *is* impossible." Now we are the first to admit that no one is going to further the development of radio very much simply by entering for every contest and madly working hundreds of DX stations; but the combined effect of thousands of amateurs doing just that, and, still more, the combined effect of what they do to their gear and their operating *in between* contests does, surely, have a profound effect upon the state of the art.

At all events, the Contests and the Competitions are with us for keeps; those who don't like them are in no way obliged to have anything to do with them except utter mild curses when their favourite band goes bad on them for a week-end.

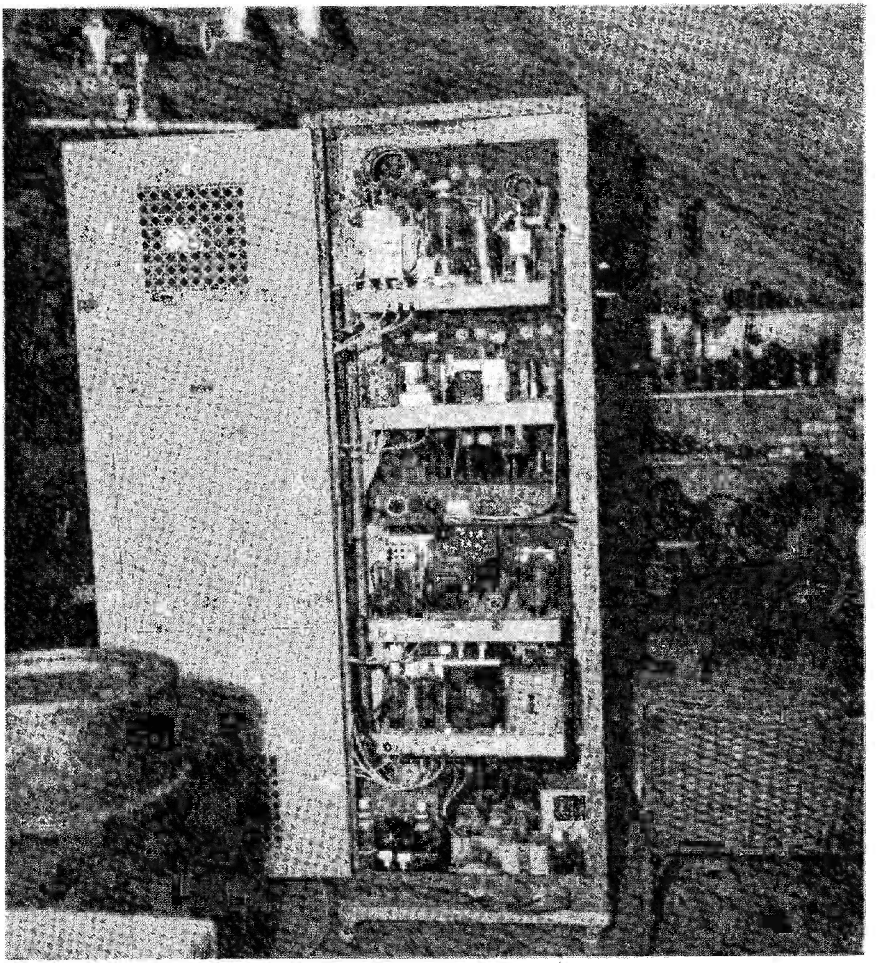
Meanwhile—talking of week-ends—take a look at the little table of forthcoming events appearing herewith.

Add to those in the table the first half of the VK/ZL Contest (CW), which took place last week-end, September 30-October 2, concurrently with the RSGB Low-Power Contest on 3·5 mc, and you will agree that this Contest business is, in fact, becoming a Business. No doubt there are other small affrays and dog-fights that we wot not of.

We simply cannot publish the rules of all these affairs without producing a special issue for the purpose, and therein, we think, lies one of the weaknesses of such things. There is nothing resembling a uniform set of rules. For instance, in the CQ DX Contest you send the other chap's RST plus your own Zone number. In the BERU Contest you send the RST followed by your own "serial" number, starting at 001 and working up. In the ARRL Contest you send RST plus your own "personal" station number, which remains the same throughout.

In the VK/ZL Contest you send the other chap's RST normally, followed by a *six-figure* number comprising your own "personal" three-figure number plus the last one you received from a station worked. (No one has

Oct. 7, 1400-Oct. 9, 1400	VK/ZL Contest (Phone)
Oct 14, 1400-Oct. 16, 1400	VK/ZL Contest (CW)
Oct. 21, 1400-Oct. 23, 1400	VK/ZL Contest (Phone)
Oct. 29, 0200-Oct. 31, 0200	CQ DX Contest (Phone)
Nov. 5, 0200-Nov. 7, 0200	CQ DX Contest (CW)
Nov. 5-Nov. 6	RSGB Top Band Contest
Nov. 12-Nov. 20	Magazine Club Contest (Top Band)
Nov. 26, 0001-Nov. 27, 2359	All-European DX Contest (CW)
Dec. 3, 0001-Dec. 4, 2359	All-European DX Contest (Phone)
January 14-January 15	BERU Contest (CW)
January 21-January 22	BERU Contest (Phone)
January 28-January 29	BERU Contest (CW)



W9DKM is Fire Chief at Lisle, Illinois and runs the full gallon on all bands, phone and CW. This view is of the works of the 1 kW transmitter.

yet suggested an exchange of "handles.") In some contests there is a quota, or limit to the number of stations worked. In some there is a vast multiplier, in others none. So, to enter for the lot, you have to be either a Memory Man or a collector of paper-work from all the organisations concerned.

Take your pick—enter for the one you like best !

DX News of the Month

In future we are going to try to keep DX matters and operating topics separate, so let us start with the DX news, which is prolific enough. The three principal charmers of the month seem to have been FK8AC (14020), ZS9J (14 mc CW) and CR5UP (14 mc 'phone). The latter, by the way, also put through a beautiful harmonic which caused many people to call him on 28 mc—but no one raised him ! FK8AC (QTH in list) was interesting in that we were lucky enough to give him his first G QSO, at 0740 on September 7 ; but thereafter heard him only in the evenings, the other way round.

The other main event has, of course, been the opening really wide of 28 mc. W6's and 7's have been roaring in on both 'phone and

CW at various times from 1700 to midnight. First, though, we will deal with 14 mc events.

G2FSR (London, E.4) collected six new ones on the band, which makes him top scorer in our list now with the fine total of 197 countries. He should top the double century next month. His additions were CR5UP, HS1SS and VK1ADS (all 'phone) and VP1AA, ZS9J and FK8AC (all CW). He has also heard FI8AK a lot, but thinks he is fishy, if not phoney. G5FA (London, N.11) added M1C, PZ1AL and YK1AB to his total, and also raised YO3GH, who told him that YO is now the official Roumanian call, and their QSL Bureau is Box 95, Bucarest.

G4QK (Croydon) mentions CR7AF, HC1JW, YK1AB, HZ1KE, and ZB2G. G5BZ (also Croydon) raised ZD6DH. G3FGT (Birmingham) climbs further up the ladder with his 25 watts, having added 4X, AP, VU, MD7, MD4, VS1, ZL and HE1EU. G2WW (Penzance) has resumed CW activity after a long period on 'phone. He has still, however, been raising new ones on 'phone, including MP4BAC, VP2LX, YN4CB, CR5UP (who called him after a contact with a 4X) and SP1CR, claiming to be 20 miles south of Warsaw. CW fetched in KS4AI, EA8's and an MD7.

GM3CSM (Glasgow) has collected VS1DF, W2OXE/MM (N. of Baffin Land), HB1JJ/HE, LX1QF, JA2RO and lots of less rare birds. He finds it difficult to raise Pacific DX from up there, although he has heard FO8AC, KM6AO and VK9NR. New ones on 14 mc 'phone for G5GK (Burnley) were W6NVN/KW6, HS1SS and EA6ET. G6TC (Wolverhampton) reports for the first time in two years. With his 807 PA and 68 ft. Zepp he has raised KS4AI, KG6FY, MD4GC, ZD4AM, VS1DA, KH6's, and others. He hopes to put up a rotary folded dipole soon. 'TC, by the way, plays the bass in a band in which G3FRO is second trumpet—probably the only case of two amateurs in the same band with no QRM troubles !

G3ATU (Roker) suggests that UY5AK ("New Republic") is certainly 'phoney. He also mentions LZ1ID, said to be testing a 2kW commercial rig on the amateur bands ! But he says EA6EG is genuine, and QSL's with the Majorca postmark ! 'ATU has met ex-VS7AD, who told him that the VS7's will drop in number shortly owing to the impending departure of several of them. G6BS (Cambridge) has collected MP4, YK1, KG6CU, ZD2P (Cameroons), VP2LA, FE8AB and ZD6DH.

G3CNW (Ickenham) succeeded in adding eight new ones, including YS1VJ, HE1IL, YV5BX, OA4J, VP8AI and HP1BR. He, too, mentions LZ1ID, who was saying he couldn't receive replies because of QRM from his local BC station—but this didn't stop everyone on the band from continuing to call him. And he has also been hearing ZA3B, who is likewise mentioned by G4OO (London, S.W.11). G4OO gives his QTH (see panel, hopefully !) and says the ZA assured him he was genuine—as also did a type signing SP5AC. G6BB

FOUR BAND DX

Station	Countries Worked					Power
	28 mc	14 mc	7 mc	3·5 mc	Total	
G6QB	116	167	67	34	188	150
G3DO	97	152	37	21	182	150
G2BJY	91	74	24	4	123	25
G3ATU	86	163	60	26	170	10/150
G6CB	86	37	6	1	103	20/150
G2VD	84	160	52	27	165	150
G2WW	76	160	31	21	170	150
G8QX	70	107	18	12	129	150 (P)
G8IP	62	114	34	13	129	3/150
G8VB	59	122	49	50	142	120
G5FA	57	125	83	17	139	35/150
G2HIF	57	42	9	6	78	150 (P)
G8KU	48	125	26	9	134	120
G3FNJ	43	105	34	19	117	150
G5GK	36	126	89	11	187	150
W2RDK	34	116	134	33	180	?
G6BB	34	110	38	19	123	10/70
G2AO	32	114	34	30	123	125
G8VG	26	107	53	19	122	60/75
G2YS	25	111	26	21	122	100/150
G3EIZ	15	39	23	34	53	25
G5WC	12	116	50	1	117	45
G3FGT	12	69	24	22	76	25
GW3CBY	8	40	22	16	53	15/30
G2HKU	7	90	33	1	98	4/25
G3ACC	5	102	13	20	111	150
G6BS	4	165	102	28	172	150
G2DHV	4	79	20	18	84	25/60
G4QK	3	103	33	19	107	150
G6TC	3	75	38	11	87	20/65

(London, S.W.2) has started collecting BB's and managed to raise VO6BB, together with HB1JJ/HE, MD2GO, KS4AI, VS1DC and CX3CS.

G2HKU (Sheerness), with his 25 watts, has rolled in HE1IL, ZB2G and 2E, UY5AK, ST2TC, EA6EG and VK's and ZS's. He would like to see a power limit of 25 watts for everyone—see notes on QRP later ! G3FNJ (London, N.W.6) has been struggling for Zone 26 for ages, and then worked XZ2FK and XZ2SY within a week. G3FGT (Birmingham) finds that his long-wire still rakes them in, such as VS1CW, HE1EU, AP2N, VU2DX and lots more. He thinks he has persuaded MD2GO to appear on 3·5 mc—let's hope he turns up.

The 28 mc News

Practically anything can happen on this band now. Even the rare KL7 has been heard once more ! VK's and ZL's and J's romp through on both CW and phone in the mornings, but the W's generally clean up the band pretty well in the afternoons and evenings. The Four-Band Table is in 28 mc order this month, and with a warm blush of shame we have had to put our own call-sign at the top of the list for the first time since this table was started a year ago. Out of those 116 countries on Ten, more than 100 were worked in 1946 with the old 807, when the going was easy. There must be many types who have worked a higher total, but they don't come forward and say so.

G2BJY (West Bromwich), who is a very high scorer with his 25 watts, has added FE8AB and ET3AF ; he also mentions XZ, MI3, ZL, VS6 and 7 and a host of the more usual DX.

"....Worked any DX this morning, dearie ?...."
(With apologies to Joe's YL)

G2HIF (Wantage) remarks that with the coming of the W/VE signals the ZS/ZE/VQ stations show little change from their mid-summer strength but are more difficult to work with all the Americans after them. Other "highlights" mentioned by him are VP3HL, VS9AJ, TI2RC and KZ5AF, all on phone during the early evening. G5FA contributes XZ2FK, VE6AP, HC1KP, VS9AL and FE8AB. G6BB throws in OQ5BU, HZ1KE, ZS5YF and FE8AB.

GM3CSM raised FE8AB, OQ5BU, HC1KP, HZ1KE and an unusual one—TF5TP—all on CW. We should mention, by the way, that some of these reports came in before the band really opened wide, and that we shall have to be pretty particular about what we call 28 mc DX by next month.

DX on 7 mc

The Faithful Followers of Forty are in their element again. G6BS has at last managed the Century, six new ones having given him the fine score of 102. They were HB1JJ/HE, IS1AMF, EA6AF, ZS5YF, MD2GO and a CM2. But 'BS and the others now have a sinister rival in the person of W2RDK (Gloucester, N.J.), who has come into the Four Band Table and will show a score of 134 on 7 mc—122 of which are confirmed ! 'RDK tells us to look out for VP5BD (Cayman Is.) on 7295 kc from 0400-0500 GMT. He also says that W3BXE has been on from St. Pierre-et-Miquelon, but the French authorities, for some strange reason, gave him the call FQ8AB instead of the FP that one expects.

G6BB raised CO7BL and YU1WEZ for two new ones on the band ; G4QK collected ZL2JD, KP4HU, ZB1AJX, LX1AF and others ; G8VG (Dartford) worked UA9CK, who was running 5 watts on 7021 kc, and also a UP. G5GK found TA3FF for a new one and also worked sundry ZL's and W7's, while G5FA reports plenty of W's plus KP4KF in the early mornings.

Eighty Metres

For some reason there is a scarcity of 3·5 mc news this month, the only report being from G5BZ, who raised CM2SW for a new one. We do happen to know that VE's, VO's and W's are arriving before midnight at the CW end, but otherwise there isn't much to add.

In Defence of QRP

G3FIT's remark last month (that he found 10 watts hard going on 7 mc) has rallied the QRP experts. G3EIX (Swindon) says that his 10 watts does all that he wants ; about 70 per cent. of CQ calls bring replies, and he has worked 25 countries on 7 mc, including USA. For a change, 'EIX went down to 6 watts and

TOP BAND LISTING
***Starting August* 1, 1949**

Station	Counties	Countries
G2YS	30	4
GW3CBY	20	5
G2AJU	20	3
G5XF	12	2
G6ZN	10	3
G2DHV	10	1

used 6 ft. of wire indoors as an aerial, and he *still* got a reply to nearly every call.

G2AJU (Ipswich) uses 1½ watts to 2-volt valves in a MO-PA circuit, and with this he has worked over 100 stations on the Top Band. Since August 1, he has covered 3 countries and 20 counties, and only on two occasions did he "QRO" to 3 watts (Arabackle, another battery !) Even on phone he has worked stations up to 50 miles distant in daylight, and the phone has been heard as far off as Cardiff.

G6ZN (Horbury) is a well-known exponent of QRP, and he resents the attitude taken by some of the big fellows in dismissing QRP stations as "small fry". As he says, the lack of mere blasting power doesn't make a station any less efficient. High spots from G6ZN's doings were a 3-watt QSO with W7DXZ on 14 mc, when the W said his signals were as strong as most other Europeans, QSO's with 10 counties on Top Band, and a 280-mile contact with G3PU (Weymouth) using 0·019-watt on the same band ! 'ZN's 3-watt DX includes VE, VO, ZB2, OY, TF, SV and lots of the Russian districts.

So let no one belittle these QRP fellows—they know their stuff, *and*, let us add, they get a kick out of their hobby that is missing from many QRO stations.

Operating Topics

It is necessary to quote at some length from a screed received from G6ZO (Edgware) on the subject of the inane behaviour of some operators who frantically try to raise a new country without bothering to listen to the pile-up and understand what is going on. As Jim says, "... the more enlightened DX operators resort to the skiful use of QLM or QML and the result is a joy to listen to—or is it ?

"To quote a few examples : TA3AA calls CQ on 14020 and signs QLM. Several dozen eager-beavers call him smack on 14020, but two or three call on 14005. Result, he has a 100 per cent. QSO with one of the latter. W3EKK/VK9 calls CQ on 14018 and signs QLM—a few hundred W6's call him on his own frequency and a G5 who called on 14003 beats them all, despite their kilowatts and rotaries.

"A certain G8 was heard to call AC4RF for some 20 minutes on his own frequency, during which time AC4RF had three 100 per cent. contacts with other stations answering him 15 kc lower, as requested. Obviously, the G8 was not even *hearing* 4RF, far less listening to him.

"FP8AA calls CQ on 7050 kc and signs QLM—about 500 W's come back between 7048 and 7052 (sounds like bagpipes playing !) —but he works a G4 calling on 7002.

"Moral—learn your Q Code. If you still don't know what QML and QLM mean, give up chasing DX ; you will be doing the rest of us a greatly appreciated service."

With all of which we heartily agree. One could add scores of cases in which the callers have piled up promiscuously while an actual QSO has been taking place, and the DX station has been so disgusted that he has just quietly faded away, leaving a raging mob *still* calling.

Of course the DX boys are the masters of the situation all the time—if they are good operators. They can always crack the whip if they know how. The mere remark "Anyone breaking in before I finish this QSO won't get a reply at all" has been known to produce a hushed silence that becomes quite oppressive! We need a Q signal for some such warning. "QKO : Keep off or you've had it!" would suit.

News from Overseas

From GM3ANO (H.M.S. *Jamaica*) comes a grievance about phone operating—and quite rightly, too, for it has jarred on us for years. If you are quietly laughing up your sleeve while telling the other fellow something on CW, there's nothing to indicate this to him except the odd "Hi"—invented for that purpose. But when, as 'ANO says, a phone man, in a tone of voice calculated to freeze you to the chair, gives no sounds of laughter but solemnly says "Hi," it's just plain darned silly. You know the sort of stuff : "The XYL has just broken her leg and had to go to hospital, Hi ! "Don't expect her home for six weeks, Hi ! " And so on. Does this constitute an admission that amateur phone communication is still so primitive that the other fellow couldn't hear us laugh or couldn't interpret the tone of voice as he would in ordinary conversation? Try a few "Hi's" over the telephone next time you get a wrong number.

GM3ANO adds that conditions out in VS6 have been pretty good for Europe, with GI4RY often the outstanding signal.

VP8AB writes from the Far South—Teal Inlet, Falkland Islands—and tells us that VP8AM is one of the lads marooned in the Antarctic at Marguerite Bay (Base E). The relief ship couldn't reach them last summer, but should do this time. VP8AB has heard him on 7 mc phone, and VP8AI has worked him on 14 mc.

G4JF (late of Staines) is leaving for Southern Rhodesia and taking his gear with him. His address will be c/o Meikels Ltd., Umtali, and we hope to hear him on the air some day.

ZD2P (QTH in panel) has hitherto asked stations to QSL *via* the Bureau and thinks that for this reason he is suspected of being a pirate. He is not, and his full QTH appears in the list.

Mr. H. R. Fox (ex-G8RZ) writes from Kusunda, India, to tell us of the untimely death of Mr. D. H. Halliday, B.Sc., A.M.I.E.E. VU2AF and ex-G8FQ of Stafford. This has been a great blow to his many friends in VU and sad news for his former associates at home. Mr. Fox has a number of VU2AF's cards, already made out for QSO's, and is forwarding these at once.

VS2CQ (Kuala Lumpur) has now been on the air nearly a year, and has had about 300 contacts with 51 countries. He finds operation very difficult on account of high temperature and humidity, and adds that cockroaches feed on insulation and seem immune to HT. Active stations in VS2 are 2AU, 2AZ, 2BH, 2BN, 2CB, 2CK, 2CL, 2CN and 2CQ (all in Kuala Lumpur) with 2AL, 2BD and 2CC in other parts. Kuala Lumpur chaps have a Friday night ragchew on 80-metre phone. VS2CQ adds that a keen SWL type out there has many confirmations of reception of G, EI, PA, ON and DL4 stations *on* 3·5 *mc.*

An interesting letter from G3ERB (Berkeley, Calif.) tells us about the conditions under which the W6 gang work. Chief comment is that they seem to be obsessed by the idea that high power is necessary for results. 'ERB says that much of the San Francisco area is in a hollow in which it is very difficult ever to hear Europeans, and that the people perched up on the heights have a different radio outlook from the others ! He finds the most impressive thing out there the portable-mobile operation.

SVØAL (Salonika) still plugs away with his QRP, and remarks that he is afraid of mentioning his power (less than 10 watts) to the W's, especially when one using 800 watts is only one "S" point better than he is ! He lets loose a tirade on the types who call without listening first, particularly those with beastly notes, of whom there are many. He remarks that SVØWI uses 100 watts and an 8-wavelength V-beam pointing NW on 28 mc, so he should hit G with a resounding whack. SVØAL hopes to appear on 7 and 3·5 mc ere long.

"....Chap says we've got a chirpy note...."

ZONES WORKED LISTING

POST WAR

Station	Z	C	Station	Z	C
Phone and CW			Phone and CW		
G2FSR	40	197	G2BJY	37	123
G6QB	40	188	G5WC	37	117
G5GK	40	187	GM6IZ	37	98
G3DO	40	182			
G2WW	40	170	G2YS	36	122
G3ATU	40	170			
G2VD	40	165	G6CB	35	103
G2AVP	40	163			
G3AKU	40	138	G3ACC	34	111
G8IP	40	129	ZD4AM	34	96
G2AO	40	123			
			G2FYT	33	100
G8KU	39	134			
G3CNW	39	130	G4QK	32	107
GM3CSM	39	128			
G5MR	39	118	G6TC	31	87
			G2SO	31	87
G8VB	38	142	G2DHV	31	84
G5FA	38	139			
G6WI	38	128	Phone only		
G6BB	38	123			
G3FNJ	38	117	G3DO	37	146
ZS2AT	38	114			
G3BNE	38	109	G8QX	35	129

Miscellany

Another good list of Top-Band Calls Heard from EA2LS appears at the end of this feature. He hopes to make some cross-band contacts, with himself on 3·5 and the G's on 1·7 mc.

G5FA had a nice personal contact with ex-J2AHI and his wife, who were returning from Tokio *via* Europe. They managed to work, from his station, G2DC, whom they knew well over the air when he was a J4.

EI9J quotes a message from ZS6AM saying that he works many VK's on 3·5 mc and only wants Asia for WAC. He will shortly be turning up from Kenya as VQ4GJD. EI9J, by the way, worked both ZS6AM and ZS5YF on 3·5 mc ; he thought the former was a hoax, as he was coming in just like a European (579) but the card has arrived and clinches the deal.

G3ACC (London, S.E.22) is in trouble with BCI since her neighbour bought "one of those silly little portable (frame aerial) things". Whereas a series trap in the aerial cured QRM before, Meg doesn't know quite what to do now, and asks for bright ideas.

GM6IZ (Aberdeen), whose recent return to the ether has been commented on before, sends a table showing how he has worked " 100 Countries in 100 days with 100 watts"—and very nice, too. His average hours-per-day on the air were 3·06 ; QSO's 417 (209 W's, 208 others) ; and in April he worked 29 countries, in May 36 more, in June 24 more and in July 12. ; 101 countries in 37 Zones is the grand total. The aerial was far from "magic," being a half-wave with quarter-wave stub, 20 ft. high, suspended between houses and below the rooftops. Any challengers for this feat ?

Deadline for the November Commentary will be first post on October 12. Please address everything to DX Commentary, *Short Wave Magazine*, 49 Victoria Street, London. S.W.1 ; don't be late. So we will sign off with 73, BCNU and lots of Hi's.

DX QTH's

EA8BC	Box 8, Laguna, Tenerife, Canary Is.
FK8AC	Box 104, Noumea, New Caledonia.
JA2CK	Box 27, A.P.O. 994, c/o PM, San Francisco.
JA2MY	A.P.O. 503, c/o PM, San Francisco.
KG6GA	U.S. Coast Guard Depot, Navy 926, c/o F.P.O., San Francisco.
KG6SF	426 E. 18 Street, National City, Calif. (*Stn. on Saipan*)
PK5HL	Box 21, Banjarmasin, Dutch Borneo.
SP5AC	Box 320, Warsaw, Poland (?)
TI2CG	c/o U.S. Embassy, San Jose, Costa Rica.
VK5AE, VK5AS, VK5CV	Box 119, Darwin, North Australia.
VP4CO	A.P.O. 869, c/o P.M. Miami, Florida.
VQ3AD	c/o C.I.R., Arusha, Tanganyika.
VS1DZ	G.H.Q. Signal Regt., Singapore.
VU2DX	126 Palace Road, Mylapore, Madras 4.
YN4NW	Box 51, Bluefields, Nicaragua.
ZA3B	Radio Marine Station, Durazzo, Albania.
ZD2P	D. C. Piccirillo, Radio Officer, Posts and Telegraphs, Port Harcourt, Nigeria.
ZD2S	G. Sherwood, c/o W.A.A.C., Ikeja Airport, Lagos.

G CALLS HEARD OVERSEAS

1·7 mc

EA2LS, Joe Azurza, Matia 14, San Sebastian, Spain.

September 1, 2210-2240 *GMT.* (*Bad QRN*).
G3ART (569), 3PD (569), 3TA (579), 6AB (579).

September 2, 2210-2240 *GMT.* (*Wx Fair*).
G2FIX (579), 2KF (579), 2YS (559), 3DXI (569), 3EPV (579), 3ERN (559), 3FOP (569), 6AB (579), 8FF (569).

September 5, 2230-2300 *GMT.* (*Heavy Storm and QRN*).
G2GC (569), 2LC (569), 3AGC (579).

PIRACY—A NEW LOW

There is the pirate who comes on with an imaginary G call, he who goes one further by using a DX callsign, and the type who operates under a call already issued to another station. If there are degrees of meanness in this business, the last is the most despicable. This is particularly so when the callsign is used in the manner recently headlined in the London *Daily Express*. A pirate working under a G3 call has been offering free trips to this country "at my own expense"; the fact that a Russian amateur was among those so "invited" has a slightly comic flavour about it, but it seems that other invitations were issued which might well have been taken as genuine, with all the circumstances which could follow. It is much to be hoped that the individual concerned will be traced by the GPO—and it is the duty of any amateur knowing who the culprit might be to report him. And should he by any chance see this note, we hope he will realise he has struck a new low by gaining publicity for Amateur Radio through such a mean trick.

Blow for Freedom

Lattice Mast to Stay

From Notes by **A. HOUCHIN (G3GZ)**

A CASE of considerable importance to all amateurs either owning, or contemplating the erection of, structures such as lattice towers in residential areas was recently decided at Slough.

G3GZ of 90 Shaggy Calf Lane, Slough, built himself a 58-ft. tower to which strong objection was taken by the neighbours on the broad grounds that it was an eyesore. A petition was organised and G3GZ was ordered by the local authority to remove the tower. He thereupon cut it down to 32 ft. and appealed to the Ministry of Town and Country Planning against the local order.

The Inquiry

On July 26, an Inspector deputed by the Ministry held a public inquiry into the whole matter at Slough. G3GZ found himself arguing his case, single-handed, against the Bucks County Council, the local authority, and a deputation of his complaining neighbours.

Some of the evidence given is interesting. Attention was drawn to the general unsightly nature of back-garden shacks, television aerials tottering at all angles, tradesmen's vans parked in front gardens over week-ends, and advertisement hoardings. G3GZ made a strong plea for the clean, healthy hobby of Amateur Radio and all it meant to the nation —he also pointed out that in the Slough area alone there are about 50 tower-like erections of different kinds, some higher than his. The local authority evidently regarded the inquiry as a test case (which it was) and strenuously opposed the granting of the application on the grounds that "there would be nothing to prevent others finding some excuse to make similar structures."

The County authority suggested a compromise—a nice, slim tower of light steel, painted or camouflaged, and perhaps moved a little nearer the house. But G3GZ pointed out that while he was willing to compromise in any way he could, in fact steel for such a structure as his would be impossible to obtain.

The Decision

The inspector from the Ministry then visited G3GZ and viewed the tower. On August 31 last, the Minister handed down his decision—to the effect that the tower could remain for a period not longer than 12 months from that date, after which (by implication) it must be removed or replaced by a more sightly structure.

As readers will appreciate, all this is of the greatest importance where there may be a conflict with the local authority (or the neighbours) regarding the erection of a beam-supporting tower or lattice mast.

In theory at least, the local authority (and again the neighbours) can object to any sort

of structure which obtrudes above the house line or garden wall. Each case can only be decided on its merits—it is obviously wiser to obtain the local authority's permission first—but this one so ably handled by G3GZ is certainly a precedent to which all who may find themselves in a similar difficulty can refer.

It can truly be said that G3GZ himself, in refusing to be browbeaten or over-awed by the not inconsiderable forces arrayed against him, has struck a blow for freedom in these matters.

Acknowledgments are due to the *Slough and Eton Express*, the *Slough Observer* and the *Daily Express* as the sources from which some of the foregoing has been compiled.

Evening on the Air

What Often Happens !

By **J. D. HEYS (G3BDQ)**

PEACE at last ! The YL is safe and sound with mother at the pictures . . . the dog is asleep under the bench ; so here goes. Stand back OM's—now for some DX. On with the "joy" . . . pleasant chatters from all five power packs (*must pack those laminations one day—try a bit of shellac, p'raps*) and the little red lamps glow benevolently. That's funny, Ten seems dead. Old G6—— reckoned ZS would be pouring in about this time. Could it be that temporary tap on the Windom ? Impossible ! I bound it up with dead-loss tape only the other day. To heck with this, let's try Twenty ; the PA's a bit shaky on Ten anyway (*must neutralise sometime—even if it is an* 807 !).

Where's that exciter coil ? Here we are ; under the bench with the dog, as usual. Now for the PA grid coil. What a bind this coil changing is . . . will go all modern soon and rig up a bandswitched job. I wonder what ass invented butterfly nuts ? (*A plug-in tank circuit is really overdue at this station ; perhaps some time in the next holidays . . .*) Whooshburrrrr . . . there we are—bang on 14050 kc. What an exciting violet tinge that 807 has ! A good sign they say . . . hope so ! Char-chip-char-chip char-char-chip-char . . . Queer ! She doesn't chirp on Forty. (*That neon stabiliser on the feeder must be put to a real job.*) Ah well, everything helps to push us through the QRM.

On at Last

Now for business. You can't beat a crafty CQ at the start ; it proves she's getting out. A round dozen—that's enough. Here go the switches . . . VFO off . . . aerial over (*I'll fix that relay up soon*) . . . RF gain up. MURDER! . . . How does I1—— always find my frequency for his endless CQ's ? Easy does it . . . at last —a call. Let me see ; weak and watery, that means one of those KH6's or even AC4YN. (*What did I hear ? An OH ?*)

What strange QRM on the band tonight. Thought so—someone knocking at the door. There's only one person it can be ; Ivor Scanner again, moaning about TVI. Quietly does it (*rubber pad under the key always at this station* !). We'll pretend to be out . . . Sh, good dog. (*That reminds me ; the harmonic suppressor shall have to make its debut.*)

Now for that sig again . . . Burroomph—G3BDQ DE G3—— FB OM.UR SIGS 599 ACROSS TOWN TONITE BEST ON THE BAND HI HI HI 73 SK ! . . . I'll really fix that type one of these days.

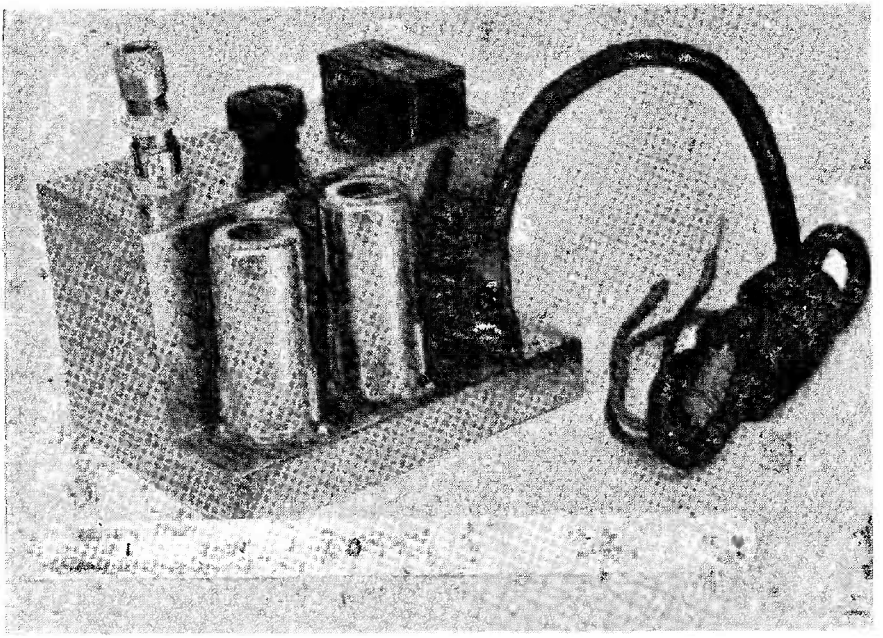
Well, they can never say we don't try to raise DX. What did Old Timer say ? ("90 per cent. operating time should be spent listening.") Try anything once here, so let's have a look round the phone band for a change. Yes . . . a VK5 calling CQ Europe. Quick ! . . . VFO zero beat . . . lovely, can't miss . . . modulator on . . . mike in circuit . . . Phff, Phff ! Funny, no mod. Who could have pinched the mike battery ? Probably in the YL's cycle lamp ; shall have to rob the AVO. Ouch ! How come that the outsides of those 6L6's are live ? (*Now I remember ; I didn't take the shields to earth.*) Too late . . . VK5—— is in QSO !

Try One-Sixty

I WILL have a QSO tonight ; must hurry though, the YL will be back soon. What about Top Band ? Can't miss up there. Aha ! the local net. G5—— is really on form tonight. Change coils again . . . series tune the Windom (*I'll have to keep a condenser handy for this job.*) . . . half an amp up the spout . . . good !

" Hiya G5—— and gang ; this is G3BDQ. Excuse me breaki . . ."

Curses ! What now ? Lights won't work either. Of course, that's it ; I forgot to put another shilling in the meter. Now let me see . . . sixpence . . . half a crown . . . a 50-ohm resistor . . . Too late ! The YL and Co. are back. QRT.



CC Marker Unit for Two Metres

Simple Calibration Oscillator

By M. D. MASON (G6VX)

THE unit to be described has been developed for the express purpose of supplying 500 kc marker points in the 2-metre band.

In order to make the most of the 144-146 mc frequency lists now available, it is essential to have an accurately calibrated converter or receiver. Most converters and receivers acquire a certain amount of frequency error due to drifting or mechanical shocks, so a suitable frequency standard to check this point from time to time adds up to better operating efficiency.

With a 500 kc crystal, five marker points are provided in the 2-metre band ; these are useful for making a suitable calibration chart —to be modified as necessary as more and more fixed-frequency stations are identified. When the calibration is completed and can be relied upon, stations not already listed can be measured and their actual operating frequencies filed or sent forward for future listing.

The unit was designed to be really accurate all the way from 500 kc to 150 mc. The power consumption is so small that it could probably quite safely be taken from an existing receiver. With 100 volts HT and 6AK5 valves, the 145 mc harmonics are strong enough to be picked up with only a few inches of wire connected to the calibrator output terminal. The physical size has been deliberately kept as small as possible only for the convenience of tucking the unit out of the way in some corner to be switched on as required.

Circuit

The oscillator circuit is not at all critical and once it has been well constructed with good components (the most important being the crystal) no further adjustment is required other than to zero the crystal beat-note with one of the WWV transmissions or Greenwich on 2500 kc. The particular components specified are correct for a QCC Q5/500 crystal. Should some other make of crystal be used it may be necessary to change the values of the 22 $\mu\mu$F and 500 $\mu\mu$F condensers (C1, C3) slightly in order to have an equal amount of frequency correction either side of zero beat. The frequency correction is adjusted by the variable 100 $\mu\mu$F condenser, C2. Several

crystals were tried in this circuit including a 1000 kc bar, and all worked very well.

The valve complement can be quite varied—types 9001, 9003 (EF91, EF92 with wiring modification) and 6AK5 are all suitable. The 6AK5 gives the strongest harmonics, but the 9001 is good enough.

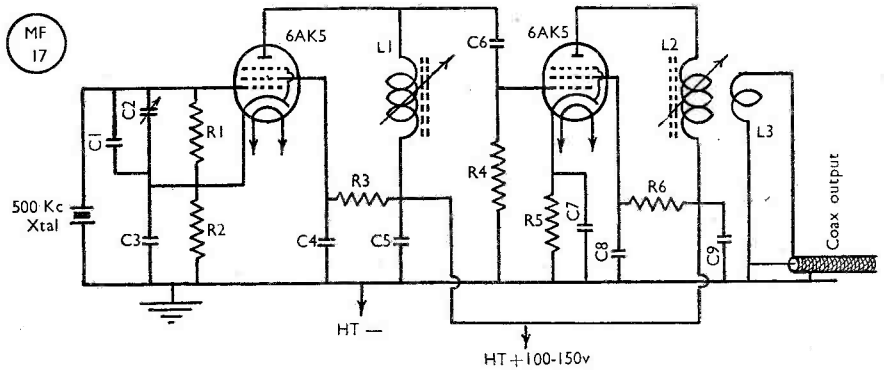
There are no particular tuning adjustments other than to peak the oscillator plate circuit on either 3 or 4 mc. This can be checked by listening for maximum signal on the regular communication receiver adjusted to 3 or 4 mc. The three-turn output coil L2 is peaked for the strongest signal by listening on 145 mc. By-pass condensers can be any value between ·01 and ·005 μF. The coil formers are small polystyrene type. The 200-turn coil L1 can be either wave- or scramble-wound and doped to keep in place. The output coil is three turns of 24 SWG enamel.

The chassis size of this unit is 4 in. long by 3 in. high and 3 in. wide. Actual size is not important as long as grid and plate leads are kept to 1 or 2 in. Once constructed, it will be found essential for its purpose, and it is cheap and easy to build.

Table of Values

CC Marker Unit

C1	= 22 $\mu\mu$F
C2	= 100 $\mu\mu$F, variable
C3, C7, C8, C9	= 500 $\mu\mu$F
C4, C5	= ·003 μF
C6	= 80 $\mu\mu$F
R1	= 500,000 ohms
R2, R3, R6	= 10,000 ohms
R4	= 100,000 ohms
R5	= 220 ohms
L1	= 200 turns, 40 SWG, on slugged polystyrene former
L2	= 3 turns, 24 SWG, on slugged polystyrene former
L3	= 2 turns coupled to L2
Valves	= 6AK5, 9001, 9003 (*see text*)
Xtal	= 500 kc bar (Q.C.C. Q5/500)



Circuit of the Marker Unit

IONOSPHERIC PREDICTION

The Radio Research Station at Slough of the Department of Scientific and Industrial Research has for many years carried out experiments and made observations for the purpose of gaining data on the behaviour of the ionosphere. A pulse transmitter and receiver, constantly in tune with each other, sweep the area 550 kc to 25 mc over a period of a few minutes, the echoes being displayed on a CRT and photographed. By reference to similar displays obtained at other stations in different parts of the world, long-term predictions can be made for periods up to six months; these are issued to such authorities as the BBC, GPO, Cables & Wireless and the Services, enabling them to plan their frequency schedules over the desired communication paths. The Automatic Ionospheric Recorder will be on view at the D.S.I.R. Stand at Radiolympia, September 28 to October 8.

TN16 Modified for Two

Surplus Converter Unit Easily Adapted for 145 mc

Notes by G4LU

The TN16/APR4 is an American 40-100 mc converter of sound basic design which can quite easily be modified to cover our two-metre band. This article shows how. The motor-operated tuning mechanism is an advantage for automatic searching.—Ed.

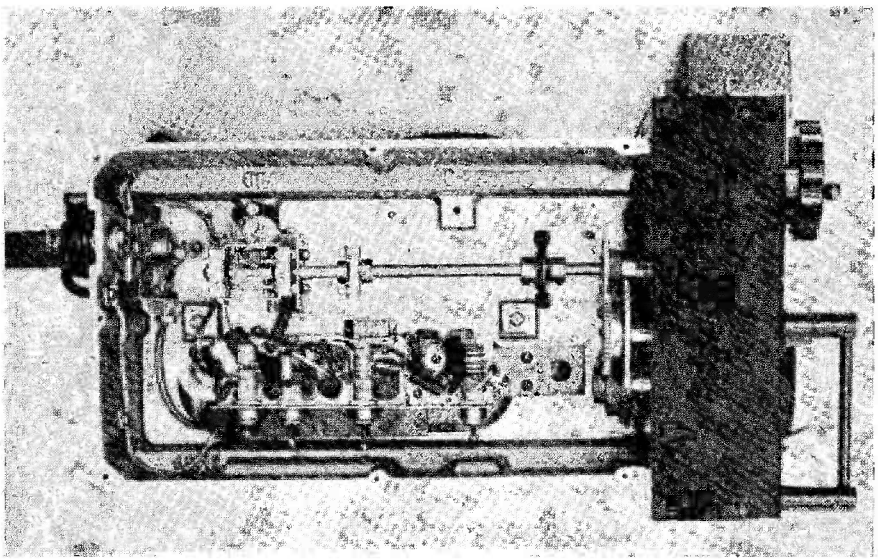
THE TN16/APR4 converter has been available on the surplus market and with some modification it can be made into quite an effective unit for the reception of two-metre signals. In its original form the TN16/APR4 covered 38-95 mc, with a 30 mc IF. The valve line up is 6AK5 RF amplifier, 9002 triode mixer and 9002 triode oscillator. Tuning is carried out by means of a four-gang condenser; two sections are employed in a split-stator connection in the oscillator circuit, and one section each for tuning the RF and mixer stage grid circuits.

Modification

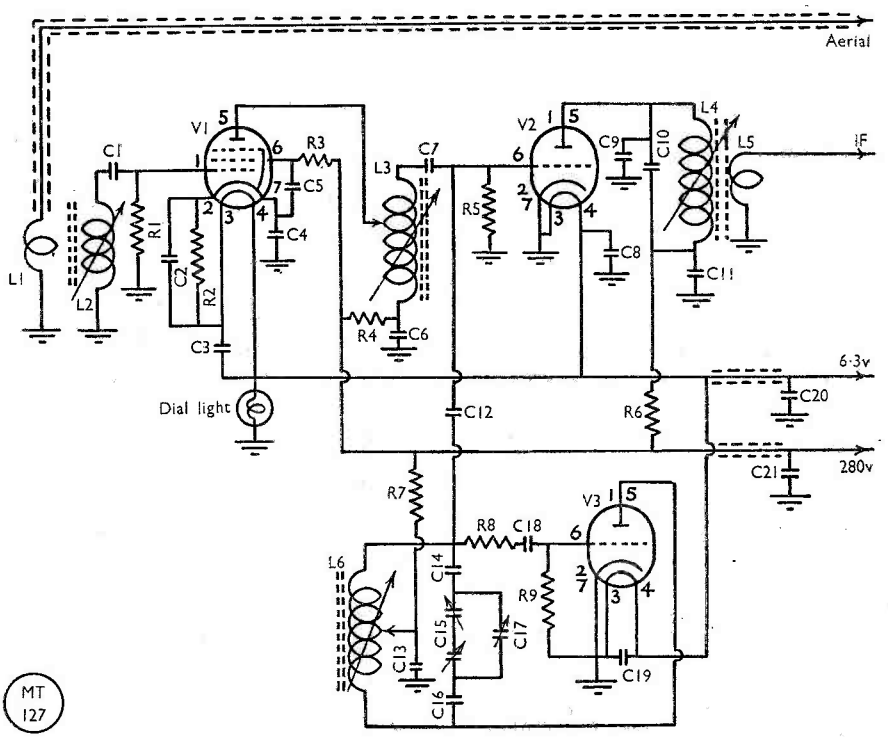
This condenser is removed in the modification and the oscillator is tuned by a smaller split-stator condenser. The RF and mixer stage grid circuits are fixed tuned to the mid-frequency of the two-metre band. Band spreading of the oscillator circuit is achieved by utilising one of the original trimming condensers in parallel with the new oscillator tuning capacity. In all other respects the oscillator circuit remains unaltered, except that a slightly smaller coil is used.

In the writer's model the IF was changed to 10 mc in order to standardise with other converters and facilitate changing over quickly for comparative checks on performance. The 10 mc IF transformer consists of the coil and former from an 1133 IF assembly which is slipped over the original ceramic former and secured by slight packing with a strip of empire tape. For those who have not a suitable unit available, the dimensions of this coil are given in the schedule.

Tuning of the IF circuit is effected by condenser C9, which is connected directly between the anode and cathode pins of the mixer valve, and an auxiliary condenser, C10, which is adjusted experimentally so that the IF can be brought within the range of the coil slug. The mixer stage grid leak, R5, needed to be increased and the oscillator coupling condenser, C12, reduced to give best results at the higher frequency. Some experimenting was carried out with the interstage coupling condenser,



Inside the TN16/APR4 converter after G4LU's modification for Two. The revised tuning system is clearly shown.



The TN16/APR4 as modified for Two by G4LU. This can be compared with the original circuit, which will be found on one of the panels of the unit itself when purchased.

C7, and the surprisingly large value of 300 $\mu\mu$F was found to give optimum results. A slight improvement was also obtained by tapping the anode of the 6AK5 valve down the mixer grid coil by approximately one turn. Very little change is required in the RF stage except for a smaller grid coupling condenser, C1, and an additional cathode by-pass condenser, C4. In order to obtain stable operation of the RF stage it was found necessary to return the two cathode by-pass condensers C2 and C4, and the earthy end of the grid coil, L2, to the common earthing point adjacent to pin 3 on the RF stage valveholder.

Fig. 1 shows the modified circuit and comparison with the original circuit printed on one of the side panels of the converter case will show readily the extent of the changes.

Alignment Procedure

The initial adjustment of the oscillator circuit and the adjustment of the band setting condenser, C17, together with the adjustment of the coil slug, can be effected by means of an accurately calibrated and sensitive wavemeter. The final touches can be made from on-the-air tests with signals of known frequency. The RF and mixer stages can be lined-up on strong local signals if desired or by using a stable signal generator. Alternatively, another method is available which is convenient and requires nothing more than a simple tone-modulated oscillator, a pair of headphones and an 0-10 mA meter. The principle is to use the mixer valve (the oscillator valve is removed for this test) as an anode bend detector. The meter and headphones are connected in series in the mixer anode circuit and the link output circuit of the oscillator is taken, first to the mixer grid direct for the initial adjustment of the associated tuned circuit, and then to the aerial terminal of the converter for the final setting up of both signal circuits.

Table of Values

The TN16/APR4 Modification

*L1	= 2 turns on original former
*L2	= 5 turns on original former
*L3	= 3 turns on original former, tapped one turn from grid end
*L4	= 12 turns, ½-in. diam.
*L5	= 2 turns, overwound on L4
*L6	= 2 turns on original former, centre tapped
*C1	= 7 μμF ceramicon
C2, C3, *C4, C5, C6, C8, C11, C13, C19	= ·001 μF mica
*C7	= 300 μμF ceramic
*C9	= 100 μμF ceramic
*C10	= 8·μμF ceramic
*C12	= 2 μμF ceramic
C14, C16	= 150 μμF mica
*C15	= Split stator variable, one fixed plate and one rotor plate each side
C17	= 1·5-7 μμF ceramic (original trimming condenser)
C18	= 51 μμF ceramic
C20, C21	= 75 μμF
R1	= 56,000 ohms, ½-watt
R2	= 330 ohms, ½-watt
R3	= 100,000 ohms, ½-watt
R4	= 22,000 ohms, 1 watt
*R5	= 560,000 ohms, ½-watt
R6	= 56,000 ohms, 1 watt
R7	= 15,000 ohms, 2 watts
R8	= 10 ohms, ½-watt
R9	= 100,000 ohms, ½-watt
V1	= 6AK5
V2, V3	= 9002

Modification parts and values

When these circuits are peaked on the test oscillator frequency the tone will be audible in the 'phones and the mixer anode current will change. The change in the anode current of the mixer stage can be utilised for making quantitative tests with various circuit values, the greatest change being obtained when the signal circuits are giving the most gain. In the writer's model the change obtained was from 5 mA with no signal to 3 mA with signal on, but it should be remembered that the latter value will be dependent on the strength of the signal injected from the test oscillator. No great care need be taken in obtaining a great degree of frequency stability in the test oscillator since only the relatively broad signal circuits are involved, but the mean frequency should be monitored for the duration of the test to ensure that all adjustments are made at the same frequency.

A suitable valve combination for the suggested test oscillator would be a 7193 (CV6 or CV1135) as the RF oscillator and a 6J5 as the tone oscillator-cum-modulator.

Performance

In tests under practical conditions, the converter compared very favourably with one using a grounded-grid RF stage and triode mixer and would receive all but the very weakest signals audible in the comparison converter. Tone output was T9 without using stabilised HT voltage although a slight drift was experienced due to jumps in the main supply. Sufficient space is available in the case for the incorporation of an additional grounded-grid stage using one of the new B7G based triodes, if desired.

A further useful feature of the original unit is the automatic search motor incorporated in the dial mechanism, which operates from a 28-volt DC supply. This motor is quite noise-free in operation and can be left to search the band during those periods when things are quiet on Two. If the main receiver is feeding a speaker, the operator is thus free to do something useful until a signal comes up.

STATISTICS

At the present rate of licensing it may be expected that by the end of this year there will be about 8,500 amateur transmitters licensed under the G prefixes. This is a high figure—nearly three times the number of full permits in force as at September 1939—but even at that is much lower in proportion than the numbers in Australasia, Canada and the United States. In these countries, the ratio of licensed amateurs to the total population is very much higher.

★

RECORDING EQUIPMENT

We are well aware that there is a great and growing interest in what is known as "home recording"—indeed, there is a wide field of application for it quite outside and beyond the purely Amateur Radio aspect ; this amounts to taking down and playing back the other man's transmission. At the present time certain recording equipments on the market in this country, though very good, are also very expensive, and there is clearly scope for the design of amateur-built equipment using the latest techniques. We should be interested to hear from anyone who has built successful recording apparatus—on which a live demonstration can be given over the air !

★

"RECEIVING SINGLE SIDEBAND"

This is the title of a very useful practical article in the current (October) issue of our *Short Wave Listener*, of which a few copies are available at 1s. 4d. post free. Remit to the Circulation Manager, Short Wave Magazine, Ltd., 49 Victoria Street London, S.W.1.

VHF BANDS

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

Band Plan Comment—
Points on Aerials—
QSO Procedure—
Seventycem Progress—
Individual Reports

IS serious experimental work helped or hindered by interference? Quite definitely, the answer any rational individual would give is that it is hindered—unless one is engaged in the design of QRM filters. For that reason alone the Two-Metre Zone Plan seems worth a trial.

Does it make sense that avoidable QRM should be suffered just to make DX more difficult, or to make it impossible to do more than exchange RST's and 73 with a distant station? Why go the hard way about something when a little forethought can make it easier for everybody?

The proposed Zone Plan (now effectively in operation) has been supported and encouraged by the *Short Wave Magazine* because it appears to offer a sensible solution to a number of practical problems well understood by all experienced VHF workers; it should therefore make operating conditions better for all concerned. It is not claimed that the Plan will overcome every difficulty, but with stations spread out over the whole two-megacycle area (which is in itself the rational approach to the use of the band) the chances of interference generally will be much reduced; and this should also help to encourage the chatty contact as distinct from the rubber-stamp QSO made for scoring purposes.

Anyhow, within the next few weeks we shall all begin to find out whether the Plan is achieving those objectives which have been so exhaustively discussed and examined during the last several months in this space, by correspondence and at representative meetings of VHF operators. For the Plan to have a fair trial, it is essential that both its critics and its supporters give it a run. There is, of course, no compulsion about this, and it will be for operators themselves to decide, in due course, whether the scheme is serving its purpose.

We are glad to be able to say that by far the great majority of active VHF workers have said they are willing to operate in their suggested Zones (see p. 533 last time)—and that alone is sufficient proof of the fine spirit of mutual co-operation always evident on the VHF bands.

More About Aerials

Once again, aerials figure prominently in readers' letters, this time as a result of the remarks in last month's "VHF Bands". Most of the stacked-array users who have sent comments agree that there is only about 5 or 6 dB between a 4-element Yagi type and the 16-element colinear stack, but contend that such a gain is very much worthwhile. There is no denying that, especially when signals are just around noise level. Two stacked 4-element Yagis will, however, come pretty close to the 16-element colinear, while at least one station in the South-West has been finding 4 stacked Yagis a little superior to the 16-element colinear array.

A point which has been made in favour of the broadside array is that its horizontal directivity is not so sharp and hence less searching and beam rotation is required. While allowing these points, it must also be admitted that as a result local QRM will be a bigger problem with this type of array, and at G2XC, at least, there is much to be said for a beam sharp enough to eliminate car ignition QRM from as wide an angle as possible. The sharp beam undoubtedly improves the signal-to-noise ratio in bad locations. It is also probable that the array builder is after DX, for a simple dipole is quite adequate for purely local work, and to the DX man, there are frequently good reasons for wishing to push the signals to one direction only.

More than one correspondent has stated that there appears to be less fading at DX distances when using a multi-element array. This cannot be due to the vertical directivity properties of the aerial as (unless the generally accepted theories of tropospheric propagation are wrong) the range of radiation angles concerned in DX working is very small, and over such a small range the gains of stacks and simple Yagis are in a constant proportion. Reflection from aircraft causing a regular flutter fade is of course another matter, and is obviously going to be more severe when high-angle radiation is present. There is also the possibility of a horizontal swing in the transmission path due to tropospheric instability, and this would be more noticeable when using the Yagi with its sharper horizontal polar diagram. That is just a suggestion and

THE SHORT WAVE MAGAZINE

Two-Metre Contest

RULES

(1) The period of the Contest will be Saturday, November 12, 1200 GMT, to Sunday, November 13, 2359 GMT.

(2) Points will be claimed for contacts from the home location, using the 144-146 mc band. Contacts with Continental stations can count for points.

(3) Exchange of RST, reference number and QTH will constitute a contact.

(4) Contacts may be made on either 'phone or CW, but no extra points will be allowed for 'phone QSO's as distinct from CW contacts.

(5) Every contestant will allot himself or herself a three-figure reference number, which will remain unchanged during the period of the Contest. This reference number will be sent before the RST or RS report in the following manner : 342RST569, or 342RS57 in the case of a 'phone report. The reference number *must* be given with the report outwards in every counting QSO. Contacts with *non-contestants* who cannot give a reference number may be claimed, provided a report and QTH are received.

(6) Scoring will be on the following basis :—

Up to 25 miles	1 point
25 to 50 miles	2 points
50 to 75 miles	3 points
75 to 100 miles	5 points
100 to 150 miles	8 points
150 to 200 miles	12 points
200 miles and over	20 points

plus five points for each additional ten miles of distance ; proportions of these additional 10-mile distances will not count for points in proportion

No bonus or multiplier points will be scored on a county basis.

(7) Point-to-point distances will be taken from the Ordnance Survey "Ten-Mile" Map of Great Britain, or calculated from the National Grid References when these are known. In the case of a foreign station the distance will be calculated from the latitude and longitude of the station's QTH.

(8) No Contest QSO may be pre-arranged, nor may contacts be passed on from one station to another. These practices will be grounds for disqualification.

(9) The exchange of reference numbers *prior* to the Contest is forbidden, and will be reason for disqualification.

(10) Results should be sent to reach E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1, by November 21, 1949, latest, set out as follows :—

(*a*) Running log for period of Contest, showing only contacts claimed to count, with time of working, reference number in, RST in, RST out, QTH of station worked, distance and points claimed. The contestant's own reference number should be clearly marked at the top of each log sheet, and the total score at the end of the log.

(*b*) The National Grid Reference of the contestant's station, if known.

(*c*) A brief description of the equipment used, and notes on impressions and experiences of the Contest.

(11) Entries from Continental stations are invited, and if sufficient are received national winners for the various countries concerned will be determined.

Results of the Contest will be given in the January, 1950, issue of the *Short Wave Magazine* with a preliminary comment in the December, 1949, issue.

quite possibly the answer is something very different. It may just be that the extra S-point the array gives makes the fading *appear* less. A drop from S6 to S4 may maintain 100 per cent. readability, whereas S5 to S3 probably will not and will therefore *seem* to be a deeper fade.

Your conductor would like to make it clear that these comments should not be taken to imply an antagonism to multi-element arrays of the collinear type, for no one can deny their fine performance at many of the well-known 2-metre stations; rather, the intention is to point out that many exaggerated claims have been made for them in recent months, and vague remarks such as "lowering the angle of radiation" have led many to believe that the actual lobes in the vertical plane were lowered. This is not so. Further, it is not a desirable thing from many points of view that everyone should use the same type of equipment. Variety makes for progress!

G2BMZ (Torquay) has given some details of his 35-element array, which consists of five 7-element Yagis stacked vertically. Each beam has a reflector at 0·2 wavelength spacing, a first director at 0·16 and other directors at 0·3, making an overall length of about 11 ft. 6 in. Originally, there were just two of these Yagis stacked a wavelength apart, with the upper one at 40 ft. above ground. As a test for optimum spacing another two were set up only $\frac{5}{8}$-wavelength apart, at a height of but 27 ft. This pair was found to be equal in performance to the higher set. A fifth beam was then added and the whole set of 35 elements became one beam.

G5BY (Bolt Tail) also has been trying out a rotary consisting of 2 seven-element Yagis stacked 1-wavelength apart, and with the top at 50 ft. It has very marked horizontal directivity, and on an average is about one S-point down on his 24-element stacked array. But often, when signals fade down on one aerial they come up on the other!

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH only

Worked	Station
42	G3BLP (160)
40	G5MA
38	G2IQ, G2NH (183), G5WP
37	G2OI
36	G3ABA, G6NB (167)
35	G5BY, G5GX
33	G3COJ
32	G3APY, G3CUJ, G3EHY
31	GW2ADZ, G2KG(110), G2MR, G2XC (170), G4DC (137), G4LU
30	G5BM
29	G2XS, G3DMU
28	G5BD, G8WV
27	G3BKQ, G3DAH, G5JU, G8QX
26	G2RI, G5MI
25	G2AXG, G2CIW, G4AU, G6PG (109)
24	G3CGQ, G5NF (111)
22	G2HDY, G4HT (100)
21	G2NM, G3CCP, G6UH (130)
20	G2CPL, G3VM, G6VC, G8IP, G8KZ
19	G3FD, G5RP
18	GM3OL, G6DT
17	G3AUA
16	G8SM
15	G2FLC, G3WW, G4RK
14	G2ANT, GM3BDA, G3BW, G6LK

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

Local Contacts *versus* DX

From time to time a correspondent puts in a complaint that "all the well-known two-metre stations in his locality are so busy working GDX that they have no time for local contacts." Of course, it is equally a fact that letters also come in alleging that the DX stations are always so busy working their locals that DX contacts cannot be obtained!

However, some comment on the first type of complaint seems necessary, for it *invariably comes from the man who is unable to hear the DX himself.* It may be his unfortunate location, it may be his inferior equipment, but whatever it is, so far as he is concerned there are only the locals to work. But one day, the troposphere lends a hand, and just for an hour or two the DX filters through, and by the next post your conductor receives a long list of the wonderful calls heard and worked by this "anti-DX" correspondent. Did he stop to work locals that night? Not likely! And who blames him? To probably 99 per cent. of the present 2-metre operators the major interest *is* working DX. And a good

thing too ! For without that desire, how many of these multi-element stacks and low noise-factor receivers would have been produced ? A healthy, competitive spirit, the desire to beat not only the other man but even one's own previous best, is the thing on which Amateur Radio thrives and always will. It is for that reason that competitive and achievement tables appear in these columns. As well as adding to the fun of our hobby they serve as an incentive to still greater efforts for the future.

Lest it be thought that your conductor worships DX to the exclusion of local contacts he would like to mention that during the first 14 days of September G2XC had 36 contacts with 14 different stations within 40 miles of his QTH, and in addition there were 21 contacts with the London area, which is hardly what is usually called DX. Such contacts, however, are not exactly of news value, and hence are not normally mentioned in "VHF Bands."

Progress on 420 cm.

The same problem arises with regard to 70 cm. Is it to be used mainly as a local ragchew band, or are we to explore its possibilities as a DX band ? For the former self-excited oscillators and super-regen receivers will fill the bill nicely. All else that remains is to put our aerials in a lofty position and if there is a line of sight to the chap across the town all should be well. If we go to the top of the nearest high hill then our horizon is appreciably extended and the workable range correspondingly increased.

As G5RP pointed out last month, this is where we were on 5 metres in 1935—or, to be more exact, G5BY was there in 1930 working 50 miles or more on Field Days. No doubt we could not have done it on 70 cm. in 1930, but that was mainly due to lack of suitable valves. It has been useful proving that it can be done in 1949, but most credit goes to the valve manufacturers, and so far as Amateur Radio is concerned the progress is precious little. That may seem to be putting it rather bluntly and already, before we even thought of writing this, one letter had been received complaining of the *Magazine* policy of advocating stabilised equipment on this 420 mc band. With a band so wide, certainly there is room for the SEO people to have their fun. But to anyone seriously interested in making the most of the band there appears to be only one answer, namely stable equipment.

That many of the successful VHF men are in accord with our policy is obvious. For example, G3BKQ writes : "I feel that 420 mc is going to be as good as Two, with the right equipment." G3APY comments, "If stations were CC CW they would be perfect, but it is heartbreaking to follow a mass (or mess) of a signal when it is weak. Could we have a drive to clear 70 cm. of ICW and super squish ? I am convinced also, that if the power can be put on one frequency instead of 3 to 10 megacycles we can expect much improvement in ranges." While G2IQ says, "I hope to start working people as soon as they learn SEO's are out of date. It is a pity most people have got the idea that 420 mc is a band for portable work only. There is no reason why we should not do nearly as well as on 145 mc if people would get rid of inferiority complexes."

Schedules

The value of the scheduled day-by-day contacts between stations on the VHF bands has been emphasised on many occasions and it is encouraging to see many such at present in operation on the 2-metre band. Such regular transmissions are a help not only to the stations concerned but to the many others who check on them to determine whether or not conditions are good. They should however be more than just a "DX barometer," and it is hoped that some of the regular schedule-keepers will in due course examine their results and let us have the benefit of their conclusions. Otherwise, such a series of contacts may well become nothing more than an achievement record from which nothing of scientific value will have been learnt.

The following GDX schedules are in operation at the present time :—

G2NH-G3EHY	**1400 hrs. daily**
G2CPL-G2NH	**1930 hrs. daily**
G2OI-GI2FHN	**2300 hrs. daily**
G3EHY-GW2ADZ	**1900 hrs. daily**
G3VM-G3DMU	**1915 hrs. daily**
G3VM-GW2ADZ	**2015 hrs. daily**
G5BD-G5WP	**2230 hrs. daily**
G2XC-G2XS	**0930 hrs. Sundays**

Two-Metre News

In spite of the usual complaints of inactivity, most people seem to have found something new to work. Conditions generally have been fairly good and on most evenings a few signals at 150 miles or more could be heard and worked. More than one correspondent has remarked how good things seemed to be on August 22 when everyone got to know that G6LX/P was in Rutland ! Some 36 stations were lucky, while about 15 others, mainly working on 'phone, were heard but were not interested ! G6LX comments on the poor quality of some of the signals emanating from unmodified SCR522's in the Midland area, the 'phone signals being spread over 20 to 30 kc and the CW almost unreadable due to chirps and jumping frequency. Thanks must go to G2NH, G3BLP, and G6VX who helped

TWO-METRE ACTIVITY BY COUNTIES

The Midlands and North

Cheshire
G3DH, G6TL

Cumberland
G3BW

Durham
G2DKH, G2FO, G3CDM, G3EHZ, G3EJD, G3ELP, G4WB, G8AO, G8BI, G8IF, G8JO

Huntingdon
G3AKU

Lancashire
G2BTO, G2OI, G3DA, G5KX, G6LC, G6QT, G8UF

Leicester
G2RI, G3BKQ, G3ENS

Lincoln
G3DMU, G5BD

Norfolk
G2XS, G3VM, G5UD

Northants
G2HCG

Northumberland
G2BDQ, G3CYY, G4LX, G4QA

Nottingham
G3APY, G8UZ

Shropshire
G3AHT, G3ASC, G4LU

Stafford
G3CXD, G3EEZ, G8KL

Warwick
G2ATK, G3BUR, G3DJQ, G4RK, G5LJ, G5ML, G8MZ

Yorkshire
G2HNL, G2IQ, G2MA, G2TK, G3ALD, G3ALY, G3COJ, G3CUJ, G3DMK, G6BX, G6YO, G8GL, G8SJ

SCOTLAND

Aberdeen
GM2CAS, GM2YA

Angus
GM4HR

Dumfries
GM3OL

Fife
GM3AXO, GM3CCT, GM3EGW

Lanark
GM2DI, GM3BDA, GM5VG

Midlothian
GM3BBW, GM6SR

NORTH WALES

Anglesey
GW3KY

Caernarvon
GW5YB

Montgomery
GW2ADZ

NORTHERN IRELAND

Antrim
GI2FHN, GI2HML

Southern Counties next month

with the loan of equipment as well as to G6LX. G3BFP also helped in the early tests.

Furthest north report of 2-metre activity so far comes from SWL Forbes in Wick, who says that GM2CAS and GM2YA are active in Aberdeen. The former has a rotary 6-ele. beam, and the latter a 16-ele. array. The QTH of GM2YA is favourable for work down the East Coast to the East Anglian area. In Fife, GM3EGW reports active. He has an 832 PA on 145·08, while the Rx is R28/ARC-5 modified feeding into BC342N. A number of different aerials have been tried, but all indoors. A 4-over-4 rotary outdoors is scheduled for the near future. He mentions others active in his area and these are included in the Activity-by-Counties list. Another welcome letter from North of the Border comes from GM3BDA (Airdrie) who has had some success in working Northern G and W.G The converter is the G2IQ type, which he describes as a delight to handle. A 16-element array with open wire feeder is under way to replace his 4-over-4 on which all the DX has been worked so far, now covering four *countries*. Both GM3OL and GM3BDA are supporting the band plan. We regret that our geography slipped up to the extent of inventing a new Scottish county ; Airdrie is in Lanarkshire !

On Tyneside activity is on the upgrade, and a regular S9 path has been opened up between G4LX (Newcastle) and G3DMK (Catterick) at 45 miles. G8BI (Darlington) also reports increased activity in his area, mainly with modified SCR522's at the LF end of the band. G3DMK also has a modified SCR522, with two 6AK5's in front and a 12A6 for output. A 4-ele. beam is up at 42 ft. He always has a look round the band at 1330, and is active from 1900 in the evenings. G8AO (South Shields and *S/S Wardle*) continues to listen as he cruises up and down the East Coast. He finds G5WP the most consistent signal but has also heard G2XC a number of times ! G8AO asks for some activity between 0800 and 0900, at lunch time, and from 1800 to 2000. Some people have to work during the first two of these periods, but the early evening period is full of activity along the South Coast every day.

G2XS (Kings Lynn) ran a very successful schedule at 0715 BST with G2XC for a three-week period. The distance is 145 miles, and only one miss was recorded during the whole period—and that we must confess may have been due to G2XC forgetting to remove the earth from his feeder ! (This had been connected during a thundery period the previous evening.) Several of the contacts were made at S8 'phone. G2XS has an 8-ele. bidirectional array ; he reports that SM5VL is beaming on this country each Monday,

Tuesday, Thursday and Friday from 2130 to 2135 GMT on 144·24 mc. G3VM (Norwich) thinks much of the poor conditions can actually be put down to poor activity. He is running a schedule with G3DMU (Scunthorpe) at 100 miles at 1915 BST. G2CPL (Lowestoft) also supports the contention that activity has been below average.

G3AKU (St. Ives) finds he is badly screened to the SW, and asks for more activity during TV hours. G6VX is his most consistent signal. G2CIW (Romford) with a 16-ele. array, top at 40 ft. and fed with 300 ohm ribbon, has obtained some very encouraging results, and says signals from G2CPL, 2XC, 3ABH and 3VM are now much more consistent.

G6VC (Northfleet) has replaced his 3-ele. beam with a 6-ele. job, which appears to be an improvement. G4HT (Ealing) now works to the South with a Quad perched on the bathroom window ! He has raised G6YO (Bradford) at nearly 200 miles, and has become an associate member of the VHF Century Club. G4HT remarks that G2XS always comes in before the Cambridge stations, in spite of the longer distance. G3BLP has been holidaying in GC and endeavouring to encourage 2-metre activity in that area. G3DCC (Green Lanes, Middlesex) has a 4-ele. Yagi up, and a pair of CV6's for PA ; he asks for more early evening activity.

G2ANT (Godalming) has a 16-ele. array in use in a none-too-good location. G2MC has now moved to Brighton and hopes to be operating from there in the near future, although DC mains have to be used as a source of power.

VHF CENTURY CLUB

NEW FULL MEMBERS

G2AOK	H. Heath (Stow-on-the-Wold)
G2XS	H. W. Sadler (King's Lynn)
G3BOB	G. M. Ward (Bromley)
G3BW	W. H. Hodgson (Whitehaven)
G3FD	H. T. Brock (Southgate)
G4CI	D. S. Babbage (New Malden)
G8KL	W. Sturmey (Wolverhampton)
G8QX	K. Hopkinson (Malvern)
GM3OL	G. Percy (Dumfries)

Total : 59 Full Members

G5BD now has 250 cards

NEW ASSOCIATE MEMBERS

G3EHY, G4HT

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1949

Starting Figure, 14

Worked	Station
19	G2XC
15	GW2ADZ
14	G2XS, G3VM

Note : *Scoring for this Table is cumulative, and it will run for one year to August* 31, 1950.

In the South-West, G5BY (Bolt Tail) has found conditions to be poor, August 19 being the brightest date. G5QA (Exeter) wants further contacts with GW ; he works GW2ADZ most evenings around 1830 GMT. G3EHY (Banwell) says that he fires into a 300-ft. hill at less than a quarter of a mile when he is working the Hampshire stations, but in spite of that a large number of successful contacts were made with G2XC during the past month. Signals are, however, not so good as in many other directions. He has heard GW3KY, and his best contact of the month was G5KX.

GW2ADZ sees no future in continuing the Counties tables and thinks it a waste of good paper ! He bemoans the lack of signals from London on Sunday mornings.

PAØLU worked G2TK on August 22, and has heard a number of other G signals. He promises to send some photographs of the PA VHF gear. DL4XS is active on 144·14 mc with a 16-ele. beam and 120 watts.

Seventycems

Greatest distance yet covered on 70 cm. appears to be the 109 miles between GW6DP/P on Snowdon (NGR 23/610544, 3,560 ft. a.s.l.) and G2JT at Fairfield, in the Lake District (NGR 35/359118, 2,868 ft. a.s.l.). Contact was made on September 10 and the signal strengths were S5-6 each way. At the Welsh end the equipment was a 6J6 transceiver modulated by a 6C4, with a hand generator power supply, and a 90 deg. corner reflector aerial. At G2JT/P a twin 6J6 Tx modulated by a single 6J6 was run at about 7 watts input, and the Rx was a separate 955 super-regen. A 16-ele. curtain was used on the Tx and a 4-ele. beam for the Rx. The weather on Snowdon was misty and there was heavy condensation, but in the Lakes, driving rain made the venture far less comfortable and only the fortitude of G2JT got the station on the air and kept it there. Tests between Snowdon and Skiddaw at 120 miles, in fine

TWO-METRE ACTIVITY REPORT

To maintain the usefulness of this section, please set out your list on a separate sheet and exactly as shown below. That is, with callsigns in numerical and alphabetical sequence, arranged horizontally, repeating the numeral but not the prefix, and divided into "worked" and "heard" listings. And please print all calls clearly!

G3DMK, Catterick, Yorks.

WORKED : G2FO, 2HNL, 3BQJ, 3CIO, 3CUJ, 3CVO/A, 3DMU, 3DRG, 3EHZ, 4LX, 4RB, 4WA, 5BD, 8AO, 8BI.

HEARD : G2BLS, 2CPL, 2MA, 3ALD, 3DSA, 6LX.

G6NB, Chertsey, Surrey.

WORKED : G2BMZ, 2CPL, 2IQ, 2OI, 2XS, 3AHT, 3BHE, 3CCP, 3COJ, 3CXD, 3DMU, 3EHY, 3EJL, 3FIJ, 3VM, 3WW, 4AP, 4MW, 4RK, 5BD, 5QA, 5UD, 6WT, 6YO, GW2ADZ, PAØPN.

G3EHY, Banwell, Somerset.

WORKED : G2AEX, 2CIW, 2KG, 2NH, 2IQ, 2OI, 2XS, 3AHT, 3BUR/P, 3DA, 3DMU, 5BM, 5KX, 5ML, 5TP, 6NB, 6UH, 8UZ, GW2ADZ.

HEARD : G2DGO, 2WJ, 3APY, 3AVF/P, 3CXD, 3QK, 4LU, 5QA, 8VV, GW3KY. (*August* 15 *to September* 12.)

G4HT, Ealing, Middlesex.

WORKED : G2AFB, 2ANT, 2BN 2CIW, 2DGO, 2DPD, 2HCG, 2IQ, 2RI, 2YL, 2ZV, 3ABH, 3AHT, 3AKU, 3CCP, 3CVO 3CWW, 3DCC, 3FD, 3GM, 3RI, 3VM, 3WW, 4AU, 4CG, 4LU, 4MR, 4MW, 4ZU, 5AA, 5BD, 5DT, 5LI, 5RD, 6GR, 6HC, 6LR, 6LX/P, 6YO, 8GX, 8SK/P, 8SY, 8TB, 8WV.

HEARD : G2CPL, 2OI, 3ALD, 3AUA, 3BKQ, 3DAH, 3EHY, 3EJL, 6WT, 8QX. (*New stations since August* 14.)

G3EJL, Southampton, Hants.

WORKED : G2AJ, 2ANT, 2BMZ, 2HDY, 2QV, 3AHT, 3AUS, 3DAH, 3EBW, 3EHY, 4AP, 4AU, 4RD, 5MA, 5NF, 5RD, 5QA, 5TP, 5WP, 5ZT, 6NB, 6UH, 6WT, GW5SA.

HEARD : G2AVR, 2BN, 2CIW, 2DPD, 2KG, 2NH, 2OI, 2XS, 2XV, 3AGA, 3AVF, 3CCP, 3CMT, 3COJ, 3CWW, 3FD, 3VM, 4HT, 5BD, 5BM, 6VX, 8IL, 8IP, 8KZ, 8SY.

G2CPL, Lowestoft, Suffolk, NGR 62/536910.

WORKED : G2CIW, 2FZX, 2HCG, 2MA, 2NH, 2XC, 2XS, 3BOB, 3CWW, 3CXD, 3DMU, 3VM, 4AU, 5BD, 5MA, 6LX/P, 6NB, 6YO, 8IP, 8SJ, 8WV.

HEARD : G2AJ, 2HDY, 2IQ, 2KG, 2WJ, 3ABH, 3ALD, 3ALY, 3ANB, 3APY, 3CFR, 3COJ, 3DEP, 3ENS, 4CI, 4MW, 4RK, 5KH, 5TP, 5UD, 5WP, 6VC, 6VX, 6YP, GW2ADZ, PAØPN. (*August* 16 *to September* 12.)

G5QA, Exeter, Devon.

WORKED : G2BMZ, 3AVF, 3CMT, 3EJL, 3RI, 5MA, 5RY, 5TP, 6DT, 6NB, 6WT.

HEARD : G2IQ, 2NH, 2OI, 2XC, 3AGA, 3AHT, 5TZ, 6VX.

G3VM, Norwich, Norfolk.

WORKED : G2AJ, 2ANT, 2CIW, 2CPL, 2HCG, 2TK, 2WJ, 2XC, 2XS, 3AEK, 3AKU, 3BOB, 3BTL, 3CUJ, 3CWW, 3CXD, 3DMU, 3DRG, 4AP, 4AU, 4HT, 5BC, 5MA, 6LX/P, 6NB, 6VC, 6VX 6YP, 8SJ, GW2ADZ.

HEARD : G2BVW, 2IQ, 2KG, 2MA, 2NH, 3BHE, 3DEP, 3ENS, 3FIJ, 3FOD, 3WW, 4CI, 4DC, 4MW, 5BD, 5WP, 6DH, 6OH, 6PG, 6UH, 8IP, 8WV. (*August* 15 *to September* 12.)

GW2ADZ, Llanymynech, Montgomery.

WORKED : G2ATK, 2BMZ, 2CPL, 2HDY, 2HCG, 2KG, 2XC, 2XS, 3ABH, 3AHT, 3ASC, 3BHE, 3DAH, 3DMU, 3EHY, 3VM, 4AU, 4HT, 4RK, 5BC, 5BY, 5LJ, 5ML, 5QA, 6NB, 6OH, 6VC, 6ZQ, 8KL, 8SY.

HEARD : G2BFT, 3EVC, 3GW, GW3KY, 5SA.

G3BUR/P, Kings Norton, Birmingham, NGR 42/047767.

WORKED : G2ATK, 3AHT, 3BHE, 3DJQ, 3EEZ, 3EHY, 3EVC, 4AU, 8KL, 8MZ, 8QX, GW2ADZ.

HEARD : G2XC, 3ABH, 6VX. (*September* 10-11.)

G8BI, Darlington, Co. Durham.

WORKED : G2DRG, 2FO, 2HNL, 2MA, 3BKQ, 3CDM, 3CUJ, 3DMK, 3DMU, 3EHZ, 4LX, 6BX, 6UX, 6YO, 8SY.

HEARD : G2IQ, 2XS, 2XT, 3APY, 3ALY, 3MY/P, 4WB, 8AO. (*Since August* 18.)

G2XC, Portsmouth, Hants, NGR 41/760069.

WORKED : G2AVR, 2BMZ, 2CIW, 2DPD, 2FMF, 2IQ, 2KG, 2PU, 2QV, 2RI, 2WJ, 2XS, 3AHT, 3ALD, 3AVF, 3CWW, 3DAH, 3DCC, 3DMU, 3EBW, 3EHY, 3FD, 3FIJ, 3NR, 3VM, 3WW, 4DC, 4HT, 4LU, 4MW, 4RK, 5BC, 5BD, 5LI, 5MR, 5XA, 6HC, 6LX/P, 6UH, 6WT, 6YP, 8IP, 8SY, 8WV, GW2ADZ, 5SA.

HEARD : G2ATK, 2BN, 2DGO, 2OI, 3BKQ, 3COJ, 3CUJ, 5GX, 5ML, 5RO, 5SQ, 6YO, 8QX, 8UZ. (*August* 19 *to September* 16.)

G5BY, Bolt Tail, South Devon.

WORKED : G3AGA, 3AHT, 3CFR, 3CMT, 3EJL, 3FMO, 5WP, GW2ADZ.

HEARD : G2ATK, 2CIW, 2DSW, 2IQ, 2KG, 2MV, 2OI, 2RI, 2WJ, 2XC, 2XS, 2YL, 3ABA, 3ABH, 3ALD, 3APY, 3CXD, 3EHY, 3RI, 4GR, 4LU, 4RK, 5BM, 5KX, 5NF, 5TP, 6DT, 6LX/P, 6VX, 8UZ, 8WV, GW5SA. (*August* 19 *to September* 14.)

G3DCC, London, N.8.

WORKED : G2AJ, 2BN, 2CIW, 2DWV, 2HDY, 2KG, 2MV, 2XC, 3AEX, 3BOB, 3BLP, 3BYY, 3BUN, 3CGQ, 3CQ, 3CWW, 3DAH, 3FD, 3FP, 4AU, 4CG, 4CI, 4DC, 4HT, 5BC, 5DT, 5TB, 5KH, 5MA, 5UM, 5VY, 5YM, 6CB, 6PG, 6OT, 6VC, 6YP, 8IP, 8KZ, 8SK.

HEARD : G2BRH, 2NH, 2WJ, 2XS, 2YL, 3ABH, 3CVO, 3ECA, 5PT, 5WP, 5RD, 6LX/P, 6NB, 6NF. (*August* 12 *to September* 12.)

G8KL, Wolverhampton, Staffs.

WORKED : G2BFT, 3AHT, 3BHE, 3BUR/P, 3CAQ, 3CXD, 3DJQ, 4LU, 5BM, GW2ADZ.

HEARD : G2XC, 3ABH, 3BKQ, 3BLP, 3EHY, 3ENS, 4RK, 5BY, 5ML, 6NB, 6VX, GW3KY. (*Period ending September* 12.)

G3AKU, St. Ives, Hunts.

WORKED : G2AIQ, 2AJ, 2FLC, 2HCG, 2IQ, 2KG, 2MA, 2XS, 2XV, 3ALD, 3CGQ, 3CJY, 3VM, 3WW, 4AU, 4CI, 4DC, 4HT, 4MW, 5BD, 5MA, 5UD, 5WP, 6LX/P, 6PG, 6VC, 6VX, 6YO, 8SY.

HEARD : G2XC, 3BLP, 3CUJ, 6NB. (*August* 5 *to September* 11.)

G2BTO, Bolton, Lancs.

WORKED : G5KX, 6LC, 8UF.

HEARD : G2OI, 3CHY, 3CSC 3DA, 3DM, 6QT, 6TL, 8SB.

G6LX/P, Rutland.

WORKED : G2AJ, 2ATK, 2CPL, 2FKZ, 2HCG, 2HDY, 2IQ, 2MA, 2XC, 3ABA, 3AKU, 3ALD, 3APY, 3BBA, 3BLP, 3BOB, 3CGQ, 3CUJ, 3DMU, 3EEZ, 3VM, 4AU, 4HT, 5BD, 5MA, 5NF, 5UD, 5XA, 6DH, 6NB, 6OS, 6VX, 6YO, 6YP, 8SJ, 8WV.

HEARD : G2AVQ, 2MR, 3BKQ, 3CXD, 3CYY?, 4CG, 4MW, 4RK, 5BC, 5KH, 5TP, 6CB, 6LR, 6OH, 8IO. (*August* 22-23.)

weather, on the following day were unsuccessful. Much of the path between Snowdon and the Lakes is over water, and G6DP thinks this probably explains the good signal strengths. More stable equipment is envisaged for the future and for use over more difficult paths.

During the September 10/11 week-end, G3BUR/P was operating at Redhill Farm, Kings Norton, near Birmingham. Five stations were worked, the best being G3APY at 57 miles. This site was not found to be as good as the previous one at Walton Hill, being 400 ft. lower. The Tx was SEO, but it is understood that CC will be in use next time. The ASB8 bandwidth is considered far too wide and unnecessary QRM is obtained as a result, but on the other hand it is considered that 10 kc is much too narrow for present conditions. The ASB8 has now been altered to 56·3 mc first IF and 10 mc second IF. The gain has come up tremendously, but instability resulted and further modifications were necessary to overcome this. The choice of 1st IF ensures that the 2nd oscillator harmonics fall outside the band. Bandwidth has been brought down to 50 kc but when, as happened on one signal, transmitters drift as much as 6 mc in a few minutes, tuning becomes tricky !

G3ENS/P tried a number of different portable sites during the September Contest week-end, working G3APY from each of them. G3APY finds his 5-ele. 70 cm. Yagi indispensable. He has heard the third harmonic from a 2m. station 9 miles away at S9-plus ! G5BM (Cheltenham) went out portable on Painswick Beacon, but found conditions disappointing, best contact being with G3ENS/P at 73 miles. The Tx was a pair of 8025's with 15 watts input, and a super-regen receiver. G4CG (Wimbledon) was also active, but heard no one else. He would be interested to know if anyone received his transmissions ; the Tx is 8012 pushpull SEO, and the Rx a 1294 modified with a CV53 preamplifier ; a half-wave dipole with chicken wire reflector is at 30 ft. He comments that he often hears signals on the band but they do not identify themselves. Please give call signs frequently.

G2IQ (Sheffield) is busy on 70 cm equipment. He has a P58 working, but no RF stage. He says it is possible to get a noise factor of 12 dB without the RF stage and with crystal mixer only. G3BKQ (Leicester) has made up a 12-ele. Yagi and put it inside a corner reflector ; receiver is an unmodified P58 and Tx a 105. G3APY/P on August 21 was so strong he blocked the IF in spite of being at 38 miles. G3BUR and G5BM, both portable, have been heard. An RF stage is being added to the P58.

PAØLU and PAØZQ are busy on 434 mc. Their converters use 955 osc. in a coaxial line circuit and 6J6 push-push mixer. PAØZQ has an 832 tripler for Tx and PAØLU has a German radar transmitter ; input is 80 watts.

Last, but not least, congratulations go to G3FUL (Luton) who received his licence on September 8 and made his very first contact the following day on 420 mc. This was with G3CGQ, also of Luton.

The Tables

Most correspondents are in favour of the yearly "Counties Table" and so, in spite of only a few claimants for it, a start has been made this month. With G2XC in the lead (probably for the first and last time) it just *has* to be published ! Support also seems general for the "20 best contacts monthly" competition and full details will be given next month.

In Conclusion

Once again the heavy correspondence received shows that in spite of the many complaints of inactivity, interest is as keen as ever. Latest date for next month's reports is October 12. The address is E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. With you again on November 4.

LONDON VHF DINNER

Advance Notice. The next Dinner for Fiveband Club members will take place on Friday, November 25, for a maximum of 70. The organiser is G6VX and full details will appear in the November issue.

CARDS IN THE BOX

If your call appears below, send your name and address (on a large S.A.E.) to BCM/QSL,London, W.C.1 and the card(s) held for you will be forwarded. If you would like your address to appear in "New QTH's," which ensures eventual publication in the *Radio Amateur Call Book*, please mention that at the same time.

G2KB, 3CUO, 3DSE, 3DXQ, 3EGT, 3EOB, 3EPB, 3EPR, 3EQF, 3ESW, 3EXY, 3FES, 3FGP, 3FHM, 3FNQ, 3FQB, 3FQI, 8BB, 8SB, GM3DZG.

NEW QTH's

This space is available for the publication of the addresses of all holders of new callsigns, or changes of address of transmitters already licensed. All addresses published here are automatically included in the quarterly issue of the Call Book in preparation. QTH's are inserted as they are received, up to the limit of the space allowance. Please *write clearly* and address on a separate slip to QTH Section.

GW2BFD C. Pritchard, 30 Park View, Abercynon, Glam., S. Wales.
G2BFK F. C. Studley. 4 Whitmore Road, Harrow, Middlesex.
G2CRL H. Clamp, 18 Mortimer Street, Derby.
GM2CRV G. Cardoo, 21 Burnhill Street, Ruther-glen, Lanarkshire.
GM3BAH H. M. Dorward, c/o Brown, 7 Meadow-bank Place, Edinburgh. 8.
G3BFX W. E. G. Scott, 48 Gassiot Way, Sutton, Surrey.
G3DEI D. H. Croxson, 461 Footscray Road, New Eltham, London, S.E.9.
G3DHB Capt. D. H. Baynham, Woodside, Burwood Park Road, Walton-on-Thames, Surrey.
G3EDK J. Taylor, Jnr., 49 Beaumont Road, Bournville, Birmingham. 30.
G3EEO Derby Short Wave & Experimental Society, Nunsfield House, Alvaston, Derby.
G3ELQ T. G. Warburton, Fair Holme, Helm-shore, Rossendale, Lancs.
G3EQK C. C. Bolland, 198 Sandyford Road, Jesmond, Newcastle-on-Tyne. 2.
G3EVX A. Hibberson, 419 Woodchurch Road, Prenton, Birkenhead, Cheshire.
G3EVX/A A. Hibberson, Block F, Bletchley Park Hostel, Bletchley, Bucks.
G3FHN E. W. B. Aldworth, 14 Chester Avenue, Bethersden, Ashford, Kent.
G3FIE T. G. Hull, Heatherbrae, Heath End, Farnham, Surrey.
G3FJT E. A. Coward, 93 Greenside Road, Shepherd's Bush, London, W.12.
GI3FJX J. Davidson, 60 Upper Cavehill Road. Belfast, N. Ireland.
G3FKQ W. M. Baines, 35 Whitley Crescent, Wigan, Lancs.
G3FNT P. Dean, Sunnyside, Mount Road, Preswitch, Lancs.
G3FNV T. J. Butler, Mill House, Christleton, Chester.
G3FPA W. J. Young, 35 Buckland Road, London, E.10.
G3FPJ A. A. Littlewood, 156 Gordon Road, West Bridgford, Nottingham.
G3FPN J. R. Davey, Fitz Park Lodge, Keswick, Cumberland.
G3FPW S. V. Cleaver, 66 Green Lane, Coventry, Warks.
GM3FPX W. Gilmour, 30 Sutcliffe Road, Glasgow, W.3.
G3FQG J. R. Ankers, The Nothe, Preston Street, Shrewsbury, Shropshire.
G3FQJ J. W. Barton, 433 Greystones Road, Sheffield, 11.
GM3FQM J. Irwin, 22 Comiston Terrace, Edin-burgh. 10.
G3FQP L. Yates, 26 Lydgate Hall Crescent, Crosspool, Sheffield. 10.
G3FQQ J. S. Thornton, 3 Western Parade, Billericay, Essex.
G3FQU C. H. Sullens, 29 Bridge Way, Whitton, Twickenham, Middlesex.
G3FQV M. B. Snowling, 39 Grove Walk, Norwich, Norfolk.
G3FQW S. Wells, 37 Rosebank Avenue, Sudbury, Wembley, Middlesex.
G3FRM M. Page, 21 Longley Street, London, S.E.1.
GM3FRQ J. D. Hendry, 27 Clepington Street, Dundee, Angus, Scotland
G3FRT E. N. Evans, 32 Cable Road, Hoylake, Wirral, Cheshire. (*Tel.: Hoylake* 3108.)
G3FSF G. H. Maddock, Ferry Cottage, Noss Mayo, nr. Plymouth, Devon.
G3FSL G. P. Bryant, 3 Wolseley Road, Barn-wood, Gloucester.
G3FSQ V. Williams, 11 Alexander Road, Egham, Surrey.
G3FSW M. I. Wilks. 57 Longley Lane, Northen-den, Manchester.
G3FTW H. G. Morris, 2 Thurlow Park Road, Dulwich, London, S.E.21. (*Tel.: Tulse Hill* 2270.)
G3GAD G. A. Day, 13 Agnew Road, Honor Oak Park, London, S.E.23.
G3GEX P. L. Burton, 54 Elm Drive, North Harrow, Middlesex. (*Tel.: Harrow* 5550.)
G4MW M. T. O'Dwyer, 17 St. Kilda Avenue, King's Hedges Road, Cambridge.

CHANGE OF ADDRESS

G2AYQ J. E. Bowden, Albany House, Goonown, St. Agnes, Cornwall.
G2DPA R. C. Parnaby, 32 Cartwright Lane, Beverley, Yorks.
G2DPA/A A. T. C. Training Centre, Brackley, Northants.
GM2FHH L. Hardie, 44 Inchbrae Drive, Garthdee West, Aberdeen.
G2HIF C. Sharpe, 20 Harcourt Road, Wantage, Berks.
G2MC H. B. Dent, 47 Sussex Square, Brighton, Sussex.
G3ABB C. L. Fenton, 40 Fourth Avenue, Chelmsford, Essex.
G3AEW C. F. Barnes, 13 Stanton Harcourt Road, Witney, Oxon.
G3ALK E. J. Holmes, 2 The Avenue, Wanstead, London. E.11.
G3BLO F. G. Sargent, Nursery Cottage, Cole-brook, Plympton, nr. Plymouth, Devon.
G3CAF F/Lt. R. Tillyard, R.A.F. Hendon, London, N.W.9.
G3CAG R. H. Pearson, 24 Ashfield Grove, Bletchley, Bucks.
G3CMZ W. A. Rowley, 2 Sandbeck Avenue, Skegness, Lincs.
GW3CYP R. Thomas, 22 Newton Street, Llanberis, Caernarvon, N. Wales.
G3DC F. E. Woodhouse, 153 Hampstead Road Brislington, Bristol. 4.
G3EDT J. E. Rickaby, 99 St. David's Road, Cheadle, Cheshire.
G3EFP J. C. Pennell, Woodend, Kingston Gorse, nr. Angmering, Sussex.
G3EQU J. E. A. Mortimer, 41 Chestnut Grove, Wembley, Middlesex.
G3SX R. D. Mackenzie, 10 Comely Avenue, Wallasey, Cheshire.
G4RO A. E. Read, Ottershaw, Upton Avenue, St. Albans, Herts.
G5BS C. S. Bradley, Half Yoke Farm, East Farleigh, Maidstone, Kent.
G6OO T. Woodcock, 12 George Street, Bridling-ton, Yorks.
GM8FM J. H. Shankland, B.Sc., 21 Thorn Drive, Bearsden, Glasgow.

CORRECTION

G3DVO C. Needham, 35 Kingsway Stainforth, Doncaster, Yorks.

Here and There

Results, R.A.E., May 1949

From the Department of Technology of the City and Guilds of London Institute have just come the results of the Radio Amateurs' Examination, held all over the country (and overseas) in May last. The analysis shows that a total of no less than 898 candidates sat (700 in 1948), of whom 636 passed, or 71 per cent. ; in 1948, 76 per cent. of the candidates were successful. In his report, the Examiner attributes the slightly less favourable pass-rate this year to the fact that a large number of those sitting avoided the mathematical question ! This involved quite a simple calculation to extract quantities in a series AC circuit under given conditions.

The full Paper as set appears in the current (October) issue of our *Short Wave Listener*. As in previous years, the March-April-May (1950) issues of that journal will deal in detail with these questions, for the information and guidance of those taking the next Radio Amateurs' Examination.

This will be on May 10, 1950, for which entries are required by March 1. Intending candidates should apply through their local Technical College (or the Education Authority) during January or February. As has frequently been explained in the past, the R.A.E. is held at local centres and the subsequent Morse test is also arranged at the head Post Office nearest to the candidate's home address. So everything is made as easy as possible—and in truth the examination itself need baffle no one prepared to give a little time to the study of fundamentals and basic Amateur Radio technique.

Coming Next Month

The second in our new series of fully detailed constructional articles will be "The Beginner's Transmitter," to be covered in two parts in the November-December issues of the *Short Wave Magazine*. This is another carefully prototyped design, using only branded parts which are readily available, and much care and attention have been given to the production of a practical piece of equipment, " sure-fire" from the beginner's point of view. With some 600 amateurs about to come on the air (*see* R.A.E. results above) we feel sure that this design will not only solve the transmitter problem for many of them, but will also be of great interest to a large number of more experienced operators.

Articles to follow in this particular series will be a QRO Band-Switched Transmitter with 813 PA ; a Dual-Purpose Speech Amplifier-Modulator arranged to give audio output at different levels for either low- or high-power working ; a Multi-Match Aerial Tuner Unit ; a Single-Control VFO/Exciter giving a flat 3 watts of RF drive on five switched bands ; and (more in the future) some constructional designs based on new circuit techniques.

The Eddystone 750

Readers will be very interested to hear that Stratton & Co., Ltd., Birmingham (of "640" fame) are shortly to come out with a new and improved version of the original 640, which has sold in thousands in this country and abroad and of which production has now ceased. Among many other features, special attention has been given in the "750" to bandspread and selectivity, and modern miniature valves are used in all RF circuits.

In due course, we shall be giving further details of this new receiver, and the first full Test Report will appear in the *Magazine*.

F.O.C. Election Notice

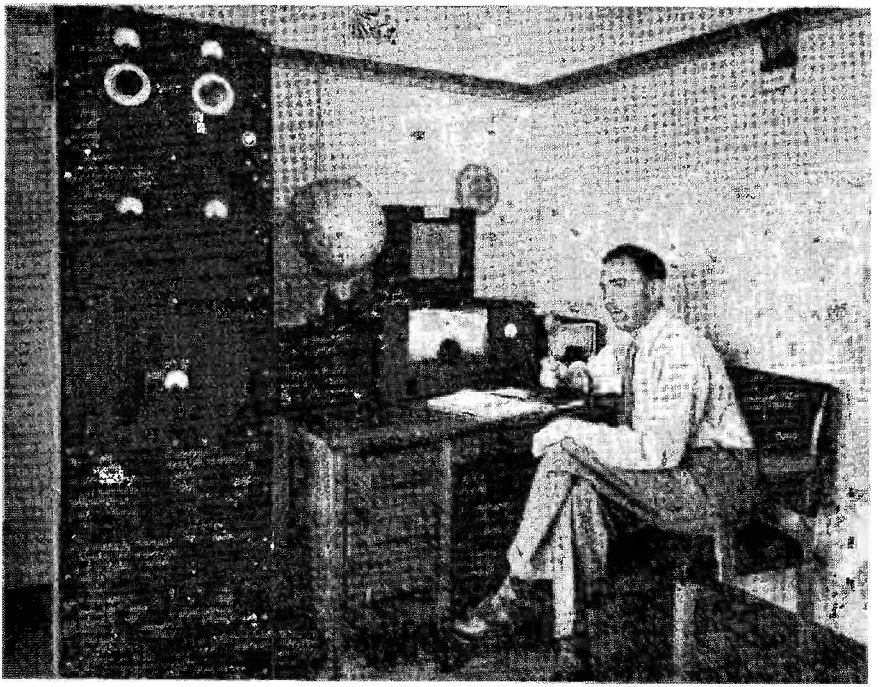
In accordance with the Rules of the Club, the following eleven operators have been elected to active membership of the F.O.C. since the September *Magazine* notice appeared;

A. Bowman, G3FAB (Coventry) ; J. Mann, G3AAM (Birmingham) ; D. M. Gledhill, G8QJ (North Harrow) ; T. Luxmore, G3AWL (Wingate, Co. Durham) ; C. W. Cox, KG6DI (Guam) ; P. J. Barnes, G3BKT (Ramsgate) ; A. R. Allen, G3EXR (Camberley) ; S. Kelly, G3COZ (Cheltenham) ; H. Biltcliffe, G5HB (Watchfield) ; J. A. Hunt, G2FSR (Chingford) and J. Jardine, G3ECB (Manchester).

This brings the current membership of the First Class Operators' Club up to some 240.

Amateur Radio Exhibition

The third in the series of Amateur Radio exhibitions sponsored by the Radio Society of Great Britain is to take place during the period November 23-26 next, at the Royal Hotel, Woburn Place, London, W.C.1. The official opening will be by Lord Sandhurst, O.B.E., at 2.30 p.m. on Wednesday, November 23. Admission will be by catalogue (1s. at the door) and, as in previous years, the Short Wave Magazine, Ltd., will be one of the 25 firms taking a stand at this show.



The other man's station G6AG

This station is designed for full-power phone operation on the 3·5, 7, 14, 21 and 28 mc bands—though in the main activity is confined to Twenty, 120 countries having been worked post-war on telephony.

In the centre at the operating position is a special amateur-band-only receiver, arranged to have about 150 deg. of dial spread over each band; a built-in crystal calibrator, giving 100 kc and 1 mc check points, allows of very accurate setting up. The dial is calibrated in frequency, and other features include a band-pass crystal filter and S-meter.

To the right of this receiver is an all-band exciter unit, consisting of a 6SK7 VFO operating in the range 1·75-1·9 mc and giving output on any required frequency through a series of broad-band doublers and one trebler; in these stages, 7C5's are used, and the exciter will give 3 watts of RF into the first 807 amplifier in the transmitter rack.

The PA is a 250TH, modulated with a pair of 805's, the preceding speech-amplifier sub-modulator being 6SJ7-6J5-6J5 phase inverter-P/P 6J5's-P/P 6A3's, giving 10 watts audio drive for the 805 modulator. Separate HT supplies are provided at each level for the transmitter.

Aerials in use at G6AG consist of folded dipoles fed with 300-ohm ribbon, the required line being selected at the point of entry to the operating room, thence to the aerial change-over relay. The station-control system is such that band changing can be effected in about one minute to any desired frequency.

Country-chasing is not by any means the prime interest at G6AG—C. J. McClelland, 439A Rochester Way, Bexley, Kent. He is always ready to chat over the air and to discuss purely technical topics. Future development at his very fine station will be the construction of entirely separate VHF equipment—the receiver has already been built: 6AK5 RF, 6AK5 mixer, 9002-6AK5 oscillator-doubler, and two 10 mc IF stages using 6BA6's, with which an exceptional signal-to-noise ratio has been obtained.

THE MONTH WITH THE CLUBS

FROM REPORTS

This month, encouraged by the opening of the autumn-winter season and the spate of AGM's, we find that 39 Clubs have reported their activities. Attractive programmes for the season are announced by most of them, and there is no doubt that the whole Club movement is in a very healthy state.

Many Clubs have announced their intention of taking "MCC" very seriously this year. May we remind those who did not see the announcement in the September issue that the dates for this year's event are November 12-20. Rules and entry forms will be sent to all Secretaries in ample time.

Please note that there is no serious change in the rules or the scoring system since last year, and that *no* "Flash Circular" of participating Clubs will be sent round. We consider that the sorting out of Club stations from others who (however mistakenly) may call "CQ MCC" is one of the natural hazards and adds to the operating skill required in this Contest, which should be more than a mere series of exchanges of RST and QTH.

Next month's deadline for Club reports will be first post on October 12. Address them to Club Secretary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1.

London Short Wave Club.—Much larger weekly gatherings are reported, and the Committee is drawing up the Winter programme, including visits, Junk Sales and lectures. Meetings are held on Thursdays, 8 p.m. at Ostade Hall, Brixton, S.W.2.

Stourbridge & District Amateur Radio Society.—Thirty-five members and visitors attended the September meeting at King Edward's School, when Mr. Butcher of R & A Laboratories gave a talk on Moving Coil Loud Speakers. On October 1, a visit to Daventry has been arranged, and it is proposed to hold an Amateur Radio Exhibition in December.

Brighton & District Radio Club.—The Club Tx (G3EVE) should be on the air by the time this appears, and looking for Phone and CW contacts on 7 and 3·5 mc. Activity will be confined to the Club meeting nights (Tuesdays). Several visits have been paid by parties of members, to such places of interest as the GPO and RNVR HQ; more are planned. The October programme includes a talk on Television and an account of 70 cm activity.

West Somerset Radio Society.—Members have been at work preparing the Club's headquarters for the Winter season. Facilities now include a car park. Considerable interest is still being shown in television, and now that G3SB is on the air again the amateur side of the club's activities will receive more support.

Romford & District Amateur Radio Society.—A successful D/F contest was held *versus* Southend Radio Society. Southend won both first and second prizes! Weather was kind, if a little too warm, and it was a "walking" contest, with the Tx only two miles from the start. Romford are entering for a similar event at High Wycombe during September. A Hobbies Exhibition is being held at Romford on October 1 and 8, and the Club will have a Tx running for demonstration to the public.

Baldock District Radio Club.—Five members who entered for the last RAE all passed, and are now working on their Morse—so there should be some new call-signs emanating from this Club before long. The successful instruction was provided by G3EAJ. Members are now impatiently waiting for "MCC," so that they can improve their position in the list.

West Bromwich & Handsworth Radio Society.—Activity continues, with meetings held on the last Wednesday of the month, 8 p.m. at the Lewisham Hotel. The Club Tx, G3BWW, has been completed and is active on 7 mc CW; some co-operation in the arranging of skeds would be welcomed, for the benefit of members shortly taking their "tickets."

Reading Radio Society.—During August, members heard a lecture on Plastic Tape Recording by Mr. Shaw of the G.E.C., a talk by Capt. Benbough on Circuit Draughting, and a dissertation on Super-regenerative Receivers by Dr. Lemon. A practical demonstration of metal-working was also given by Mr. F. Ruddle. A VHF D/F Field Day is being held early in October.

South Manchester Radio Club.—All members who sat for the RAE this years were successful, so this Club is naturally running a course for next year's exam. An extra classroom is being hired for the purpose (at the Church Schools on meeting nights) and a charge of 5s. for the complete course will be made, to cover expenses. New members keep coming in and the figure is now around the 60 mark.

Barnsley & District Amateur Radio Club.—The AGM was held in September, and all officials were re-elected. The Club is in a happy position from both membership and financial viewpoints. Future meetings will begin at 7 p.m.

Testing out the spare Rx for G2XA/P. G3PL (phones) does the work while G3EJR and G5MN wait for results. In the hat is G8UL, just supervising!

on the second and fourth Fridays of each month.

Brentwood & District Amateur Radio Society.—This Club now has its own call—G3FSM—and is active on the Top Band. Things have been a little quiet on account of holidays but will be in full swing again next month.

Midland Amateur Radio Society.—The Field Week-end (September 10/11) was an outstanding success and was attended by 50 members and as many visitors. G4OI did the organising, and the site was Redhill Farm, 650 ft. above sea level. Four tents and a van (provided by G5IW) were in use, with the gear available including HRO's, AR88's and several transmitters. Frequencies up to 28 mc were handled by G2AK/P and G5IW/P; on the higher frequencies G3BUR was in action. The Annual Dinner is to be held on October 15, 6.30 p.m. at the Imperial Hotel, Birmingham. MARS activities were featured in the BBC's Midland Regional programme on September 16.

BTH Recreation Club (Rugby)—Radio and Television Section—The new season opened at the end of September, with a review (by Mr. J. Moir) of Present-Day Practice and Future Trends of British and American Television. The Club Tx (G3BXF) will be taking part in MCC for the first time.

Wishaw & District Radio Club.—The AGM was held on September 2, presided over by GM8JW. Two new members were welcomed and the programme of the ensuing season's activities was drawn up.

Warrington & District Radio Society.—Members enjoyed an interesting visit to Moorside Edge BBC Station on September 10, 28 people attending the outing. Meetings continue in the Sea Cadet Headquarters, off Wilderspool Causeway, on alternate Mondays at 7.30 p.m. A social evening is planned for November 25.

Edinburgh Amateur Radio Club.—This Club has been presented with a T1154/55, complete with power pack, by GM5YW, and it is hoped that this will take the air when the Club call is received. Junk Sales, Morse classes and lectures are in full swing, and the class for next year's RAE is also under way. Membership is now 40 and still increasing.

Luton & District Radio Society.—An interesting programme has been arranged for the winter, and meetings will be held every Monday—7.30 at Surrey Street School. Two more members have passed the RAE and two more have their licences. One junior member—aged 14—passed the C. & G. exam.

Worthing & District Amateur Radio Club.—A large attendance of members heard the President's address at the AGM in September, when a very satisfactory first year's running was reviewed. Next meeting is at 8 p.m. on October 10, at the Adult Education Centre, Union Place. Note new Secretary's QTH, in panel.

Thames Valley Amateur Radio Transmitting Society.—At the meeting on September 7, the glad news that TVARTS were the winners of NFD was announced. The "A" station was run by G6GB and the "B" station by G6NB, and much hard work was put in by the President, G5LC. The club's own Field Day, run on similar lines on August 28, was won by G6MB.

Wirral Amateur Radio Society.—Membership now stands at 76, of whom 45 are transmitters. A successful Junk Sale was recently held, and construction for the forthcoming Contest is going ahead

rapidly, much competition being forecast. November meetings, at the YMCA, Whetstone Lane, Birkenhead, will be on the 9th and 23rd at 7.30 p.m.

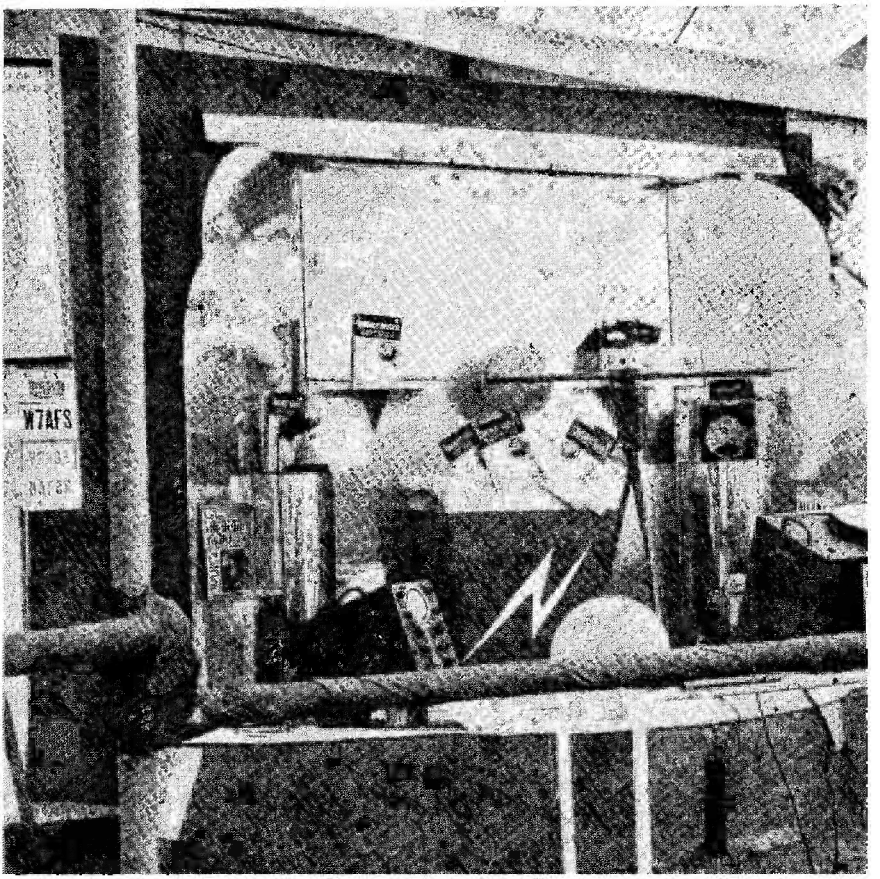
Radio Society of Harrow.—Meetings have been well attended right through the holiday season, and several overseas visitors, including VQ4AJ, have been welcomed. Recent events have included a talk on Static, a debate and a visit to a communications station. The Club meets on Tuesday evenings, and new members will be welcomed.

Grafton Radio Society.—At the Fourth AGM, held recently, the new officials were elected. GW3ALE is President, and Mr. A. W. H. Wennell Chairman for the ensuing season. G2AHB continues his valuable work as Hon. Sec.

Clifton Amateur Radio Society.—An ambitious programme for the new season was planned at the AGM, at which G3FVG was re-elected as Hon. Sec., the committee consisting of N. Moore, W. Wooller and D. Bruce, with the Hon. Sec. as Chairman.

R.A.E. & Farnborough District Amateur Radio Society.—The new season opened with a meeting on September 26, and fortnightly meetings continue from that date, 7.30 p.m. at the Assembly Hall, R.A.E. A full programme is prepared, and Morse classes will again be organised if members wish.

Wanstead & Woodford Radio Society.—Attendances continued to be good throughout the holiday period, somewhat to the surprise of the committee, who expected a drop. The Club television receiver has been completed and is in full working order; it has received sound and vision from the Eiffel Tower already! Transmitting members are looking forward to MCC.



Centre display at the stand run by the Cray Valley Radio Transmitting Club at the Sidcup Trade Fair and Exhibition, September 10-17. The size of their stand overall was 40 ft. by 15 ft. deep and two fully equipped 150-watt phone stations were featured.

Basingstoke District Amateur Radio Society.—Several members, together with some from Reading, visited Brookmans Park BBC Station in August. The tour lasted some 2½ hours, after which a visit was paid to the factory of Marconi Instruments, Ltd.

Grimsby Amateur Radio Society.—Permanent premises having been secured, the club has resumed weekly meetings which are now held on Thursdays, 7.30 p.m. at the Club Room, back of 50 Welholme Road. The transmitting licence has been received, and constructional work on 144 mc gear has begun.

Cray Valley Radio Transmitting Club.—This club staged an outstanding exhibit at the Trade Fair and Exhibition, Sidcup. The stand was equipped with two 150-watt phone stations—G3MZ on 14 mc and G3ANK on 7 mc. Components were also on show, together with a complete amateur station of 1917 vintage ! A model rotary beam complete with remote control and selsyn great-circle indicator was another very attractive feature of the display, not to mention QSL cards, maps, charts and photographs. Many "live" QSO's were made and considerable public interest attracted by this fine effort.

Pontefract & District Amateur Radio Club.—Meetings of this club are now held every Thursday at the Pontefract Community Association Centre, Halfpenny Lane. The new Chairman is Mr. R. G. Sutton, G3ADH.

Kingston & District Amateur Radio Society.—The last month's activity has been confined to Morse practice and ragchews, many members being away. Next meeting, at the Kingston Hotel, is at 7.45 p.m. on Wednesday, October 12.

Cromwell Radio Club (London, S.W.).—This club was inaugurated at an informal meeting in September. It is proposed to meet fortnightly in one of two "shacks" available for the purpose, and constructional classes, Morse classes and visits to places of interest are under consideration. See panel for Secretary's QTH.

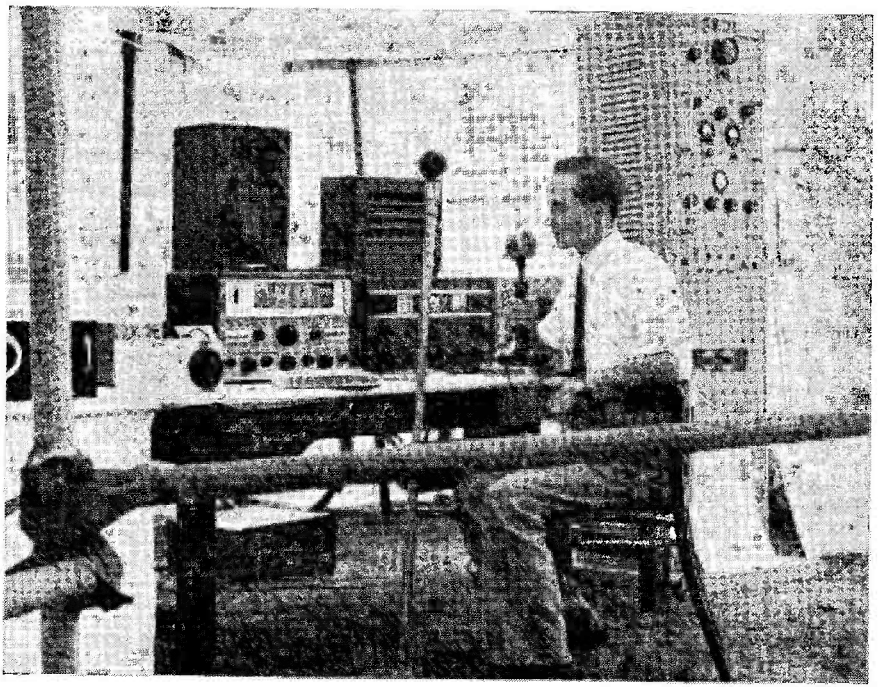
Liverpool & District Short Wave Club.—We have been notified by the former Hon. Sec., G3DVW, that he has had to resign on account of pressure on his spare time. The new Secretary's name and address appear in the panel.

Sunderland Radio Society.—Forthcoming events include the Monthly Business Meeting

NAMES AND ADDRESSES OF CLUB SECRETARIES

The list below represents only those Clubs reporting for this issue of the *Magazine*. A similar list appears every month and the Active Club Register, compiled from entries in this space, is periodically printed in full in our *Short Wave Listener*.

BALDOCK : N. F. Wilshere, G3CEU, 13 The Tene, Baldock, Herts.
BARNET : C. J. Spencer, 31 Byng Road, Barnet.
BARNSLEY : J. A. Ward, C4JJ, 44 Northgate, Barnsley.
BASINGSTOKE : L. S. Adams, 16 Bramblys Drive, Basingstoke.
BRENTWOOD : J. F. Moseley, G2CIW, 45 Geoffrey Avenue, Harold Park, Brentwood.
BRIGHTON : L. Hobden, 17 Hartington Road, Brighton.
BTH, Rugby : Hon. Sec., Radio and Television Section, c/o BTH Recreation Club, Rugby.
CRAY VALLEY : G. Miles, G2CXO, 33 Silverdale Road, Petts Wood, Kent.
CROMWELL, S. W. LONDON : E. W. Jordi, 103 Gloucester Road, S.W.7.
EDINBURGH : N. H. McLean Ross, GM2DYP, 64 Thirlestone Road, Edinburgh 9.
FARNBOROUGH : R. J. Corps, B.Sc., Armament Dept., R.A.E., Farnborough.
GRAFTON, N. LONDON : W. H. C. Jennings, G2AHB, Grafton LCC School, Eburne Road, N.7.
GRIMSBY : J. W. Booth, G2AJB, 33 Buller Street, Grimsby.
HARROW : S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
KINGSTON : R. Babbs, 28 Grove Lane, Kingston, Surrey.
LIVERPOOL : R. A. Hogg, 39 Southmead Road, Allerton, Liverpool 19.
LONDON : R. Lisney, G3FLI, 6a Ongar Road, S.W.6.
LUTON : E. Radford, 37 Wilsden Avenue, Luton.
MIDLAND : A. W. Rhodes, 135 Woolmore Road, Birmingham 23.
PONTEFRACT : C. H. Gould, G2FQH, 51 Pontefract Road, Ferrybridge.
READING : F. Hill, G2FZI, 997 Oxford Road, Reading.
ROMFORD : D. L. K. Coppendale, G3BNI, 9 Morden Road, Chadwell Heath, Essex.
SOUTH MANCHESTER : M. I. Wilks, G3FSW, 57 Longley Lane, Northenden, Manchester.
SOUTHPORT : F. H. P. Cawson, G2ART, 113 Waterloo Road, Southport.
SPEN VALLEY : N. Pride, 100 Raikes Lane, Birstall, near Leeds.
STOURBRIDGE : W. A. Higgins, G8GF, 35 John Street, Brierley Hill, Staffs.
SUNDERLAND : C. A. Chester, 38 Westfield Grove, High Barnes, Sunderland.
SUTTON & CHEAM : L. Seaton, 8 Croft Road, Sutton, Surrey.
THAMES VALLEY : Major A. Eden, 31 Chatsworth Crescent, Hounslow.
WALSALL : J. F. Young, Walsall Technical College, Bradford Place, Walsall.
WANSTEAD : R. J. C. Broadbent, G3AAJ, Wanstead House, The Green, London, E.11.
WARRINGTON : W. R. Murray, G3CUB, 56 Crow Wood Lane, Widnes.
WEST BROMWICH : G. Johnson, G2BJY, 22 Lynton Avenue, West Bromwich.
WEST SOMERSET : T. C. Bryant, G3SB, 16 The Parks, Minehead.
WIRRAL : R. A. Browning, 24 Norbury Avenue, Bebington, Cheshire.
WISHAW : A. R. T. Williamson, 14 Coronation Road, New Stevenston, Motherwell.
WORCESTER : J. Morris-Casey, G8JC, c/o Brookhill Farm, Ladywood, Droitwich.
WORTHING : R. Forge, G3FRG, 2 The Plantation, Worthing.



The 14 mc station (G3MZ) on the Cray Valley Radio Transmitting Club stand at the Sidcup Trade Fair during September, with G2CXO (Hon. Secretary) at the microphone. The C.V.R.T.C. contribution was a very enterprising effort and covered all aspects of Amateur Radio operation. The many visitors were keenly interested in the live QSO's made from G3MZ, and G3ANK on 7 mc.

(October 5), a talk on Quality Disc Reproduction (October 19), and one on Magnetic Tape Recording (October 26). The Sound Film on the Decca Navigator will be shown on November 16.

Barnet & District Radio Club.—Meetings continue every Wednesday, but indoor activities were somewhat curtailed by the good weather. The Club Tx and aerial have been erected and work has now started on a receiver ! Three members passed the RAE and all hope to be licensed before long. The Club is awaiting MCC with interest.

Spen Valley Radio & Television Society.—The 1949-50 Syllabus shows a full programme ; at the next two meetings there will be talks on Measurements and the Radio Amateur, by G2BOO (October 12) and Some Aspects of Television (E. Warrender, B.Sc., October 26). In November, G5IA talks on Radio Allsorts (November 9) and G3CUM on Wire Recording (November 23).

Southport Radio Society.—At the last meeting G3SS gave a talk on Valves, with a demonstration of some early types and an exposition of how technique had improved. Morse classes have started, and are held each Monday. Membership continues to grow, but more new ones are always welcome.

Worcester & District Amateur Radio Club.—At the September meeting members enjoyed a talk by Mr. Griffiths (Slade Radio) ; this was followed by two prize draws. At the October meeting G3WH will talk on Beam Aerials, and the November meeting will be a Junk Sale. Speakers are urgently required, and the Secretary would like to hear from volunteers. Absent members who have not replied to the Secretary's recent circular letter are asked to do so as soon as possible.

Walsall Technical College Radio Amateurs' Club.—Their Field Day, held on September 3-4, was a great success and thoroughly enjoyed by all who participated. A recent interesting visit has been to the Walsall Police Station, when everything was shown members from the dungeons in the basement to the aerials on the roof. A very full programme has been laid on for the winter, with something happening every week-

end in addition to the usual mid-week meeting. Some of the visits planned are to the Sutton Coldfield TV Station, Broadcasting House in Birmingham and Factory Tours—also, of course, MCC will be hotly contested.

Sutton & Cheam Radio Society.—News Letter No. 11 details a wide range of activities and interests, and offers an attractive programme for members during the next three months. Here is another Club co-operating in a local Hobbies Exhibition, and they will be running a stand to cover Amateur Radio interests; this will all happen during the period October 12-15, and we hope to see some photographs and hear of yet another successful venture of the kind.

SWL NOTE

Our associated journal is the *Short Wave Listener*, soon to go into Vol. IV. It is designed to appeal particularly to SWL's, and every month covers a wide range of listener activities in considerable detail. The *Short Wave Listener* is the only established periodical of its kind in existence, and is produced by the staff of the *Short Wave Magazine*. The cover price is 1s. 3d., or 16s. post free for a year, twelve issues by direct subscription. Write the Circulation Manager, Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1.

THE ZONE MAP

Our *DX Zone Map* at 6s. post free is a steady seller and carries a great deal of information which is essential for those in any way interested in DX activity. A great circle map of the world centred on London, it is large enough (and strong enough) for wall mounting, and gives accurate beam alignments with rough distance of all parts of the world relative to London—on the scale used, this holds good for the whole of the United Kingdom. Remit to the Circulation Manager, Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1.

THE LOCAL CLUB

If there is a radio club in your locality, it is not only entitled to your active support but may be very helpful to you in a number of ways. Apart from the personal contacts only a local club can make possible for those diverse individuals with a common interest in a scientific hobby such as Amateur Radio, everybody has something to learn from others as well as something to teach.

SMALL ADVERTISEMENTS

9d. per word, minimum charge 12/-. No series discount: all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors.

TRADE

OUR new component list is now available. Write for your copy.—M. Watts & Co., Baker Street, Weybridge, Surrey.

QSL'S and LOGS by MINERVA. The best there are. Samples from Minerva Press, Elm Park, Essex.

MOVING Coil Meters, 500 micro-amps, (0·5 mA). Scaled 0-600 v, resistance 500 ohms, flush fitting, zero adjustment. Ideal for 2,000 ohms per volt meter, or tuning meter, etc., 3/11 post paid.—Jack Porter, Ltd., 30/31 College Street, Worcester.

ALL Ham Supplies—wide range by all well-known makers in stock, including Eddystone, Raymart, Hamrad, Labgear, Bulgin, Belling Lee, Denco, Woden. No lists. SAE with enquiries.—Newson, G3GY, Market Place, North Walsham, Norfolk.

829's, 37/6; PT15's, 7/6; 866A's, 19/6; 807's, 10/-. Guaranteed. Postage and lists free.—Electrad Radio, 64 Gt. Victoria Street. Belfast, N.I.

ALUMINIUM chassis and panels. Any size manufactured quickly. Holes punched for valve holders, etc. Plain or cellulose finish.—EAD, 18 Broad Road, Willingdon, Sussex.

BANKRUPT and Surplus. Ex-Govt. Valves. ECH35, 6K7, 6Q7, EL32, 6X5, 5/-; 6V6, IW4/350, 5Z4, VR150/30, KT33C, U50, 5/9; 5Z3, 5U4, MU14, 6/-; PT15, 7/6; 813, 30/-; VCR139A, 10/-. Coil packs, IFT's, TRF coils, electrolytics, meters, etc. S.A.E. for lists.—Lambert & Clapshaw, 384 Hornsey Road, London, N.19.

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

WIRE Recording? American stainless-steel wire, approx. 10 oz. reels (2 hrs. at 2 ft/sec.), 30/-. Head/Osc. data, 2/6. Wilson, 17 Berwood Farm Road, Erdington, Birmingham.

URGENTLY WANTED :—AN/APS-3 RADAR PARTS, e.g. AS-12 SCANNER, RT-10 TRANSMITTER-CONVERTOR & MD5A MODULATOR. BUNCH FISHING CO., GRIMSBY.

COMPONENTS. All your requirements including DENCO, EDDYSTONE, HAMRAD, RAYMART, etc. Send for lists. Seward, 57 Wokingham Road, Reading.

GOING QRO? Ex-W.D. equipment in good electrical condition. Transformers, all 230v input, 1100-0-1100v 200 mA, 4v 5a, £1/18/-. 1200-0-1200v 200 mA, 4v 5a, £2/5/-. 1400-0-1400v 250 mA, 4v 5a, £3. 350-0-350v 150 mA, 4v 5a, £1/2/6. 7·5v 4a × 3; 6·3v 4a × 2; 4v 5a, 15/-. 4v 5a CT × 3, 14/-. 6·3v 1a; 7v 5a, 4v 6a, 13/-. Chokes: 20H 250 mA, £1; 20H 150 mA, 18/-; 7H 250 mA, 14/-; 7H 350 mA, 12/-. 9H 100 mA, 5/-. Condensers: 4mF, 1500v, 5/-. 4 mF 500v, 3/-. 0·1 mF, 500v, 8d. 0·01 mF mica, 6d. Tx RF chokes, honeycomb wound, similar Eddystone 1022, 1/3. All carriage paid. Cosmic Radio Ltd., 129 Oxton Road, Birkenhead.

XTALS. Blanks 4 mc, and 7275 kc, 1/- each. 7300 kc, plated and wired, 1/3 each. Thermo units, two xtals 7275 and 7290 kc, 4/- each. 4 mc Thermo units, 1/- each. GW3AX, Thomas, Roseland, Kittle, Bishopston, Swansea.

WELDED STEEL TOWERS, 32-FT. HIGH, TWO SECTIONS, EASILY ERECTED, £18. D. E. SCARR, LTD., HOWDEN, E. YORKS.

CONDENSERS, 8 mF 450v, brand new, 2/3. ·001 mF Silver Mica, 6 for 1/9. 14 SWG DCC wire, 1/10 half-pound. Post free. F. Exeter, Abbey Gate, Minster, Sheerness, Kent.

SMALL ADVERTISEMENTS

TRADE—*continued.*

CRYSTAL Microphone inserts (Cosmocord Mic-6), guaranteed brand new, 15/6 post free. Radio-Aid, Ltd., 29 Market Street, Watford. Phone Watford 5988.

7KV rectifiers, KT44, KT33C, 5Z4, EK32, 5/- each. 7C5, U17, 6SN7, 12A6, 4/6 each. EF36, EBC33, EF39, 6SJ7M, 6SK7M, 4/- each. EF50, 3/6 each. Lists other bargains. Annakin, 2 Sunnydale Crescent, Otley, Yorks.

G4GZ for valves ! 815's, 813's, 41/-; 811's, 808's, 27/6 ; TZ40's, 23/6 ; 866A's, 16/6 ; 35T's, 36/- ; 6L6M's, 10/6 ; 6J7M's, 6K8M's, VR150/30's, VR105/30's, 5X4G's, 7/- ; 6SF5M's, 6Y6G's, 6/6 ; 6J5M's, 6SJ7M's, 6/- ; Prices include postage. Please note new address. J. T. Anglin, G4GZ, 106 Cleethorpe Road, Grimsby, Lincs.

PRINT—QSL's and "OFFICIAL" LOG BOOKS for Full Call or SWL, Samples. Try G6MN, Printer, Worksop, for your next order.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box numbers 1/6 extra.

EDDYSTONE Model S.640 Communications Receiver, nearly new (30 hours operational time), complete with set of Brown's phones and Eddystone speaker. What offers?—Fistral House, Westfield Road, Bengeo, Hertford.

WANTED.—Power Pack and Receiver Cabinet for Super Pro, SP200. Offers to—GM2FVV, 20 Murray Place, Stirling.

BC348 Xtal model, fully modified, 230v internal P/P and 6K6 output with neg. feedback, aerial trimmer, ideal for SWL. Guaranteed. £17.—Box No. 607.

EDDYSTONE 358X receiver, 40 kc 31 mc, xtal filter, for 230v AC—£16. B2 receiver, £3. Both in excellent condition.—G3FMK, 47 Allen Street, Maidstone, Kent.

SALE.—T1154, £5. T1083, £5. R103A (AC only), £8. T36, 10 60 mc, xtl/MO 807-807-2 807's, fitted mod. transformer, £15. Crystal wavemeter 1191A, with new spare valves, £7/10/-. Tx : 6v6-807, 10-20-40-80 metres (Radiocraft), £6. No P/Packs for above Tx's. Wanted : All-wave portable. Offers ?—Box No. 606.

BC348 modified—1st RF 6AK5, tuning meter, internal 230v AC power pack, 2 stage audio amplifier, £10.—O'Shea, 306 Utting Avenue East, Liverpool, 11.

HELP urgently required. Amateur desperately requires to rent unfurnished flat or house in London area. Any reasonable offers very welcome. —Box No. 605.

R1147B receiver, unused, £2. AR77 requires re-aligning on 10 metres, £19. Hambuilt 9v communications superhet, 230v AC, 1·7 mc-30 mc, £9. Tx valves, 832, 17/- each, new.—G2CJL, Station Road, Cheddar, Somerset.

FOR sale.—Two TR9 transceivers, complete with valves and meters, 35/- each, carriage 5/- extra.—Sutton, Park Villas, Whalley, Blackburn, Lancs.

HRO Model MX, 6 coils, power pack, 10 in. PM speaker in metal case to match, spare valves. All in perfect condition, £30.—Brown, Rose Tree Cottage, Bovingdon Green, Marlow, Bucks.

EXCHANGE.—R107 and R208, together cover 1·2 to 60 mc without a gap, 200-230v AC, re-aligned. Mullard red "E" Valves. Wanted S.640 or similar.—Box No. 608.

HRO with power supply (without cases), with 3 coils, 0·9 to 30 mc, for sale. Offers ?—Box No. 609.

BC342 (no xtal model) with own matched black crackle speaker+massive 230/110 transformer. All perfect condition, £17. Perkins, 40 Calton Road, Gloucester.

SMALL ADVERTISEMENTS

READERS'—*continued.*

R107 as new, 6V6, S-meter, handbook, £11/10/-, carriage paid.—Engineer, c/o The Ice & Cold Stores, Beach Road, Eastbourne. *Phone*: *Eastbourne* 909, any time.

SWAP.—German Kodak 2½×3½, F.4·5, Meyer Gorlitz in Compur, 3 plate holders and cut film adapters. For 52 outfit or similar.—Auton, 117a Commercial Road, Swindon, Wilts.

B2 Transmitter, Receiver, power unit, official instruction handbook, crystal, key, headphones, replacement valves. Perfect condition. Components for 10-watt modulator, including special modulation transformer, £15. 829B, 815, 6AG7's, 956, 6AG5's, 6AK5's. Offers ?—G3AIZ, 56 Hampton Road, E.7.

R1155 first-class condition, power pack with ammeter and voltmeter. Offers to Croft, 38 Ashburton Avenue, Ilford. *Phone*: *Rippleway* 1934.

WANTED.—Blue Diamond 300 watt 230 AC generating plant. Also 832 and 829, 6J4 valves. —Glenhaven. Cliff Road, Wembury, nr. Plymouth.

AMPLIFIER-MODULATOR. 6L6's P/P, suitable for PA or modulator for Tx 20 watts output. £7. —G3DRF. *Phone*; *Hillside* 7010.

CR100 Receiver, excellent condition, complete with speaker in steel cabinet. Best offer over £22.—G3KI, South Lodge, Eastgate, Lewes, Sussex.

CLEARANCE.—B221 freq. meter, £7/15/-, less spares, £6/15/-. RA10FA 8-valve com. receiver, 28v, £3/10/-. BC433 radio compass, less valves, 30/-. TR1196, £4/10/-. R109T, £4/10/-. BC348, £12/10/-.— L. K, Hodson, 54 Sunny Bower, Tottington, nr. Bury, Lancs.

TWO-METRE xtal converter, 3 6J6 crackle case, also Eddystone 640, £25. Pair Emiscope CRT, 12 in., white, new, £12. F & D coils fitted. Exchange lightweight club cycle, 531, etc., for any communications Rx.—Taylor, Shoemaker, Lake. Sandown, I.O.W.

SELL or swop.—500-0-500v, 150 mA transformer, 18/-. Two-range ohmeter, Evershead, in leather case, a snip, £2. National receiver, FB7A, 7 valves, SK range, band spread coils, 10, 20, 40, 80 metres, one set general coverage coils, good condition, £8/10/-. Varley 140 mA choke, 7/6. Matched pair 810's, 30/- each. 805's, boxed, £1 each.—W. Stirling, 137 Glasgow Street, Ardrossan, Ayrshire.

SALE. HT supplies, 1000v, Woden DTM 18, DTF 12, PCS 12, DCS 13, with 866's, £10. Also 600v, Woden DTM 16, DTF 18, PCS 11, DCS 12, with 5R4GY, £6. RF power amplifier, 10-20 metres, RAYMART condenser, push-pull 35T's. All these chassis are by Eddystone with crackle 10½ in. panels and chrome handles. Offers to G3AVR. 10 Barnet Way, Mill Hill, N.W.7. *Phone MIL* 2991.

1154 Transmitter in transit case—new condition. Price, £5/7/-. 1,750 × 1,750v 350 mA transformer and swinging choke—250 mA. Nearest £4.— Box 610.

SALE. *QST* 1938-48, 132 copies, good condition, offers ? Also quantity *Wireless World* 1938-47. SX15 Sky Challenger 545 kc-38·10 mc, needs attention, £10. Pair Eimac 35T, 50/-. Jeffs, 19 Corbyn Road, Bordesley Green E., Birmingham 9.

WANTED. Late model HRO, with bandspread coils. Or would exchange for American 150-watt Tx, VFO 3 to 18 mc, in perfect condition, requires HT supply only. G4RS, 17 Tudor Avenue, Bebington, Cheshire.

2 TRANSFORMERS—230 primaries, 450-0-450, 200 mA, 6·3, 4 amp 4 times, 5v 2 amp. 750-0-750, 200 mA, 6·3v 5 amp, 4v 4 amp, 30/- each. Chokes, smoothing, Pr. 200 mA, £1. Pr. 500 mA, 15/-. Wanted, Pr. 813's, Pr. 805's, One 28 mc coil for Eddystone 358. Carriage extra.—Box No. 611.

FOR sale, best offer, complete station, 120-watt CW, 70-watt phone, 1·7 to 28 mc, VFO/Xtal, superhet receiver, Class-D wavemeter, power packs and considerable quantity spares. Write 7 High Street, Burnham-on-Sea, Somerset.

SMALL ADVERTISEMENTS

READERS'—*continued*

GENUINE Millen "R-Niner," boxed, as new, £12/10/-. 145 Oscillator, with power pack, £10. 120-watt phone Tx, P/P 807's RF and mod, rack built, £75. Or offers? S.A.E. for full details.—Cook, Grove House, Drove Road, Swindon, Wilts.

SNIP.—S-27C, Hallicrafters, 130-210 mc, FB for 145 mc, as new, with manual, £27/10/- or offers?—G3AAJ, 385 High Street North, Manor Park, E.12. *Grangewood* 4587.

OWNER going abroad. CR300, 15 kc-25 mc (no gaps), hotted up, beautiful job, black crackle, variable selectivity, audio filter, perfect bandspread, 500 kc crystal calibrator and speaker, built-in, separate power pack (included), 1 RF, 2 IF, RF and audio gains, BFO. Transport included, £21. Empire portable typewriter, almost new, scarcely used, £20. 1000 kc, crystal battery oscillator, 30/-.—Wilcock, 101 Bromley Road, Catford, London, S.E.6.

RG37 Communication Rx. 14 kc-30 mc, 9 bands, turret coil. All stages metered 600-1000 cycle filter, 6V6 output, grey cellulose, new condition. Must sell. £16 or best offer.—Box No. 614.

EDDYSTONE S640, brand new, with uncompleted guarantee, unwanted gift, £20. B2 Tx and Rx, complete with power pack, 3·5 mc crystal, key, phones, in perfect order, £11.—1 Bridgefield Road, Gateacre, Liverpool.

SO-RAD 481 Tx 20/40/80 metres. Built-in AC P/Pack 28-40 watts CW/Phone. New, complete, one xtal. Must sell. £15 or offer?—Box No. 613.

CR100 30 mc to 60 kc, £22. 145 VFO, with internal 1000 kc Xtal calibrator, £4/10/-. Class-C wavemeter, 22/6. 6v vibrator pack for same, 12/6. New commercial television cabinet, 17 in. × 16 in. reinforced glass aperture for 9-in. tube, £4. Accept D104 part exchange.—G2CVO, 13 Mount Echo Drive, E.4.

HOWARD communications Rx, ten valves, matched speaker, sixteen controls, xtal filter, meter, built-in frequency monitor on amateur bands, 550 kc to 43 mc. London area. £24.—Box No. 612.

SELL.—3-4 mc Tx/VFO. BC454 with P/Pack. Small multi-meter. 50 valves, etc. S.A.E. details.—G3DVF, Link Farm Cottage, Amble, Northumberland.

TWO racks, instrument, ex-R.A.F., six feet, heavy base, takes down for transport, 35/-.—Auger, Hillcrest, 9 Prospect Hill, Whitby, Yorks.

BC348 PERFECT, 230v, p/pack, £16. Eddystone 5-10m convertor, little used. Eddystone speaker, 35/-.—Moore, 16 Sandiway, Meols. *Telephone : Hoylake* 3221.

TRANSMITTER. 150-watt phone 28 mc (converted T1131), all valves, 6-ft. rack. Owner going abroad. No reasonable offer refused. N.W. London.—Box 616.

HRO Senior Rx for sale, complete, 550 kc to 30 mc, £27. Write G3AIS, 1 Newhouse Close, New Malden, Surrey.

AR88D perfect condition, with matched 10 in. Wharfdale Golden Speaker, £50. All letters answered.—Box 615.

WANTED 446A lighthouse triodes, also send details of any other VHF equipment. G3BKQ, 76 Hillsborough Road, Glen Hills, Blaby, Leicester.

WANTED. Transmitting valve type ATP35 (Army), PV1·35 (Mullard). Urgent. Bryant (G3AGO), Nunns, Coxtie-Green, Brentwood, Essex.

P58 250-650 mc Rx, best offer. Inspection weekends. Fancourt, Kilburn, Derby.

WANTED, metal cabinet as made by Hallicrafters for use with table model SX28 or SX28A receiver. Can anyone supply, please? Box No. 617.

TX, steel rack, tritet-P.A. (RK20), phone, CW, 3·5, 7, 14 mc, 4 meters, 8 valves, £35. CNY1 transmitter, receiver, control unit, manual, complete, £25. Christian, Attwood, Bromham Road, Biddenham, Beds.

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