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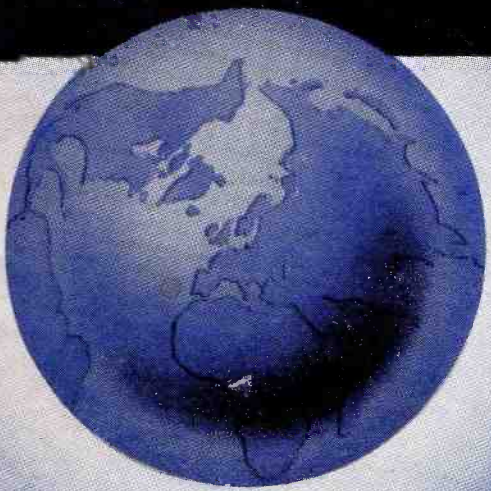
The SHORT WAVE Magazine



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VOL. IX No. 9 NOVEMBER, 1951

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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

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The SHORT WAVE Magazine

FOR THE RADIO AMATEUR AND AMATEUR RADIO

EDITORIAL

Achievement

During the last few weeks DX records of a new kind have been made at the LF end of the amateur spectrum. Signals from GW3ZV, GW3FSP and G6GM have been heard in New Zealand, and ZL1AH has been received in this country. On any of our bands from Ten to Eighty this would hardly be news—but the results to which we refer were obtained on 160 metres, which makes it very big news indeed.

The Antipodes on 1.7 mc! Trans-Atlantic contacts have been possible for quite a number of G operators, but there were obvious difficulties about working the Antipodes, apart from the distance. However, GW3ZV and ZL1AH examined the project as a scientific problem to be solved; they worked out a schedule, in terms of times and frequencies, which would give them the best chance of making contact if the theory held good. It would have been easy enough to accept the general view that Antipodean DX on 1.7 mc was outside the realms of practical possibility. But, as always, there was somebody to show that the generally accepted view is not necessarily the right one.

And so another great milestone has been passed in the long history of Amateur Radio. The sincere congratulations of amateurs all over the world will go to the operators concerned on their outstanding feat.

* * * *

And talking of milestones, this issue of SHORT WAVE MAGAZINE *also happens to be one, but of another kind. Since our first appearance in March 1937, it is No. 100 of the series, broken only by the war years.*

Austin Forbes G6FO.

NBFM As A Practical Proposition

CURING TVI ON TEN METRES

By **B. WARDMAN (G5GQ)**

This subject will be of considerable interest to all phone operators, even if not afflicted with TVI, or not on Ten—the only DX communication band upon which frequency modulation is at present permitted. In his excellent article, our well-known contributor shows how easily NBFM can be tried out, and he covers in detail all points likely to arise in design, setting up or operation. His main argument is that—provided the transmitter itself does not interfere under steady carrier conditions—the use of Narrow Band Frequency Modulation should be a certain safeguard against TVI when working phone on the ten-metre band. Editor.

LIVING in Central London, the writer has unusual opportunities of meeting many other amateurs. At some time during the discussions the old trouble always crops up, TVI. Yet, whenever he suggests NBFM, surprise is expressed, coupled with the suggestion that it is a complicated system which is no good unless special gear is used at the receiving end. The surprise is much greater when he retorts, "I always use NBFM and you've never yet had trouble in getting me with your normal receiver."

To most of us, Amateur Radio is a hobby; we're interested in playing with our gear, not in studying theories. So, although NBFM has been known for years, we've regarded it as something academic and not practical enough for our use. It was certainly true at this station where NBFM was first tried out some two years ago as an afternoon's experiment, but which instead has come to be, the main system of modulation used at G5GQ.

Discussion

First, what are its main advantages? Almost complete immunity from TVI caused by modulation, plus simplicity of modulating equipment.

Let's look at this TVI aspect first, and especially at the meaning of "TVI caused by modulation." It is doubtful whether there is an amateur station in the entire world which does not use *some* form of amplitude modulation. It's all very well to laugh that off with "I only use CW," but it can be shown that CW itself is a form of amplitude modulation. What amplitude modulation, in fact, means, is the action of varying the amplitude of the carrier, and this is the same thing, whether it is done by means of the voice through normal speech equipment, or with a key which permits maximum amplitude when it is down and zero amplitude when it is up. Because of the relatively slow hand speed at which we send, we are liable to forget that keying the transmitter is a form of modulation; when a large number of characters per second are sent, wide side bands have to be allowed for them, just as with a phone signal—as witness the tremendous channel width required by the BBC vision transmitters. When amplitude modulation does break through on to TV, it is one of the most difficult things to cure.

In amplitude modulation, the carrier frequency is kept constant whilst its amplitude is varied.

In frequency modulation, the *amplitude* is kept constant whilst the actual frequency is varied by the speech.

How does this affect TVI? If your carrier, unmodulated or unkeyed, has no effect upon the local TV sets, it is pretty certain that you can apply frequency modulation with practically no risk of interference. So, if the transmitter comes through this test, but under keying or amplitude modulation creates local riots, the use of Frequency Modulation will give you additional hours of peaceful operation.

Next, simplicity of modulating equipment. One simple modulator valve only is required, such as an EF50 or any triode of equivalent size. For circuit simplicity a pentagrid can be used, but more of this later. About three volts RMS of audio is needed, which means direct operation from the high output carbon types of microphone, or the usual two-stage pre-amplifier if a crystal microphone is used. The only

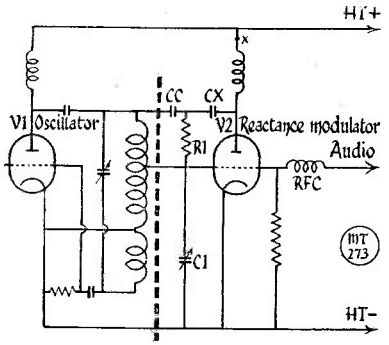

Fig. 1. Basic circuit for NBFM working, where VI is the transmitter control oscillater, frequency modulated within audio limits by the reactance modulator stage V2. The working values are given in the table herewith and the action of the circuit is described in the text.

essential for simple operation is that the rig must be VFO controlled, since crystal control involves quite a lot of additional equipment.

The Rx Side

Receiving equipment was mentioned in the opening paragraph. A great deal of nonsense has been talked about the need for special FM receivers; they are just as idealistic as separate rhombics for all wavebands and continents, which most of us have gone without quite happily. Narrow-band frequency modulation is received perfectly satisfactorily upon the common, garden or vulgar receiver found in amateur stations. The natural selectivity of the various circuits converts the FM into a normal audio signal. The only point is that the audio is in the sides of the carrier, and this means tuning off peak and on to the sideband. If a properly modulated FM signal is tuned in at the normal peak position, *no* modulation should be heard; modulation will appear as soon as it is detuned on to one of the sidebands. On a normal, selective receiver it is somewhat disconcerting at first to

Table of Values

Fig. 2. Using 6L7 as Reactance Modulator in NBFM

R1/C1 = Phase shift network as in Fig. 1.
C2 = 8 μF
C3 = .01 μF
R2, R5 = 0.5 megohm
R3 = 300 ohms
R4 = 30,000 ohms

Table of Values

Fig. 1. The basic FM control circuit.

Cx = .001 μF isolating condenser to keep HT off grid V2.
Cc = .001-.0005 μF coupling condenser; not strictly necessary, but may be required with series tuned oscillators (HT on tank coil) to isolate HT on VI from grid of V2.
R1 = 50,000 ohms } Phase shift network
C1 = 4 $\mu\mu$F } *See text.*

peak a signal at S9 and hear no speech, and then detune to about the S6 position and receive S9 speech.

Note very carefully that the natural selectivity of the normal AM receiver allows it to receive FM. It's just plain, common sense to grasp that selectivity varies from receiver to receiver, and so does their ability to receive FM. Some receivers like more deviation than others, and this simply means adjusting it at the transmitter end by increasing or decreasing the volume control. In operation at G5GQ, when we are told that our quality is not too hot (politely expressed usually by "having a bit of trouble reading you") we immediately drop off the deviation a bit, to the amazement of the operator at the other end, who suddenly hears perfect speech because the deviation now suits his receiver response curve. As an instance of this, during a local three-way QSO one evening, it was necessary to reduce the deviation for the AR88 user and increase it quite a lot for the HRO.

Finally, with most receivers, there is no need to cut out the AVC; just another fallacy debunked.

Comparative Effectiveness

Now to the factor dearest to our hearts: how *effective* is NBFM compared with normal amplitude modulation? It's a difficult question to answer

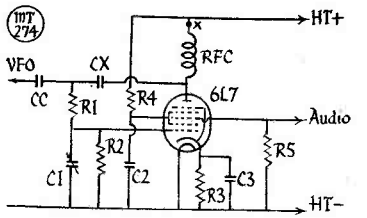

Fig. 2. Using the 6L7 as a reactance modulater in a NBFM control circuit. The significance of the condensers Cc and Cx is covered in the text.

accurately, but as we're interested in practice and not theory, the answer, based on experience at G5GQ, is around 75%. However, here ar the points:

(a) *Local Phone.* With an S9 signal, there is little to choose between NBFM and AM; the latter kicks the S-meter up just that fraction more. On weaker, ground-wave stuff, excellent contacts have been maintained with an S4 carrier.

(b) *DX Phone.* With an S9 signal there is little difference between the two methods. At S6 and below, it is probably only 50% as good because FM (received on AM receivers) is more prone to phase distortion, and is also more susceptible to QRM because of the need to detune. However, during the 1949 ARRL phone tests, nearly 50 W stations were worked in one hour's operation on ten metres using around 100 watts to a dipole (end fed) strung ten inches away from the wall of the steel-framework block of flats in which G5GQ is located.

(c) For both local and DX contacts, how can one make comparisons if AM is out of the question owing to TVI, whereas FM permits full operation?

Applying NBFM

So much for the merits or demerits of NBFM. How does one apply NBFM to the rig? There are all sorts of methods, and those who are interested in the technical aspects should stop reading this article and study that most comprehensive work, *Frequency Modulation,* by August Hund, published by the McGraw Book Company. At the risk of being called categorical, the writer would express the opinion that the simplest, sure-fire method for amateur equipments is the one-valve reactance modulator, technically known as the quadrature of ninety-degree phase-shifter. Having read its technical name, just forget it and, instead, concentrate on what it does.

What we are trying to do is shift our frequency in accordance with the variations of our speech. Forgetting all about FM for the moment, how does one vary the VFO frequency? We swing the tuning condenser round until we land just off the frequency of that DX station. In other words, we've varied the capacity in the tuning circuit. We could do just the same thing by varying the inductance in the circuit; remember the old variometers and "slide tuned inductances"? If we could vary the inductance or capacity in our VFO circuit at *audio* frequency, then we should obtain frequency modulation. That is exactly what the reactance modulator valve does; it varies the inductance or capacity of our tuning circuit in response to the audio impressed on its grid—in effect, electrically compressing and expanding the inductance or wobbling the tuning condenser, according to the way it is connected up.

The fundamental circuit is shown in Fig. 1. Across the oscillator tuning circuit is connected the 50,000 ohm resistance R1, and the tiny condenser (about 4 $\mu\mu$F) C1, forming the ninety degree phase-shift circuit, after which the system is named. The reactance modulator (V2) draws a small amount of RF from the VFO circuit, and, by virtue of this phase-shifting network, the current in its anode circuit will be 90 degrees behind the current flowing through C1. The result is an injection of inductance, *i.e.* additional inductance placed across our tuning circuit, or, more simply, change of our VFO inductance. The amount of change depends upon the mutual conductance of our reactance modulator, so if we can vary this continuously under the control of our speech, then we effect frequency modulation. All that's necessary is to vary the modulator grid voltage, which means using the audio speech input. Simple!

The only thing to memorise is the values of the two components: R1, which is 50,000 ohms; and C1, which is about 4 $\mu\mu$F.

Practical Points

Almost any small receiving triode may be used in this circuit. However, the grid of the modulator, V2, carries both RF and audio. The RF choke, RFC1, must be inserted to isolate the RF from the audio. If an EF50 is used, exactly the same considerations apply, and in this case the normal screen voltage and screen by-pass condenser must be used.

To overcome the difficulty of applying RF and audio to the same grid, that special valve, the pentagrid, designed with two grids to cope with two different frequencies, is usually employed. Here, RF is applied to grid 1, whilst audio is taken to grid 3. Fig. 2 shows the pentagrid, type 6L7, used in this application. Again, the phase-shifting network, R1, C1, can be seen.

This network is not so obvious when used with the other pentagrid, type 6SA7 or 6SA7GT, which many will prefer as cheaper than the 6L7. R1 is still obvious, but C1 is concealed inside the valve as the actual control grid-to-cathode capacity inherent in the valve. This circuit is shown in Fig. 3.

VFO Considerations

How about the VFO? The amount

of deviation (frequency modulation in effect) caused by a reactance modulator is very small at the fundamental frequency; certainly, it is not sufficient to give ample modulation. However, the deviation doubles as we double the frequency; if we modulate a VFO operating on 3.5 mc, we shall find twice the deviation on the second harmonic (7 mc), four times on the fourth harmonic (14 mc) and eight times on the eighth (28 mc). The easiest practice is to modulate at one eighth the final frequency, and, since NBFM is only permitted at the moment on the 28 mc band, this means using a VFO on 3.5 mc. As an experiment, the writer built up a VFO which could operate on 3.5 mc (fundamental multiplied by 8), 2.34 mc (x 12), and 1.75 mc (x 16). The only difference noticed was the necessity to reduce the audio as the VFO frequency was reduced. It is possible to use a fundamental of 7 mc (for 28 mc output), but most amateurs seem to have 3.5 mc fundamentals available already.

With most types of VFO, little trouble should be encountered in setting up the system. Many times it has been put to the writer that the Clapp type VFO is far too stable an oscillator to be modulated in this manner. Accordingly, that used by him is shown in Fig. 4, together with some notes which apply to the setting up both with the Clapp and other VFO's.

Setting Up

The first thing to do, before attempting any modulation, is to check that the audio side is all right. At the point marked "X" (between the top of R6 and the HT feed line) couple a pair of phones through a transformer or audio choke. Clear speech should be heard when the volume control of the speech amplifier is turned up enough. It is a waste of time going further until this is proved. Then switch on the VFO to check in the phones that it causes no audio oscillation. Notice the modulator HT supply arrangements; a 50,000 ohm resistor is used in the anode circuit instead of the customary RF choke. The use of the normal RF choke in this position is one of the most likely causes of spurious oscillation; the use of the 50,000 ohm resistor obviates this trouble, and measurements indicate no loss of RF. A similar resistor is used in the screen grid circuit, and since the 6SA7 screen current is normally higher than the anode current, the use of these similar resistors in both leads results in

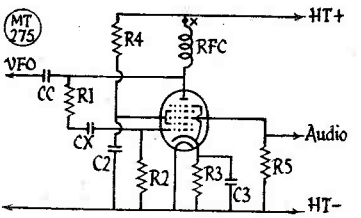

Fig. 3. The 6SA7GT/G as a reactance modulator for NBFM. This valve has grid 5 internally connected to cathode; if a metal version is used, the connection must be made externally. In the circuit as given here, the capacity C1 (not shown) is that inherent in the valve between control grid and cathode.

Table of Values

Fig. 3. Type 6SA7GT/G as Reactance Modulator

C1	=	Inherent Grid 1-Cathode capacity
C2	=	8 μF
C3	=	12 μF, with .01 μF in parallel
R1	=	50,000 ohms, as Figs. 1 and 2.
R2, R5	=	0.5 megohm
R3	=	350 ohms
R4	=	10,000 ohms

the correct voltages being applied to the electrodes concerned. In particular, note the small value (30 $\mu\mu$F) of the coupling condenser between the VFO and the modulator; if higher values, as used with other VFO's (such as .0001 μF) are put in, a resistance-capacity amplifier effect would arise in the modulator, causing amplitude modulation (as well as FM), which is just the thing to be avoided.

Having checked the audio side, it's time to try the whole thing out. Switch on the VFO and listen to the 28 mc harmonic, or output, beating against it to check the note. With the audio gain at zero, the note should be pure T9. If, instead, the note sounds like a buzz-saw, try reducing the value of the coupling condenser, CC, until the note is perfect. This effect is noticeable when beating with the carrier; even with a tremendous AC carrier effect there is little hum in the *centre* of the carrier. Do not mistake this effect for AF oscillation, which gives an audio note in the centre of the carrier and is usually due to oscillation in the modulator screen circuit; the 8 μF condenser shown invariably prevents this, but the point is mentioned in case it should arise.

Having got the carrier note clean, switch off the BFO and tune to the side of the carrier. Turn up the mike volume control and speech should be heard; as

the gain is increased, the speech will get stronger and then, as the gain gets to a certain point, it will get no louder but become distorted. That means it is over-modulated (or the deviation is too great) for your particular receiver. The quality should be just the same as that obtained from your speech amplifier; no distortion should occur.

Checking Control

Now to assess the percentage modulation. Turn down the receiver until the signal on 28 mc is about S4, switch on the BFO and note whether the carrier is chopped up somewhat when you speak into the microphone. It is much easier done than written here.

But, what a shock! Has something happened to the carrier? Maybe, as the speech gain is turned up, the carrier note changes from T9 gradually to T3. That is a symptom of FM, because we are altering the frequency with audio. Therefore the least trace of background noise or hum, which would pass unnoticed with AM, shifts the carrier and gives this effect; and this effect may result in no hum on the actual transmission itself. An exceptionally quiet audio system and a silent microphone background are necessary to have a perfectly clean carrier. This is an ideal, as listening to some of the commercial mobiles using NBFM will show; these often have very rough carriers, but their speech quality is excellent.

Reverting to the Clapp alone, many will ask why the modulator is connected to the cathode of the Clapp instead of to the grid, as in the other circuits. It will work that way, just at it will connected to the lower end of the inductance, but it is somewhat troublesome. For one thing, the grid of the Clapp is rather susceptible to AC hum. More important, there are quite a lot of RF volts there. The tendency, using an EF50 in the Clapp, and a 6SA7 as modulator, is for the whole bag of tricks to stop modulating and shift frequency by a few kc. This caused the writer some bewilderment until, one day, he measured the volts on grid 3 of the modulator (which should be about − 1)

Table of Values

Fig. 4. Circuit complete for NBFM Unit as used by G5GQ

C1	=	Inherent grid-cathode capacity
C2	=	8 μF
C3	=	12 μF, with .01 μF in parallel
Cc	=	30 $\mu\mu$F air-spaced
Cx	=	.001 μF mica
R1	=	50,000 ohms
R2, R5	=	0.5 megohm
R3	=	350 ohms
R4	=	50,000 ohms
V1	=	EF50 VFO stage
V2	=	6SA7G Reactance Modulator.

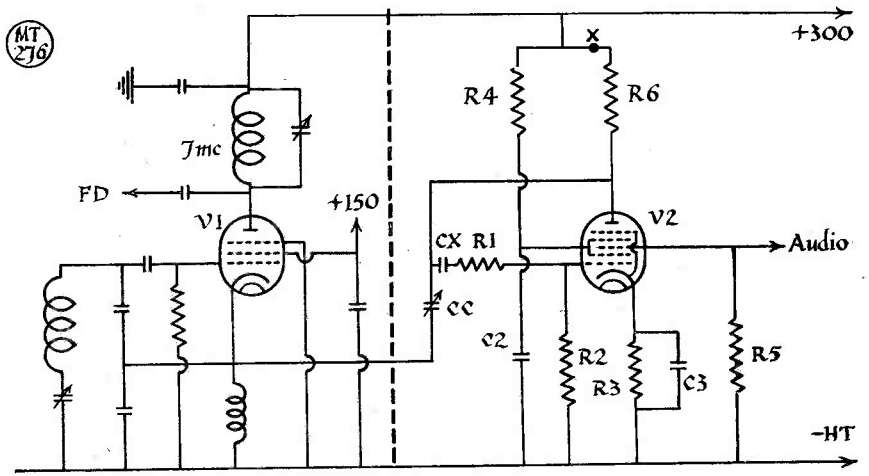

Fig. 4. A practical NBFM driver circuit, VFO/RM, as used by G5GQ for ten-metre phone working. All necessary values are given in the table, and some points regarding the arrangement are discussed in the text. "X" is the check point for audio test.

and found them around plus 200 volts! Excess RF had created a static charge and paralysed the modulator. Coupling to the cathode as indicated completely cured *that* bother.

One last check, this time on the audio voltage required. It is perfectly easy to measure this. Disconnect the speech side from the reactance valve. Then connect to a variable bias supply, for example, to a 4.5 volt flashlamp battery, thus being able to vary the bias a volt or two. Upon varying the bias by about 2 volts, the carrier on 28 mc should change by about 6 kc. If this test proves satisfactory, then the actual frequency modulator system is in working order, and the application of two or three volts audio should be ample for full modulation.

Monitoring

One thing which is so obvious that it is likely to be overlooked is that FM cannot be monitored on the usual crystal-diode phone monitor. The writer publicly confesses that he himself fell into this error and wondered why no modulation was audible. Of course, the average monitor of that type is far too broadly tuned to respond to FM, and if it does appear to respond, then amplitude modulation is getting through.

Finally, if this article arouses any enthusiasm for NBFM, don't forget that it's only allowed on the ten-metre (28 mc) band at present. Perhaps one day we shall be permitted to use it on 14 mc during TV hours as a simple cure for TVI.

Modifying Receiver Audio Characteristics

REDUCING BAND-WIDTH ON THE IF SIDE

By **J. N. WALKER (G5JU)**

With some attempt at many phone stations to reduce transmitter band-width, the question naturally arises as to what can be done about more audio selectivity on the receiver side. This interesting article gives some useful practical information on the subject.—Editor.

TELEPHONY operators generally are coming to appreciate the benefits to be derived from restricting the audio frequency range of amateur phone transmissions to a band-width much narrower than that used, say, for broadcasting. As a consequence, they are usually willing to go to some trouble to ensure the design of the modulator is such as to attenuate, sometimes quite severely, the upper and lower registers.

In the same way, it is often advantageous to restrict the audio frequency response of a receiver used for communications work. The "back-end" of a commercial receiver is usually capable of reproducing a wide range of frequencies with low distortion—so that those whose main interest is in short-wave broadcasting, calling for fair-quality speech and music, will be well advised to leave things alone. But where maximum speech *intelligibility* is the only requirement, particularly under adverse conditions, the following ideas can be incorporated with very little difficulty.

Argument

It is desirable to attenuate both low and high frequencies. The former, say from 50 cycles to 250 cycles, add little to the overall intelligibility, but in this range comes noise of a static nature. Reducing the low frequency response also permits taking liberties with smoothing, as hum, be it 50 cycles or 100 cycles, will not be audible unless its amplitude is on the high side. Cutting out the upper frequencies results in a reduction of noise—receiver and aerial derived—and heterodyne interference will be minimised. The middle frequencies are, of course, automatically emphasised, and as it is these which are of most use for intelligible reproduction, readability is usually markedly improved, both with CW and telephony signals.

Methods

There are several ways of restricting band-width. If one does not mind going to considerable trouble, a multi-section

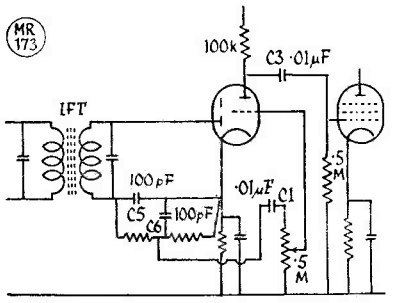

Fig. 1. A usual audio-end circuit, with values.

band-pass filter is an excellent arrangement, but it is not easy to come by such a filter ready made, nor to obtain the special parts necessary to build one. For a filter of this type to be effective, close attention must be paid to input and output matching. For the present purpose, a band-pass filter is hardly worth while.

Another method is to add selective negative (or, alternatively, positive and negative) feedback. This entails quite a number of additional components and is a good method when no objection is raised to constructing a unit to be used exterior to and powered separately from the receiver.

However, when it comes to modifying the response of a receiver without adding such items as iron-cored coils, potentiometers and valves—for which it will usually be impossible to find room, in any case—quite a lot can be done simply by adjusting the values of coupling and by-pass condensers in the audio section. A cumulative action over two or more stages adds to the effectiveness of the method.

What To Do

The system can be applied equally well to TRF and superheterodyne receivers. Because of the inherently poor degree of selectivity found in a TRF receiver, this type of circuit benefits to a greater degree than a superhet. For purposes of illustration. the detector and audio stages of a superheterodyne receiver are reproduced in Fig. 1, and typical values have been placed against the condensers and resistors. Fig. 2 shows the modifications necessary to alter the frequency response and it will be seen they are simple indeed. The coupling condensers C1 and C3, of .01 μF, are removed and replaced by mica condensers of .0001 μF. Two parallel condensers, C2 and C4, again mica .0001 μF, are added. And that is all.

Diode By-pass Condensers

It will be seen from Fig. 2 that the .001 μF condenser C2 shunted across the diode load resistor (marked R) is effectively in parallel with one of the detector circuit by-pass condensers (C6), and this in itself indicates slight further modifications. Only rarely will a value

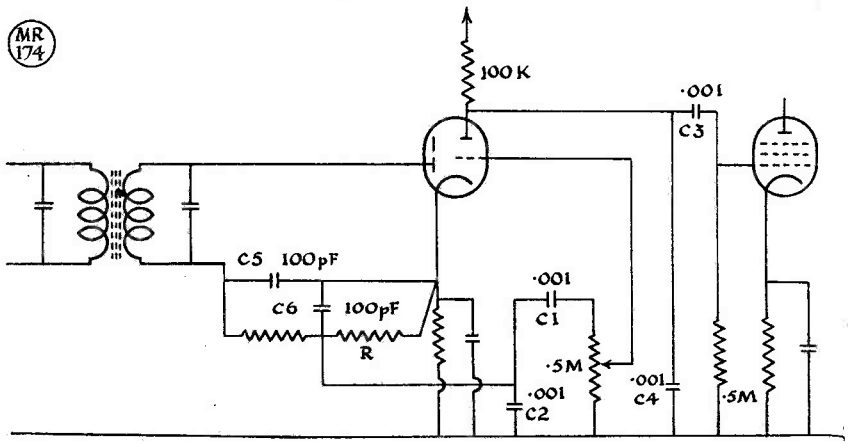

Fig 2. The circuit values of Fig. 1. altered to change the audio frequency response.

exceeding 100 $\mu\mu$F be found for the by-pass condensers in the diode circuit, the reason being the desire to maintain top response. In the present case, the purpose is to remove some "top," hence the two by-pass condensers C5 and C6 can well be increased in value to, say, .005 μF each. Obviously 100 $\mu\mu$ F is on the low side as a by-pass for intermediate frequencies, and the use of a higher value will give better filtering action. There is no necessity to remove the original condensers—the additional ones are simply connected in parallel. When this is done, the .001 μF C2 shunt condenser is omitted.

Results

The tone of the set will, of course, sound a little different, and the audio gain control may require advancing slightly beyond its normal position to give the same sort of output to suit the user. The effect of the modification can be judged by tuning in a steady carrier and rotating the BFO control—the falling off at low and high frequencies and the emphasis on middle frequencies will be immediately obvious.

Still greater attenuation of the higher frequencies can be brought about by increasing C2 and C4 to .002 μF. Such rather drastic treatment will appeal mainly to CW enthusiasts, but telephony is still fully readable, because the attenuation is smooth, as contrasted to the sharp cut-off given by a narrow band filter.

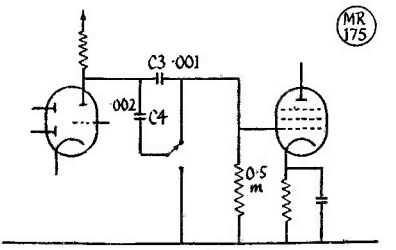

Fig. 3. Circuit for switch control of audio frequency response.

Including a Switch

Finally, in Fig. 3 is a circuit for those who would like to have things both ways—reasonably good quality for local telephony or broadcast reception, and a restricted frequency response for use under difficult conditions. Switching is shown for one stage only, and this is usually sufficient. It should be noted that here the alteration is applied to the second audio stage, and normal values of condenser used in the first stage. With C3 in parallel with C4, the value becomes .003 μF, and little difference will be found as compared with a .01 μF condenser. In the other switch position, the frequency response will be noticeably modified. If a double-pole change-over switch is employed, similar connections can be made to the first section, with a consequent greater variation between one position and the other.

RECOGNITION OF GENIUS

On January 26, 1926, John Logie Baird —a Scot who was educated at the Royal Technical College, Glasgow—gave the world's first television demonstration before an audience of some 40 members of the Royal Institution. It was the culmination of several years' patient work in an attic laboratory in Soho. On that house at 22 Frith Street, on October 22 last, Sir Robert Renwick, Bt., K.B.E., unveiled for the London County Council a plaque commemorating J. L. Baird's inventive genius. As is well known, after his first successful demonstration, Baird struggled for years with mechanical scanning and photo-electric cells; though electrically much simpler than the techniques now associated with the cathode ray tube in television, he never got quite the results which could make his system a commercial success. In fact, Baird lived to see the fruits of his original enterprise gathered by others. But it is fitting that he should be remembered as the true pioneer of what is now a great industry. His original apparatus reposes in a place of honour in the Science Museum, Kensington.

PHOTOSTATIC REPRINTS

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Multi-Range Valve Voltmeter

DESIGN, CONSTRUCTION AND CALIBRATION

By **D. P. TAYLOR, M.B.E., A.M.I.E.E. (G8OD)**

No amateur, building even the simplest equipment for himself, can be without measuring instruments of some kind, be it nothing more elaborate than an 0-50 *mA meter. If any sort of experimental work is being done, the need for good instruments becomes much more pressing. While excellent multi-range test sets and foundation instruments can be purchased relatively inexpensively, a high-resistance voltmeter of good calibration accuracy is not so easy nor as cheap. This article describes the construction of a valve-voltmeter for a wide range of AC/DC measurements, with an "internal resistance" of some* 20 *megohms on all ranges.—Editor.*

ONE of the most useful pieces of test equipment to the amateur experimenter is the valve-voltmeter. In fact, it is probably no exaggeration to say that for experimental work of any value involving alternating currents such an instrument is essential, although its usefulness need not be confined to AC measurements.

The meter to be described in this article is the latest example of a series constructed by the author, and although built for strictly utilitarian purposes, its appearance can bear comparison with expensive commercial items.

The circuitry used is straightforward and the construction well within the capabilities of the average amateur. It is, in fact, so orthodox that the idea of writing the article only occurred to the author after a number of friends had expressed interest and had taken away circuit diagrams and details.

A factor which probably discourages amateurs of limited resources from constructing such instruments is the need for calibration, leading as it does to thoughts of costly laboratory sub-standards. This should not be allowed to deter any potential constructors, since all that is needed is the loan of a multi-range AC voltmeter for an evening, and a box of assorted resistances. Even if this modest requirement cannot be met, the uncalibrated instrument is of very considerable value, since more often than not the amateur experimenter is concerned with relative readings, rather than actual measurements.

Scope of the Design

The instrument itself provides for voltage readings from a fraction of a volt to 500 volts, either DC or AC, of any frequency up to 100 mc or more. Its performance has been checked against commercial instruments, and its accuracy is within plus and minus 5% at all ranges and frequencies normally encountered.

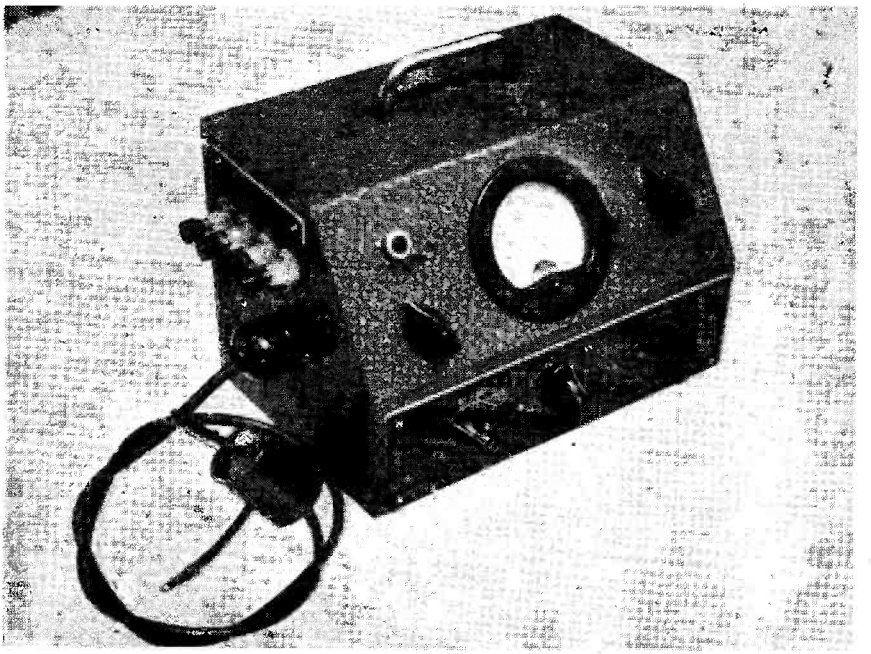
It is built around an ex-Service 0-500 microammeter, and although the other components used are also almost all in the surplus category, they could be purchased for a modest sum.

The circuit diagram is at Fig. 1, and for convenience this has been divided into four sections, which will be dealt with separately.

Power Unit

The power unit at Section "A" is so simple that little need be said about it. The writer uses a mains transformer having a 230-volt secondary and a 6.3-volt heater winding. This, in conjunction with a single 8 μF electrolytic condenser for smoothing, gives an output which varies between 300 volts at no-load and 200 volts at 30 mA. A 30 mA metal rectifier is used, although, of course, the requirement could just as easily be met by a valve rectifier and suitable transformer.

A very useful feature is a two-way wafer switch, which in one position disconnects the HT supply from the instrument proper and connects it, together with the heater, to a standard octal socket mounted on the side of the instrument case. Additional contacts on this switch also perform the same function in respect of the microammeter. The switch is at S2 in Fig. 1, and is mounted on the sloping panel to the right of the meter. By this means, the supply voltages and meter are made available for external use, and the possibilities of this facility are endless. The writer has a field-strength meter and modulation-depth meter which can be plugged into the socket; no doubt power requirements for items of test



This photograph shows the neat construction of the multi-range valve voltmeter discussed by G8OD in his article.

gear such as grid-dip oscillators, signal generators and so forth will suggest themselves to the reader.

DC Amplifier

Section "B" comprises a DC amplifier which gives the instrument its sensitivity for a high input impedance without the use of an expensive and fragile meter. Two EF50 (VR91) valves are used triode-connected (screen-grid to anode), and it will be seen from the circuit diagram that the anode and cathode circuits are identical. If no external potential is applied to the grid of V3, then the grids of both valves will be earthy and their anode currents should be exactly equal, about 5-6 mA per valve. In this case, the two anodes will be at the same potential, and a meter connected between them will not be deflected. To compensate for slight differences between individual valves and between the nominally identical cathode and anode resistances, an "Adjust Zero" control R20 is fitted.

Consider now the application of a negative DC voltage to the grid of V3; the anode current of this valve will fall whilst that of V4 will remain unchanged. The two anodes will no longer be at the same potential, and a current will flow through the meter. With the circuit values shown at Fig. 1, and the resistance R21 at minimum, a full-scale deflection of the meter will be obtained for a voltage slightly less than 1.0 volt at the terminal marked "DC." The setting of the control R21, "Adjust Calibration," can now be increased until a full-scale deflection is obtained for exactly 1.0 volt applied. This control should require adjustment only following a change of valves, or at very infrequent intervals, as valve characteristics may alter. It is of the pre-set type, and adjusted by a screwdriver through a hole in the instrument case.

Thus, the combined circuitry of Section "A" and "B" provides a DC voltmeter having a full-scale sensitivity of 1.0 volt. The reader might well object that this result could have been achieved much more simply merely by

connecting a suitable resistance in series with the micro-ammeter! A little calculation will show that to do this a 2,000 ohm resistance would be required: Contrast this with the instrument just described, in which the resistance is greater than 20 megohms. In other words, the use of the DC amplifier enables the loading on the circuit under measurement to be reduced by 10,000 times.

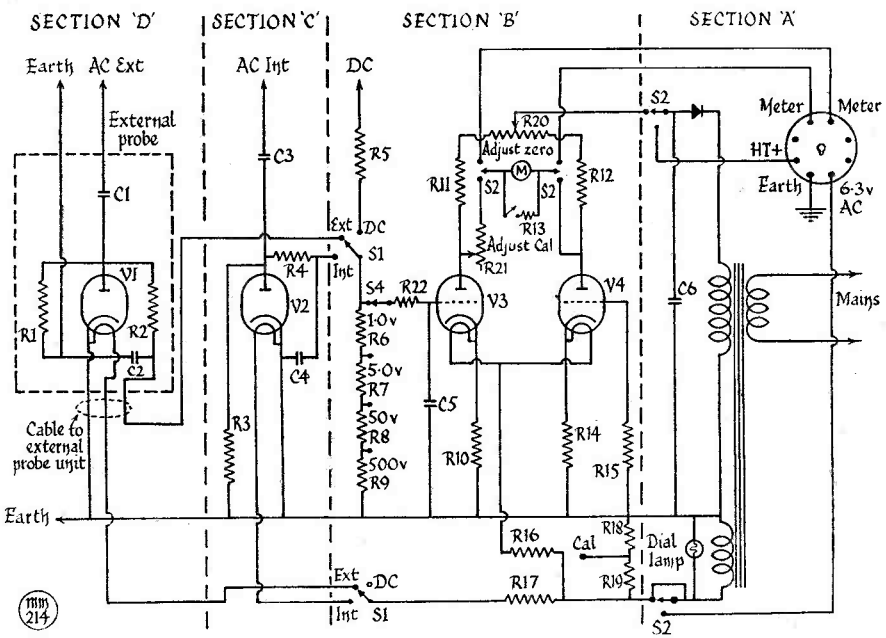
It is of interest to consider the significance of the term "DC Amplifier." If 1.0 volt is applied between the terminal "DC" and earth, then a current of less than 1/20th micro-ampere will flow, but this will cause a full-scale deflection of a 500 micro-ampere meter; this can then be regarded as the amplification of a DC current by 10,000 times.

It has already be said that the zero of the instrument is set by the "Adjust Zero" control R20; the stability of this setting is excellent once the instrument has settled down a minute or so after switching on, and is in a large measure due to the feedback across the cathode resistances of the valves. Another factor of importance in this respect is that the

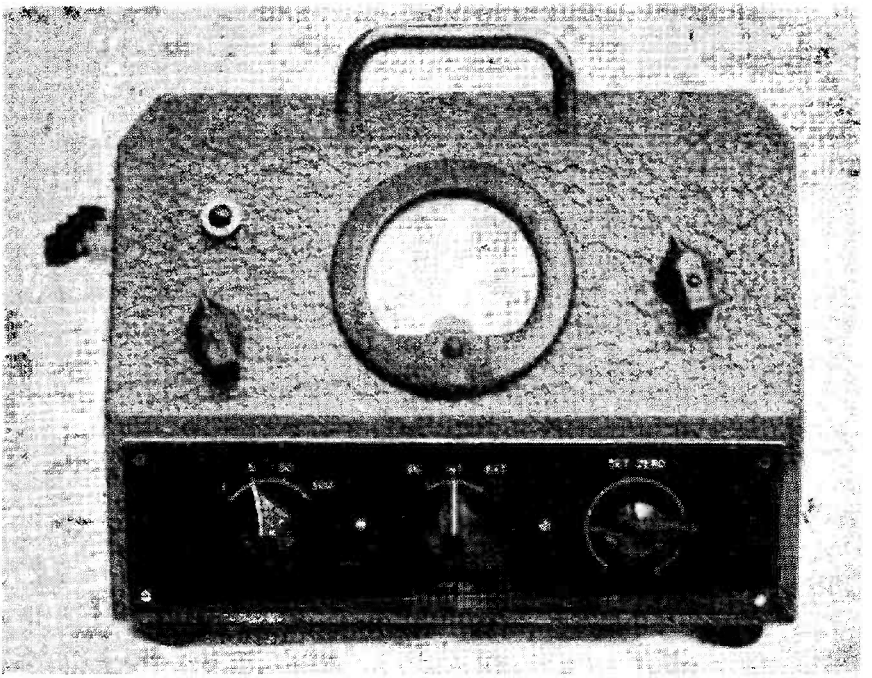
Table of Values

Fig. 1. Circuit complete of the Valve-Voltmeter.

C1 = .001 μF mica
C2 = .001 μF mica
C3 = .01 μF mica
C4 = .01 μF mica
C5 = .002 μF mica
C6 = 8 μF Electrolytic 350 Volt working
R1 = 6.6 Megohms. (two ½-watt resistances in series).
R2 = 9.0 Megohms. nominal (*See text*).
R3 = 6.6 Megohms. (two ½-watt resistances in series).
R4 = 9.0 Megohms. nominal. (*See text*).
R5 = 9.0 Megohms. ½-watt.
R6 = 10.0 Megohms. ½-watt.
R7 = 2.2 Megohms. nominal (*See text*).
R8 = 220,000 ohms. ,, ,, ,,
R9 = 25,000 ohms. ,, ,, ,,
R10 = 330 ohms. ½-watt.
R11 = 15,000 ohms. ½-watt
R12 = 15,000 ohms. ½-watt
R13 = 75 ohms. ½-watt (*See text*).
R14 = 330 ohms. ½-watt
R15 = 2.0 Megohms. ½-watt
R16 = 4 ohms approx. (*See text*).
R17 = 8 ohms approx. (*See text*).
R18 = 57 ohms. ½-watt
R19 = 330 ohms. ½-watt
R20 = 5,000 ohms. potentiometer.
R21 = 5,000 ohms. potentiometer
R22 = 3.3 Megohms. ½-watt
V1 = EA50 (VR92)
V2 = EA50 (VR92).
V3 = EF50 (VR91).
V4 = EF50 (VR91).
M = 0-500 Micro-ammeter.



Circuit complete of the Multi-Range Valve Voltmeter designed by G8OD. For simplifying the explanation, it is treated in sections.



Another view of the G8OD Valve Voltmeter ; all necessary details for its construction are given in the text, with notes on calibration.

valve heaters are run at a reduced rating of about 4.5 volts, the resistance R16 being used to drop the volts.

For measurements of voltages other than 1.0 volt a tapped potential divider is used, the tapping being selected by the " Range Switch " S4. The tapping points are selected in such a way that the DC amplifier input lies within the range of 0-1.0 volts whatever the applied voltage. The other ranges chosen are 5, 50 and 500 volts, which are very convenient for the meter scale used, since awkward mental calculations are unnecessary. The use of such decade steps can, however, be inconvenient in certain circumstances. For example, if a voltage of the order of 6 volts is being measured, then this is just too great for the 5-volt scale and yet gives only a very small deflection on the 50-volt scale. To cater for such cases, a meter shunt R13 is fitted which can be brought into circuit by the switch S3. This shunt has a resistance value exactly the same as that of the meter. and, when switched into circuit, halves the meter reading. Thus, in the example quoted, the 5-volt scale becomes a 10-volt scale and is suitable for measuring 6 volts. The meter used by the writer has a resistance of 75 ohms, and the shunt is, in fact, a 60 ohm carbon resistance which has been filed until it exactly halves the meter reading ; it could, of course, equally well have been made up from a length of resistance wire.

AC Rectifiers

To permit the measurements of AC voltages, some form of rectifier is necessary. In the interests of short connecting leads for use at VHF, it is usual practice to mount the rectifier unit in a probe, which is connected to the main instrument by a long flexible lead. This is a point on which the writer holds strong views. It has been found over a long period of use of such instruments that on the majority of occasions the

probe is unnecessary (in fact, it is usually something of a nuisance), either because the frequencies involved are not sufficiently high, or else because relative rather than absolute readings are required. There are two ways in which this can be got over—by the provision of a stowage for the probe unit within the main instrument case, or alternatively by having two recifier units—one in the main case, and the other in a probe which can be plugged-in when it is really essential. Since the components needed for the rectifier unit are very few, the latter solution is the better, rather than having to tackle the mechanical problem of providing a probe stowage. However this is a point on which the reader may have differing views.

At Section "C" is the circuit of the internal rectifier unit. It will be seen that a small diode of the EA50 (VR92) type is used in a shunt connected circuit. When an AC potential is applied to the "AC" terminals, then a DC voltage is set up across the load resistance R3, a proportion of which is tapped-off and measured by the DC voltmeter already described. The circuit calls for little comment except to note that the heater of the valve is also operated at a reduced value. This has been found very advantageous in ensuring constancy of calibration and zero setting of the instrument; the exact value is not critical, but about 4.5-5.0 volts appears to be optimum. The application of 500 volts to the valve certainly exceeds its rating, but the writer has experienced no cases of failure, although the instrument has been used for long periods on voltages of this order. The fixed condensers should be high quality mica-dielectric types, since even a very small leakage current will seriously impair the working of the instrument. The circuit of the external probe rectifier unit is at Section "D," and it will be seen to be identical to that of the built-in unit; advantage has been taken of the fact that as the external probe is used only at very high frequencies, lower values can be chosen for the condensers, thus facilitating compact construction. A switch S1 connects the input of the DC amplifier to either rectifier, or the "DC" terminal, and additional contacts switch the heater supply to the two diode valves. Of the resistances used in the rectifiers, the values of R1 and R3 are not critical, and nominal values can be selected in both cases; two resistances are connected in series to give the required value, thus avoiding excessive voltages across individual resistances. The AC calibration accuracy depends upon the values of R2 and R4, and the selection of these resistances will be given later under "Calibration."

Construction

Little need be said about the construction of the instrument, there being plenty of scope for individuality in this direction, except that it is desirable that the assembly should be built into a screened container, and that the greatest care should be taken with the insulation of components and wiring ahead of the grid of V3. The writer has found it very convenient to mount Sections "A" and "B" on a small sub-assembly and the remainder on the interior wall of the instrument case, using stand-off insulators where necessary. It goes without saying that the construction of the probe unit should be made as compact as possible, and, if care is taken, the internal wiring of this unit should be virtually non-existent. The writer has a strong inclination for a form of construction that permits the meter face to be inclined rather than horizontal or vertical.

Calibration

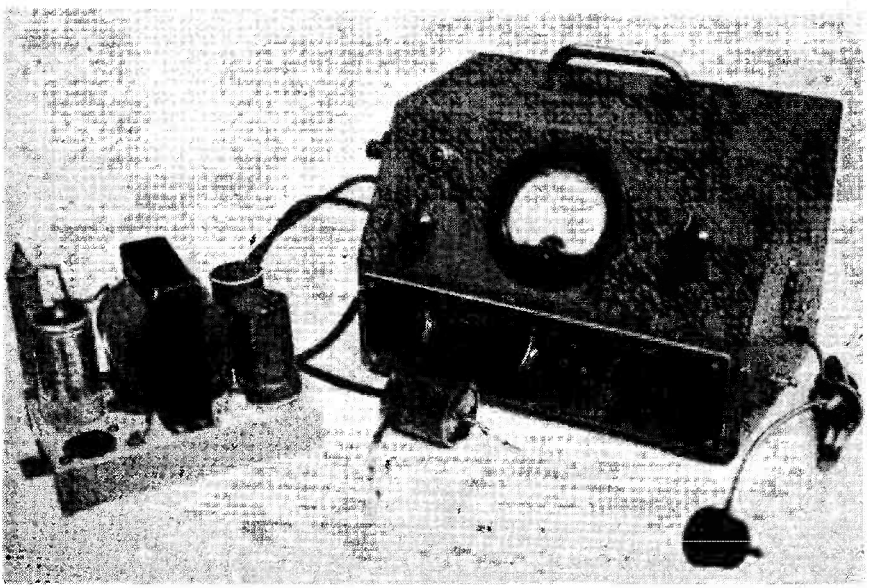
The calibration of an instrument is always a difficult matter to those whose resources are limited, since access to another meter covering the same ranges, and having an accuracy at least as good (preferably better), is an essential. However, even where this cannot be arranged, the reader should not be deterred from going ahead with the construction of a valve-voltmeter. First, as has been stated previously, a large proportion of the measurements made with such an instrument are concerned with relative rather than absolute values, and in such cases a valve-voltmeter covering a wide range is invaluable, even if uncalibrated. Secondly, if resistances are used of the nominal values of 5% tolerance or better, it is unlikely that measurements will be worse than 10% inaccurate, a figure that is very useful for anything but precision work.

It is assumed that the loan of a multirange meter can be obtained. This should be connected across the valve-voltmeter input terminals—that is, "DC" and "Earth." After allowing a few minutes for warming-up, the valve-voltmeter should be zero'ed as previously

described. With exactly 1.0 volt DC applied to the instrument, the "Adjust Calibration" control should be set to give full-scale deflection, the "Range Switch" being, of course, in the 1-volt position. Then, with exactly 5.0 volts applied, and the range switch in the 5-volt position, R7 should be adjusted for full-scale reading. This procedure should be repeated with R8 for 50 volts applied, and R9 for 500 volts. The method of adjustment (in the absence of a large stock of resistances of the nominal values) is to note whether the meter reading is too high or too low. If the former, then the value of resistance under adjustment is too high, and this is corrected by connecting a second resistance in parallel with it, the value of this second resistance being found by trial and error. If, however, the meter reading is too low, then the resistance under adjustment is too low in value, and it is corrected by adding a second resistance in series. This may sound a rather cumbersome procedure, but in practice, with a little patience and a handful of resistances from the junk-box, it does not usually take very long to arrive at the correct combinations. Having gone through this procedure for the resistances in the order R7, R8 and R9, it is as well to repeat a second time, as a check, since the later adjustments may have a slight effect upon the lower voltage ranges. Before going further, it is perhaps worth reminding readers that carbon resistances can be increased in resistance by a few per cent. by filing, but this should not be taken very far, otherwise the resistance will be weakened mechanically.

Coming now to the AC calibration, with 1.0 volt AC applied to the appropriate terminal "AC Int" or "AC Ext" and an AC voltmeter in parallel, the resistances R4 and R2 respectively should be adjusted to give full-scale reading with the range switch set at 1 volt. It is unnecessary to repeat the AC calibration at other voltage ranges, since these are determined by the potentiometer networks adjusted during the DC calibration.

As an aid to later calibration checks, a voltage of approximately 0.95 AC is available at the terminal marked "Cal" in the diagram, being derived from the potentiometer R18 and R19 across the heater supply. The reason for having



The Multi-Range Valve Voltmeter with its probe unit and power pack. It covers a wide AC/DC voltage range and, incorporating a DC amplifier, has a very high internal resistance.

a voltage of slightly less than 1.0 volt is to permit its use under conditions of high mains voltage.

During the period of warm-up the meter may go off-scale in either direction, depending on the inevitable minor differences of the valve characteristics before working temperature is reached. If this is the case, the meter can be protected by putting the switch S2 in the "External" position during warm-up and thereby cutting off the HT supply. It will be found that a readjustment of the zero setting is necessary on changing the settings of S1 or S4; this has not been found to be a serious inconvenience, although it could be avoided by using additional wafers on these switches to change the value of R11 or R12.

To readers unused to meters of this type, it is at first somewhat disconcerting to find that bringing the hand near the input terminals will cause a quite large deflection, if the meter is not connected to any external circuit. Similarly, under the same conditions the keying of a transmitter in the same room will cause quite large deflections! This is a natural consequence of the high input impedance of the meter, and is all to the good when making measurements.

Extending BC-455 Coverage

SUITABLE CONVERTER DESIGN

By **L. G. SPENCER (G4LX)**

WHEN recently designing equipment for portable operation on 7 mc and 14 mc, the BC455 Command Receiver was chosen for its light weight and compactness. This receiver only provided reception of 7 mc signals, and as 14 mc reception was also required, it was decided to follow VHF practice by using a crystal-controlled converter, feeding into the BC455.

The frequency range of the BC455 being from 6 to 9 mc, any crystal between 5 and 8 mc can be used in the converter in order that an input of 14 mc may be changed to a frequency within the range of the receiver. Fortunately, such crystals are lying in many junk boxes, and are also available cheaply on the surplus market.

For simplicity, it was decided to use triode valves in the converter, as shown in the circuit diagram. The oscillator consists of a conventional Pierce CO, the output of which is loosely coupled to the grid of the mixer valve by a short length of plastic-covered wire placed close to, or wrapped round, the mixer grid lead. The 14 mc input is fed into the mixer grid circuit, consisting of C1 and L2, a slug-tuned coil of 22 turns of 24 SWG enamelled wound on ½-inch diameter former. (The coil actually in use was removed from the receiver section of an SCR522 VHF installation). L1 is wound on top of L2 and consists of 3 turns of 22 SWG enamelled wire. Output is taken from the mixer cathode through a .001 μF condenser and a length of co-axial cable, to the aerial terminal on the BC455.

The crystal frequency selected was 7500 kc, and to cover from 14 to 14.4 mc, the BC455 is tuned from 6500 to 6900 kc.

Operation

To set up, the aerial is removed from the BC455 and attached to the input of the converter. The output of the converter is connected by coax to the aerial terminal of the BC455. The Command Receiver is then tuned to 6700 kc, the aerial tuning trimmer being peaked for maximum noise. C1 on the converter is next adjusted until a further increase in noise is apparent. On tuning the BC455 from 6500 to 6900 kc, 14 mc signals should be heard. Final peaking is then carried out by adjusting the slug-tuned coil L2.

Precautions

Breakthrough at IF had been anticipated, and precautions were taken from the outset to avoid trouble. The converter was constructed in an aluminium box, 4in. by 5in. The aerial was brought in through a co-ax socket close to L1/L2. The output was taken through another co-ax socket placed as far from the input as possible. All components were totally enclosed with the exception of the two valves and crystal, which projected on top of the box. As a result, IF breakthrough was rarely noticeable, and not due to the aerial in

any way. It could probably be eliminated completely by totally enclosing the converter in a slightly larger metal box, but this course has not proved necessary.

The 9002 heaters may be connected either in parallel or in series, depending upon whether a 6-volt or 12-volt supply is available. The HT to the converter should be from a 105-volt tap on the power pack, or direct off the BC455 HT supply through a suitable dropping resistance.

Once adjusted, the convertor can be left ready to connect up, and only a matter of seconds is needed to change frequency from 7 mc to 14 mc.

Table of Values

Circuit of Crystal Converter for the BC-455

C1 = 25 $\mu\mu$F, variable
C2, C5 = 100 $\mu\mu$F
C3, C4, C6 = .001 μF
C7 = .01 μF
R1 = 4,700 ohms, ½-w
R2 = 47,000 ohms, ½-w
R3 = 1,000 ohms, ½-w
RFC = 2.5 mH RF Choke
L1, L2 = *See Text*
V1, V2 = 9002

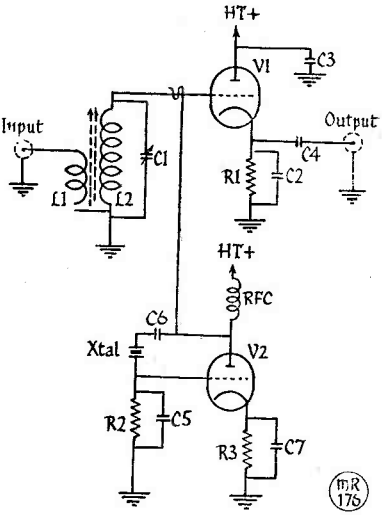


Fig. 1. Circuit of the converter suggested by G4LX, to extend BC-455 coverage into the 14 mc band.

TELCON TRANSMISSION FEEDER

The feeder line in use for the new Holme Moss TV transmitters of the BBC is Telcon Type AS.84.A1. Carrying loads up to 20 kW peak, BBC tests on a 280-yard length of this cable showed that, with correct termination, the SWR would not be worse than 0.98 over a 10 mc band centred at 60 mc.

★

ONE HUNDRED YEARS AGO

The first practical undersea telegraph cable, comprising four conductors insulated with gutta percha ("the hardened milky juice of the percha tree of Malaya") and protected by a steel wire armouring, was laid across the English Channel. Manufactured by The Gutta Percha Company, one of the parents of the Telegraph Construction & Maintenance Co., Ltd. (Telcon), their next triumph was the successful laying of the first Atlantic telegraph cable, in 1866. Specimen sections of this cable, together with models of the famous cable ships *Great Eastern* and *Colonia*, were on view at the recent Exhibition sponsored by our well-known contemporary THE MODEL ENGINEER.

XTAL XCHANGE

Here are the current offerings. Insertions in this space are free, and should be sent in to us in the form shown below.

G3FOO, 8 Withert Avenue, Bebington, Wirral Cheshire.
Has 100 kc bar, and 3640, 3660, 7009.5 and 8155.7 kc crystals. Wants frequencies 7025, 7050, 7060 kc, or near.

G3IEE, 39 Barnfield Avenue, Kingston-on-Thames, Surrey.
Has 500 kc bar, in 3/4-in. holder, and 3530, 3570 and 3580 kc crystals in BC-610 3/4-in holders. Wants same frequencies, or near, in ½-in. (FT243) holders.

G3IEW, 11 Gatling Road, Abbey Wood, London, S.E.2.
Has 7105 kc crystal. Wants 1755 kc, or near.

G8WP, Cranmere, 31 Lascelles Hall, Kirkheaton, Huddersfield, Yorks.
Has Q.C.C. Type P5 7025 kc crystal, with certificate. Wants similar certificated crystal 1850—1900 kc.

SWL, 82 Newland Drive, Scunthorpe, Lincs.
Has crystals, 4735, 4852.5, 5295, 5385, 5955, 6425, all in FT243 holders. Also 500 kc bar in 3/4-in. mounting and 1000 kc bar ex-Class D wavemeter. Wants any frequency crystals for Top Band.

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

FOR once there is no doubt about the News of the Month. It has already found its way round, by grape-vine and jungle telegraph, but there must be many who do not yet know the facts. In a nutshell, they amount to this: That GW3ZV and GW3FSP have been heard by ZL1AH, and that ZL1AH has been heard by GW3ZV, on the Top Band. It is also reported that G6GM has been received in ZL. The result of long-term planning, these Top-Band tests worked out very much as predicted, the times being just right.

As was expected, the 1800-1830 GMT period turned out best, and GW3ZV found himself obliged to come on 1900 kc, right in the middle of a local phone net, and call "CQ ZL" at 1800 on a Sunday evening. Many were the rude and frivolous remarks headed in his direction, but he has the satisfaction of having the last (and by far the loudest) laugh.

After last month's "Commentary" had gone to press, the times of the G/ZL tests had been altered to 0545-0615 GMT and 1745-1815 GMT, the ZL's calling for the first five minutes and the G's for the second—and so on. These times still hold good at the moment of writing.

GW3FSP was heard at RST-439, and GW3ZV on five occasions at strengths between S2 and S6, always in the evening (GMT). ZL1AH was logged by GW3ZV during a morning period, and the two stations did actually exchange reports, but as ZL1AH did not receive his report correctly (as verified on Twenty later), he is not claiming a QSO. Let us hope that a proper contact has materialised by the time this appears in print—although the most favourable season has now passed.

It becomes increasingly difficult to make radio history of this kind in these

Calls Heard, Worked & QSL'd

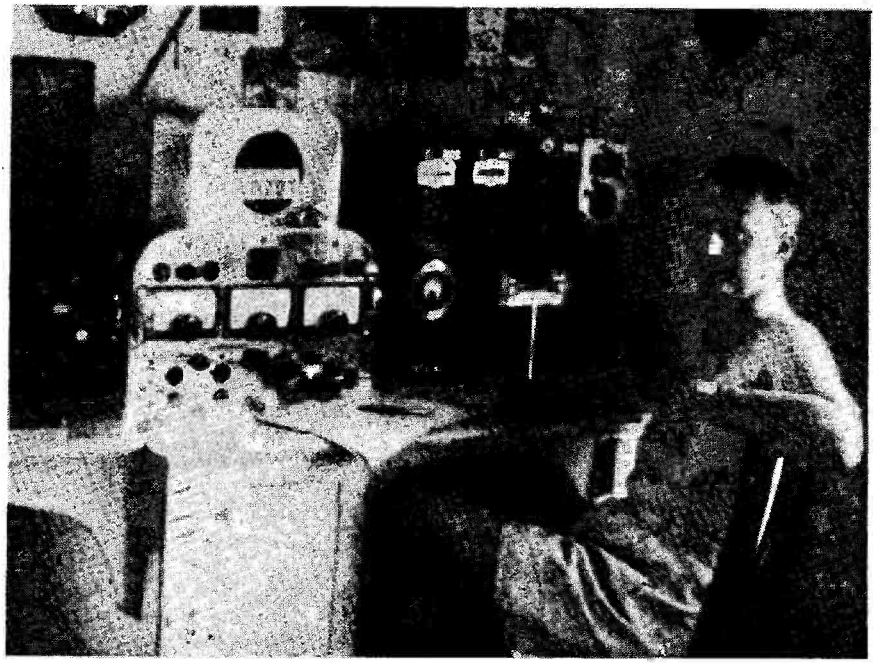
days of technical progress, but it must be admitted that these fellows have done it, and they are to be congratulated most heartily on their outstanding achievement, not to mention the endless patience and hard work leading up to it. The erection of the GW stations' aerial systems must have come in the latter category. GW3ZV's long wire, for instance, is of 1200 ft., runs across a small valley, and is 120 ft. above ground at the far end. His earth system consists of three six-inch copper strips, each 60 ft. long and buried at an unspecified depth! GW3FSP used three half-waves in phase. Although miracles can be achieved with a backyard-skywire on the HF bands, owners thereof can save their time and patience as far as ZL on the Top Band is concerned—they just don't work that way. As a final note, however, we may mention that ZL1AH has heard "an unidentified G station," so there are still hopes that others will be reported. We may have more news next month.

DX of the Month — Twenty

Nearly all the other DX news this time concerns the Twenty-Metre Band, so we will cope with that first, as usual. The conditions are still erratic, but, if anything, better than last month. Some very interesting stuff has been heard and worked.

Whenever G6ZO (Edgware) writes in he has something of more than usual interest. This month's trio from him are 8W4AF in Yemen (14070, T6, VFO), FD8AA and FB8BB. All three QTH's are in the panel. 'ZO also heard LA4QC (Queen Maud Is., Antarctica) but didn't raise him; he also missed out on LB5ZC (Jan Mayen) owing to the latter's propensity for W6's.

G3ATU (Roker) still increases his



VR2BT, Fiji, has a neat and efficient looking outfit, and is dressed for the climate. He is sought-after DX for most Europeans.

lead in the Marathon. On Twenty he added FB8BB, but was still more pleased to receive cards from ET9X, XU6F and C3JK, all of whom he had considered doubtful. He heard AC3SQ coming through quite well and working Europeans, but up came a "4X Clot," slap on his frequency, calling CQ AC3, obviously in a skip null and not hearing the DX at all. Ah, well . . . .

Nice ones from G3FXB (Hove) include FB8BB, FF8AG, HS1UN, PK4DA, VU2EJ and "the usuals." Gotaways were FK8AC, OX3PM, VP1AA, ZD1PW and 8W4AF. 'FXB says FB8BB was such a fight that his bug was sending FB8BB de G3FXB all on its own for long afterwards.

GM3EDU (Alexandra) is a new correspondent, who plunges straight in with EAØBH (Ifni), FF8AG, FY7YB, ZS3Q and other nice ones. He asks us to publish a list of the "untouchables" those who are not accepted by the ARRL for DXCC. We would like to, but the situation is obscure, since dates enter into it as well as prefixes. We know, for instance, that they won't take an OE card, although an MB9 or an FKS8 is OK. We also understand that HS and FI8 are "out"—but we have a feeling that some of these countries are out *only* for W stations, who are not allowed to work them, whereas we are still free to work all and sundry. We will try to clear the thing up in a future Commentary.

G8KU (Scarborough) goes about with a Beautiful Smile, having raised his 40th Zone at last, in the shape of FB8BB. Other new ones were 3A2AD and LB8CH (Jan Mayen). The latter does not work stations on his own frequency, and the mail boat has left for this year! GM3EST (Motherwell) is another happy one, having collected his 39th Zone with FI8RO; but his happiness is modified by the fact that he still has to find Zone 23. He has had QSL's from VQ8CB, HC2KB, PJ5FN and CT2BO, but very badly needs one from VP4TB for a 7 mc QSO.

Phone DX on Twenty

G3DO (Sutton Coldfield) proved that the Pacific phone DX was reliable by recording ZM6AA and ZK1BC and playing them back. Both stations received the recordings perfectly. 'DO had his beam aimed straight over the North Pole for this and other Pacific DX. Other phone contacts were with ZA1A, FR7ZA and FN8AD. The key brought in 3A2AD, PX1AR, 9S4RB and FB8BB for new ones. All very nice going.

G3GIQ (London, W.13) has been doing well, with CW QSO's with FI8RO and HS1UN ; phone brought him contacts with KG6AAE and KG6ABC on a day when most of the locals were bemoaning the absence of DX. These two KG's both appeared at S9 plus.

G3FPQ (Bordon) was a little peeved with FI8RO, who called "CQ F" in short bursts for twenty minutes before receiving a reply from an F station ; during the period he might have made a few others happy with short QSO's. 'FPQ worked KT1PU, OY3IGO, ZD1SD and ZS3E on CW, plus 3V8AJ and IS1BFJ on phone, and is now QRT until Christmas.

G5OQ (Tunbridge Wells) has used only Twenty during the past month, and collected HS1UN, ZD1SD, OY3IGO and others. He says South America has always been his weak spot, and he still needs his first CE after 20 years. 'OQ has compiled a list of countries *not* worked, and they amount to 129, so he feels he still has plenty of fun to look forward to. He has words to say about the thoughtless and unnecessary QRM caused on the frequency of stations like FB8BB. On one occasion an FA9 and a CN8 both called him, jammed each other out (although he replied to one of them) and had a break-in CW QSO on his frequency, ending up with *duplex phone*, still on the DX frequency. It's things like this that make us revive Clots' Corner every now and then . . . .

QRP note from G5OQ—nearly 20 years back he worked his first DX. It was AU1DF in Omsk, with 2 watts to a 2-volt valve in a CO, on 7 mc. G2JH, at the same period, worked 17 countries in one week, using 90 volts HT to a PM252. Could it be done now?

G3BDQ (St. Leonards) raised FB8BB and FI8RO for two new ones, others being VS6AE and 6CG, OQ5CP, CR7CD and VP9UU. An interesting one for G2HKU (Sheerness) was VK5DR on Cape de Coudie Lighthouse, Kangaroo Island. He also raised FQ8AE and was delighted to get his card from FG7XA (the new one).

EI4X (Clontarf) says he doesn't notice any contributions herein from the EI chaps, and so fills the gap. His best for the month were CR4AH, CR7AS, CX6AD, FP8AH, FQ8AE, HC9JW, PJ5TR, PX1AR, TA3AA, XZ2EM, ZD1, ZD2 and ZK1BC—and very good, too! He, too, tells us that XU6F QSL's with a very nice card and gives his QTH as "within 100 miles of Canton"—which, we suppose, is near enough.

G6PJ (Sheffield) wheeled in F3AT/FF8, CE7ZQ, ZC4XP, OQ5VD, 3A2AD and ZS's, ZL's, YI'S, KP4's and the like. He sends a long list of Gotaways, including some interesting calls, but space does not permit!

Ten-Metre Openings

Although we have missed them all

ZONES WORKED LISTING

POST WAR

Station	Z	C	Station	Z	C
Phone and CW			**cont'd.**		
G6ZO	WAZ	235	G3GUM	37	149
G6RH	WAZ	229	G2FYT	37	143
G6QB	WAZ	219	G3ABG	37	141
G3ATU	WAZ	211			
G3DO	WAZ	207	G2YS	36	135
G5YV	WAZ	205	G3CIZ	36	127
G8IG	WAZ	200	G2HKU	36	127
G2FSR	WAZ	196	G6TC	36	117
G4CP	WAZ	195	G2DHV	36	111
G2VD	WAZ	171			
G3BI	WAZ	162	GM3CVZ	34	107
G3TK	WAZ	157	G3HDA	34	103
G3AAM	WAZ	154			
G2IO	WAZ	152	GM3EDU	32	114
G3YF	WAZ	152			
G8IP	WAZ	144	G2BBI	30	101
G3AZ	WAZ	133			
G5BJ	WAZ	126			
G5VU	WAZ	124	**Phone only**		
G2AJ	40	205			
G5BZ	40	200			
G2WW	40	183	G8IG	39	170
G8KU	40	163			
G3FNJ	40	150	G2AJ	38	167
G3BNE	40	134			
G5MR	40	130	G3DO	37	164
			G6WX	37	135
G3BDQ	39	172			
G5FA	39	161	G8QX	36	139
GM3EST	39	158	G3COJ	36	134
G3FXB	39	151	G2WW	36	134
G2BJY	38	162	G2VJ	34	122
G3COJ	38	157	GM2DBX	34	114
G6QX	38	150			
G3FGT	38	148	G2BBI	30	98

ourselves, we gather that there have been some nice ten-metre openings. We did *hear* one (in the shack of G2AKQ at Ringwood), and it was like old times to find the American phone band full again. G3ATU rushed up "an inefficient push-push doubler thing" with about 40 watts, and worked, on phone, EK1, ZB1, FA8, ZC4, MP4K and W. Just like the old days, he says, especially those he missed . . . .

G3FXB finds ZS, PY, LU and the like quite consistent, with fairly frequent openings to other parts. CW on Ten included FF8AG, ZS3K, ZS6 and PY. G5JU (Birmingham) has put his total up substantially with sundry new ones on Ten—without a beam. He says the CW activity is increasing notably, but there are too many phones at the LF end of the band. G6QX (Hornchurch) confirms this, and is furious with a DL4 working phone on 28030 and saying: "I always use this frequency until the CW QRM gets too bad." As 'QX says, this sort of thing also reflects on the station working him, who should have made him move.

G3GIQ has found the Far East and Australia on the band in the mornings, and raised KG6AAC, who worked quite a few G's. Other contacts were with VQ4, SV, 4X, MI3, CE, ZP, LU and so on. The Gotaways are interesting enough to quote, as they inc'ude VK9GW MP4KAG, PZ1RM, HP1WM, XE, KR6, KZ5 and VK6. Yes—this is all on ten-metre phone! ZS7C has been very active, and often replies to CQ's from G's.

G2BW (Walton-on-Thames) remarks that the band has opened up well, and GM2DBX (Methilhill) hopes to get his score up near the 60 mark for the Marathon table.

The DX on Forty

For some reason the 7 mc band seems to have been a little neglected this month, but conditions have been quite good all the same. G3BDQ raised VS7NG and FA8RJ; G3ATU says things are not as good as they were this time last year, and only worked an SU.

G3FXB collected EA9, FA, KZ5, SU, VS7, 4X, VK and ZL. G5JU says Forty is the most interesting band of all at the moment, but doesn't approve of having to stay up so late to get the stuff.

G6QX, with one of the best lists for this band, worked CT2, EK, CE, MD2, SU, YI, TF, VU7FK, VP8AO and 8W4AF (Yemen). G5FA (London, N.11) brought in EK and IS for new ones, also ZC4, TF and some of the more usual stuff.

G2DPY (Shoreham) did well again, quoting ZL's, SU, LZ, MD2, TI2PZ and KS6PM—but surely the latter must have been KH6PM? He also heard HK, KZ5, CE, VP9, YK and JA, the latter being JA2DW at 0810 GMT. G2BW worked HV1AA on the band, and is naturally keeping his fingers crossed.

Eighty Metres

Very little DX interest is being shown in 80 metres, but it is nice to hear from G3FXB that he finds "the regular DX boys" most helpful in putting him through to the DX. One well-known type has even broken through on occasions with useful information—unsolicited. G6QX added to his score with ZB1BJ, and GM3EDU was delighted to work VQ4CM, and wonders whether it

Man at Work—or is he? Composing the lead for "DX Comentary" before the rain came down again.

DX QTH's

CR5AD	Box 206, Bissau, Portuguese Guinea.
FB8BB	M. Loubet, Boanamary, nr. Majunga, Madagascar.
FD8AA	M. de Tugny, Box 185, Lome, French Togoland.
PJ5RE	QSL *via* W8NKU
ZS3E	Box 4, Orange Mouth, South West Africa.
8W4AF	Director of Harbourage, Port of Mocha, Yemen.

When GW3ALE (not the sufflx) was in India, he had the appropriate mugs suitably embellished for some of the Cardiff boys—the calls are GW3ALV, GW8NP, GW3ALE, GW3BZH and GW3CAY.

might have been the first VQ4/GM contact on Eighty?

G3FPQ has received a QSL from 3V8AB, whom he worked some time back when running 3 watts to a Hartley oscillator—good going for Eighty. B2BJY (West Bromwich) has been exclusively on this band for two months, and has had some night sessions. He has found conditions for USA poor, except for occasional openings, but VE's have been slightly better. Several ZL's have been heard around 0745, but weakly. In two months on the band, G2BJY has worked 28 countries.

GW3HHO (Swansea) collected EA4CR, CT1BV, SL1BD, VE1KM, some 9S4's and other Europeans—all with 25 watts.

Otherwise there's no direct news about 3.5 mc, although we happen to know that VQ4, VK and ZL contacts have been almost commonplace and that some W's and VE's have been worked on phone during the small hours. Conditions on the band should be even better next month.

News from Overseas

SU1FX reports a change of QTH which has put him off the air for the time being. He was hoping to come back with a nice new rig, but things may well be different by now. Unfortunately, someone is celebrating his absence by using his G call. 'FX says they are hoping to put at least one SU station on the Top Band this coming winter.

W8NBK (Dennison, Ohio) is practicolly bursting blood-vessels for a VQ6 card, so should this catch the eyes of MD4BPC or VQ6N—or of anyone who knows their present QTH's—please do something about it.

GW3ALE is being continuously frustrated in VU-land by the refusal of the authorities to grant him a licence. "The matter is still under consideration . . ." after months and months. He may shortly be going to VS1, though, and will find things easier there.

W2WC (Brooklyn) sends in a Marathon score, and details of his aerials, but has not been very active. He is looking forward to the Top Band tests.

PJ5RE (Aruba) says he is a regular and interested reader, and much regrets the QSL situation out there. None of the PJ stations are licensed, but the

Government apparently approve, and it should not be long before things are straightened out. '5RE has lots of outgoing cards from the PJ boys which he can't send out because of not having the QTH's. He also handles many ingoing QSL's, about which there is no difficulty. We certainly hope to hear that the PJ's are in the clear before long.

VS2CP (Johore) is off on leave to Australia, where he says he *may* be on the air with a VK2 call. But he has every intention of returning to the air *somewhere* with a super-compact band-switching job.

For the record, here is the gen. on the ZL licences, direct from ZL2ACO (Palmerstone North). On Forty they have CW from 7000 to 7300, and Phone from 7051 to 7200. On the Top Band they are allowed CW or Telephony between 1900 and 1925 kc. Other bands, of course, remain as before.

The Northern Rhodesia QSL Bureau is now being run by VQ2HW, whose QTH is Box 199, Livingstone. The old Box 27 at Kitwe is in other hands, but cards will be forwarded.

LA2UA (Stavanger), though off the air himself with a rebuild, sends news of HS1UN. There are two operators, the one on Phone being Ted Robinson from Belgium, and the one on CW being a PAØ who also used to operate from Greece. HS1UN has been on crystals, but LA2UA made him a VFO and took it out there (he flies to VS6 once a month!) 'UA will be happy to take QSL's out to Bangkok, as he is paying another call in November. He also wishes to be remembered to all his friends in this country, and he hopes to be on by Christmas with a completely new station and some big aerials.

If perchance you happen to be wanting VQ1 (!), we have it *via* G6KC that for about 10 days from November 24 VQ4RF, W5HBM and VQ3PBD will be in Zanzibar signing VQ1RF and VQ1PBD (also possibly yet a third call) on 10, 20, 40 and 80, CW and phone.

VS7GQ (ex-G3EGQ) of Negombo, Ceylon, writes to say that he will be on 14 mc shortly, and looking out for G contacts, in particular with stations in the Bournemouth area.

Miscellany

G3GVY (Buxton) speaks up in favour of a Three-Band Marathon (he would like to see 28 mc dropped out). He also asks for a few tips on How to Interest the XYL in Radio—can anyone oblige?

G5YH (London, W.4) reminds us of a rather malicious series of definitions published in pre-war days, in which he played a considerable part. Having regard to post-war conditions, he now suggests the following:—

"My frequency": A frequency on which I want to transmit, but which turns out to be occupied.

"Clear Channel": Seven stations on the same frequency.

QRM: Thirty-seven stations on the same frequency.

DX: Station to whom one is deferential, owing to his unknown prefix (possibly a pirate on the other side of the town).

QSY: I will go up (or down) without listening, and settle on someone having a QRM-free QSO.

/P: Lorry-load of commercial gear topped off with beam mounted on overhead-wire repairing gear.

S9: S6.

T9: Nearly DC signal, with bad key-clicks and a substantial chirp.

"Snappy Operating": Sending too fast and rather badly on an ill-adjusted bug.

[over

FOUR BAND MARATHON

(STARTING JANUARY 1, 1951)

Station	Total Points	3.5 mc	7 mc	14 mc	28 mc	Countries
G3ATU	274	27	87	149	11	155
G6QB	250	21	65	134	30	152
G3FXB	246	26	78	128	14	140
G5JU	244	29	63	115	37	126
G5BZ	243	21	58	148	16	152
G6QX	236	37	78	102	19	121
G5FA	199	15	71	106	7	117
G3ABG	189	22	64	80	23	102
G2AJ	185	17	44	101	23	112
GM2DBX	164	1	30	91	42	101
G2BW	158	14	35	91	18	99
G8KU	149	16	28	96	9	101
W2WC	148	22	35	84	7	91
G8IP	133	12	50	63	8	86
G6TC	133	13	36	69	15	74
G3COI	107	19	18	68	2	75

(Note that new entries to this table must not include QSO's dating back more than two months from the time of entry. Regular reporters should send in their score month by month—three months' failure to do so will be taken to indicate loss of interest and the score will be deleted).

G6AT (Hampton Hill) will shortly be leaving those parts for Birmingham, and doesn't know when he will be able to get on the air again—but he *will* be concerned with a certain 15 kW frequency-modulated job, if that's any consolation.

G2JD (Ipswich) read VS6HR's appeal to stations in the Ipswich area, and will be delighted to work him—provided it is on ten-metre phone, which doesn't seem likely just yet. 'JD says if anyone thinks he can operate on Twenty during TV hours from Ipswich, he would be delighted to have a demonstration.

GM2DBX (Methilhill) has received his card from PX1A (for a contact last July). EA3FL and EA3HE were the operators, and all was delightfully legal and straightforward. Good news for others, we hope.

G8IG (Bromley) leaps straight to the head of the WAZ Phone list with his phenomenal score of 39Z and 170C. As a matter of fact, G2AJ told us that 8IG has worked 40 Zones on phone, but perhaps he is only counting those that are confirmed. His method of working Zones 17, 18 and 19 on phone, we are told, involved the learning of a new language . . . .

G3HKX (Bexleyheath) hopes to take part in the Top-Band Trans-Atlantics, although he has to acquire an /A licence to do so, as his own aerial facilities are not good enough. He describes the Top Band as "the one civilised band below 420 mc," and is appalled at the thought that country-chasers are at liberty even there. As he puts it, "Hello, pse QSL, good-bye for ever" is not *his* idea of Amateur Radio.

T. Sanford, an SWL from Liverpool, gives an amusing account of an Italian station's unmodulated carrier which drifted and jumped a matter of 20 kc for a long period; eventually a call-sign was heard (almost submerged by hum) and then several minutes of aimless whistling, monologues and drifting. We are suffering more and more from this sort of thing on Twenty—even in the CW band. If only some Governments would do a bit of monitoring—and take action on the results thereof . . . . It seems there must be many countries where a licence cancellation, or even a pink ticket, are unknown.

G3DRN (London, S.W.20) has some pretty acid remarks to make about operating standards. He says: "Ignoring the well-known character comedians on the phone bands, what of some of the alleged CW stations to be heard?" He starts with those who, "after sending the commencing signal KA about six times, continue with a long stereotyped QSO at about 8 w.p.m., during which time the bored listener has had time to knit a pair of socks. At the end of the QSO the whole time-honoured formula must be laboriously carried out . . . . "

He continues: "How about a campaign to increase the *proper* use of AR, K, KN and SK, to make the Morse a little snappier and to encourage the use of BK?" And he refers to a G who called him after he had called a W3, and tried to QSO, with Morse so bad that he literally couldn't read it. He signs off with "Chaps using these foot-operated keys at 5 w.p.m. must not feel insulted if I'm rather curt to them." We agree on the whole; there is lots of good CW about, and some really outstanding stuff, but there's much more that wouldn't even pass the GPO test at 12 w.p.m.

The Thing

Three different readers, G2HKG, G3EHT and G3GRI, all write to complain about a shocking display of deliberate interference with their 80-metre phone. This was the usual manifestation of an unmodulated carrier-wave, broken into occasionally by some whistling at a carbon mike. They seem to have shown exceptional patience, apparently staying on the same frequency for an hour and twenty minutes while The Thing performed its antics. Perhaps the reason why there are not more complaints of this sort is that most folks would QSY promptly and leave The Thing wasting its time!

G3ESP (Pontefract) asks why we are

MORE AERIAL SYSTEMS

G5FA:	7 *mc*, Dipole, SW-NE, 30ft. sloping to 25ft. 14 *mc*, Folded Dipole, N-S, 30ft. sloping to 16ft. 28 *mc*, Vertical Folded Dipole.
G3AMM:	67ft. top with 33ft. phasing stub half-way, and 18ft. 600-ohm feeder. Works on all bands from Two to 160.
GM3EDU:	138ft. VS1AA, 10 deg. E. of N. and 30ft. high.
G8KU	33ft. Windom and 14 mc dipole.
W2WC:	132ft. NE/SW, end fed, all bands. 7 mc Ground-plane 28 mc Folded Dipole.

always slating British pirates but showing sympathy for "Under Cover" stations in other countries. The answer is simple: A pirate is a man in a country where they *do* grant licences—but he can't or won't get one, so he uses someone else's call-sign. An under-cover man is usually far from home, in a backward country that refuses to issue a licence because it doesn't know the form. He is unable to control an urge to get on the air, and he starts up—often at considerable risk. Sometimes he is the only genuine representative of that country. Can you wonder that we have a certain admiration for him—and nothing but contempt for a pirate in a country where licences are obtainable?

Talking of pirates, we said once that we would have no more of this business of airing complaints in these columns, which are supposed to be devoted to DX matters. No more, please, but as we have received them we will mention complaints from G3HCU (Chiddingfold) and G2FUF (London, E.17), both of whom are victims of call-sign appropriation.

G5BZ (Croydon) is still QRT with his shack full of paint-pots and cement, but hopes to be on before this is published. He has found it enlightening but rather tantalising to be an SWL for a month or two. G3GUM (Formby) has completed his rebuild on the receiving side, and is now at work on the transmitter. He has already raised some nice DX in the course of testing. 'GUM says he finds the aerial data most interesting, and comments on the fact that the "top-notchers" are not using beams or elaborate arrays, but mostly long wires. He was also overjoyed to receive the card that gave him his Hundred Confirmed in the first twelve months' working—since increased to 105.

Top Band

Little news here, apart from the ZL story, but W1BB writes to say that the forthcoming *Short Wave Magazine* Trans-Atlantics will be well organised and publicised over there this time; he is making a personal trip to Canada to have a talk with VE1EA on the subject, and he says also that W4NNN/Ø is busy getting ready for the Tests.

All those wishing to take part in these Tests—starting on December 16, and the second in the series—are invited to apply to our office for a copy of the schedule and log forms, giving full details of dates, times and frequencies. It is only necessary to send a card marked "Top Band Test Schedule, Please" to the Circulation Manager, enclosing a large stamped addressed envelope. To prevent delay or confusion, please keep the request quite separate from all other correspondence.

G3IDG (London, S.W.12) writes after his first three weeks of activity—all on the Top Band—and has been delighted at the way he, as a beginner, has been treated "with the utmost tenderness and consideration." He has been a keen SWL on the band for years, and has already worked a GM, at 350 miles, with his 66-ft. aerial.

In this photograph are (standing) left to right: G6AB (a well-known Top Band man); G2AJU (a leading QRP exponent), and G2HKU, who is also very successful with QRP DX. Seated left is G4FN, who is a DXCC member and a winner of the FOC's annual marathon contest.

And that seems to be about all the news for this time. The next two deadlines are **first post on November 14 and** *December* 10. Please note the latter date now—it is advanced considerably because of Christmas, and comes immediately after the appearance of the December issue. Put it in your diary and log book to make sure of getting your news in for the first issue of 1952!

Until next month, 73, BCNU and Good Hunting.

ABSTRACTS OF INTEREST

CURRENT TECHNICAL DIGEST

Each month we present brief references to useful practical articles appearing in the overseas radio press. These publications can be obtained on a sterling subscription basis on application to: Gage & Pollard, Publishers' Agents, 55 Victoria Street, London, S.W.1. We are informed that single copies of the periodicals mentioned can NOT be supplied.

RADIO-ELECTRONICS, *June 1951*

An unusually compact and well-designed CW transmitter covering four bands (3.5, 7, 14 and 21 mc) is described by I. Queen. Embodying a completely screened VFO unit, the entire transmitter is built on one standard chassis and panel, suitable for rack mounting. A 6AK5 oscillator in the 3.5 mc band drives a 6SJ7, followed by a 6V6 in a broad-band stage, with an 807 in the PA. The final power-supply is not incorporated, but everything else is in the one assembly, which runs with an input of about 50 watts. The VFO is a Clapp, and apart from its directly-calibrated slow-motion dial on a very open scale, there are only two other tuning controls. A Pi-network for aerial coupling is also incorporated.

RADIO & TELEVISION NEWS, *August 1951*

Details are given of the tests carried out by Hams Associated, of Albuquerque, New Mexico, on the two-metre band. They launched a free-flight balloon carrying an automatic transmitter providing MCW signals on 143.9 mc, keyed at slow speed. Battery life was expected to permit operation up to 24 hours, during which time the balloon was to have ascended to 50,000 feet, drifting across the U.S.A. in a north-easterly direction and passing within range of many of the larger cities. These tests took place on August 11, and results are not yet available.

QST, *July 1951*

W1FTX describes a transmitter, using an 813 PA, which, it is claimed, is TVI-proofed with the minimum of trouble and complication. The writer takes the sensible line that good screening must come first, and that all such details as harmonic traps are wasted until the screening is completely efficacious. When the latter state has been reached it is often found that no further precautions are necessary. Screening also implies filtering of all inputs and outputs and extends, naturally, to all leads entering the transmitter and linking one unit to another. The transmitter is simple in conception, a 6AG7 taking its input from an external VFO or running as a crystal oscillator. A 6V6 doubler follows, driving the 813, which also has a 6Y6 clamper valve in its grid circuit.

CQ, *June 1951*

The scientific side of kite-flying is described in some detail by J. Conklin, who gives very full details of a box-kite 49ins. by 36ins. This, it is claimed, should rise to 400 feet with an aerial of No. 22 gauge wire—a useful device for experimental work on the Top Band or even for Field Day use. Particulars are given of the technique of flying the "skyhook," even down to the types of knots recommended and the kind of cement to use in construction.

RADIO-ELECTRONICS, *August 1951*

A double coupler for matching the transmitter to all kinds of aerial systems is described by W6HI. Intended primarily for low-power work, *e.g.* mobiles, the idea can be adapted to any transmitter. The unit consists of the output tank of the transmitter, link-coupled to a Pi-network. The anode of the PA and its HT are fed into one side of the unit, and the aerial, feeders, counterpoise or earth connection into the other. It is claimed that any type of radiating system (voltage fed, with or without feeders, or with a Windom feed, current-fed with centre-feed, or any odd length of wire) can be made to resonate with the minimum of trouble, thanks to the ingenious system of internal connections and links.

QST, *August 1951*

An unusually versatile instrument, described as a "Vacuum-Tube Voltmeter/S-Meter," is described by W1DBM. Intended for all sorts of jobs concerned with receiver testing, this meter can be tapped on to the AVC line to serve as a properly-calibrated S-meter, or can be used for trouble-shooting of almost any kind. It can also serve as an auxiliary power supply giving stabilised outputs of 150 and 250 volts and an unstabilised output of 300 volts at 70 mA. Although its overall dimensions are only 5ins. by 6ins. by 9ins., this very useful instrument will measure AC and DC up to 1000 volts and has current ranges from 1 mA to 1 amp. Full details are given of an excellent method of calibrating the S-meter.

RCA REVIEW

J. H. Nelson, an RCA engineer, whose remarks are quoted in *Radio-Electronics*, June 1951, has evolved a theory that magnetic storms which upset radio communication are directly related to the the positions of the planets. He states that sunspot numbers or sizes are almost meaningless; the determining factors are the *type* of sunspots, their age and activity. From intensive studies Nelson has concluded that planetary movements disturb the sun, which in turn disturbs the earth's electro-magnetic conditions. The claim is made that major disturbances may now be predicted two years in advance, and that "radio weather" in general may now be forecast with an accuracy of 85 per cent. or better.

NEW QTH's

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

G2BBH S. Park, 11 Church Lane, Clayton-le-Moors, nr. Accrington, Lancs. (*Tel: Accrington* 4718).

G2BZA E. L. Hunter, 111 Church Road, Hayes, Middlesex.

G3CFG R. S. Lancaster, 128a Station Road, Harpenden, Herts.

G3DBP Nottingham University Radio Society, Union Room, University, Nottingham.

G3EDS K. G. Perkins, 27 Woodville Road, Boston, Lincs.

G3FPY J. E. Dew, c/o 25 North End, Calne, Wilts.

GM3GAB Q. Kirker, 24 Rosslyn Avenue, Rutherglen, Glasgow.

G3GRE F/Lt. A. F. Jacobsen, 11 The Avenue, Knaresborough, Yorkshire. (*Tel: Knaresborough* 3008).

GM3HAM Edinburgh Amateur Radio Club, c/o 56 Elm Row, Edinburgh, 7.

G3HKX/A Station at Baldwyn's Park, Old Bexley, Kent. (*QSL to G3HKX*)

G3HMY G. Wheatcroft, 27 Lower Wear Road, Countess Wear, Exeter, Devon.

G3HNB L. E. Maund, 152 New North Road, Islington, London, N.1.

G3HNJ F/Sgt. J. Clennell, 56 Airmen's Married Quarters, R.A.F. Station, Locking, Weston-super-Mare, Somerset.

G3HNP Cpl. A. Edwards, Cpls' Club, R.A.F. Station, Locking, Weston-Super-Mare, Somerset.

G3HOC P. E. Wilson, 37 Woolwich Road, Bexleyheath, Kent.

GW3HOJ R. Holbrook, 10 Ormsby Terrace, St. Thomas, Swansea, Glam.

G3HPR L. A. Jackson, 4 Abel Close, Hemel Hempstead, Herts. (*Tel: Boxmoor* 76).

G3HQD A. E. Morton, Bath House, Dryden Street, Barrow-in-Furness, Lancs.

G3HQH H. Froggatt, 28 Lea Street, New-Mills, Stockport, Cheshire.

G3HQO J. Olive, 38 Northbrook Street, Newbury, Berks. (*Tel: Newbury* 324)

G3HQP L. S. D. Christian, 20 Kingsway, Coney Hall, West Wickham, Kent.

G3HQX J. Brodzky, 25 Gayville Road, Battersea, London, S.W.11. (*Tel: BAT.* 4690).

G3HQY P. R. O'Connor, 73 York Road, Guildford, Surrey.

G3HQZ G. Croysdale, Dunboyne, Frimley Green Road, Frimley, Aldershot, Hants.

G3HRK D. F. Willies, The Wilderness, Grove Road, Holt, Norfolk.

G3HRL H. R. Lemon, Windlesham, Crowborough, Sussex.

G3HRN D. L. Wright, 26 Stafford Road, Newport, Shropshire.

G3HRP T. J. Wright, 236 Queensway, Ashby, Scunthorpe, Lincs.

G3HRV W. A. Gardner, 38 Brackley Street, Walkden, Manchester, Lancs.

G3HRW R. Hunt, Acle Station, nr. Norwich, Norfolk.

G3HSD C. A. M. Blizzard, 25 Howard Road, Southville, Bristol, 3.

G3HSI H. S. Roberts, 93 High Road, Arrowthwaite, Whitehaven, Cumland.

G3HSK L. Seaton, 8 Croft Road, Sutton, Surrey.

G3HSM W. J. Mason, 39 Victory Road, Clacton-on-Sea, Essex.

G3HSN T. Preece, 53 Gloucester Avenue, Northampton, Northants.

G3HSS H. J. Smith, St. Martins, Locksheath Park Road, Locksheath, Southampton.

G3HSZ H. Ferguson, 29 Victor Street, York.

G3HTA J. D. Forward, 67 Mount Pleasant Road, Exeter, Devon.

G3HTB M. P. Squance, 14 Bendigo Road, Dewsbury, Yorkshire. (*Tel: Dewsbury* 1988).

GM3HTH J. N. Sinclair, Glengarth, 10 Ronald Street, Lerwick, Shetland. (*Tel: Lerwick* 276)

G3HTI H. Watson, 19 Hinkler Street, Cleethorpes, Lincs.

G3HTQ F. J. Burbridge, 59 Herbert Road, Rainham, Gillingham, Kent.

G3HUB M. E. J. Harrison, Old School House, Sherbourne, nr. Warwick. (*Tel.: Barford* 215).

G3HUB/P M. E. J. Harrison, 32 Springfield Park Avenue, Chelmsford, Essex. (10*m. radius*).

GM3HUN W. F. Hunter, 7 Haugh Park, Longstone, Edinburgh, 11.

G3IAS A. M. Smith, 21 Hamsey Green Gardens, Warlingham, Surrey.

G3IDG F. A. Herridge, 95 Ramsden Road, Balham, London, S.W.12.

G3IFC A. Benstead, 47 Parsons Lane, Alford, Lincs. (*Tel:* 3185).

G3IMI A. E. Harrowell, 78 Hamilton Crescent, South Harrow, Middlesex.

CHANGE OF ADDRESS

GC2AGP W. H. Nuttall, The Moorings, Grande Havre, Vale, Guernsey.

G2AHH G. Handley, Tan-y-Graig, Tremeirchion St. Asaph, Flintshire.

G2BCB E. A. L. Barrall, 42 John Kent Avenue, Colchester, Essex.

G2CBN J. W. J. Tyrrell, 30 Hamilton Road, Hayes, Middlesex.

G2FFO R. Johnson, 10 Rosehill Avenue, Burnley, Lancs.

G2HR E. Johnson, 35a Woodland Road, North Chingford, London, E.4.

G2YS J. W. Swinnerton, Manor Croft, Quarry Lane, Christleton, Chester. (*Tel: Chester* 35795).

G3AZO C. J. Veale, 13 Lydford Park Road, Peverell, Plymouth.

G3BHZ A. Hickling, 15 Watery Lane, Upper Welland, Malvern, Worcs.

G3CEU N. F. Wilshire, 56 Chilvers Bank, Baldock, Herts.

G3DC F. E. Woodhouse, 125 Hadley Road, New Barnet, Herts.

GM3DOC C. H. Robertson, 20 Kelvingrove Street, Glasgow, C.3.

G3DOZ J. D. Smith, 7 Parkfield Crescent, Feltham, Middlesex.

G3FMI E. T. Wilson, Hathaway, Grove Road Great Mollington, Chester.

G3FXC A. H. Watts, 14 Grange Crescent, Hooton Green, Hooton, Cheshire. (*Tel: Hooton* 3413).

G3GEJ L. M. Airey, 12 Springwell Terrace, Darlington, Co. Durham.

G3GVA J. A. Bratby, 56 The Hopping Stones, Hilmarton, nr. Calne, Wilts.

G3GVA/A (*QSL to G3GVA*).

G3HBG K. M. Bearcroft, 56 Gordons Way, Oxted, Surrey.

G3IDM D. P. J. Mead, Hamsdene, Hillcrest Avenue, Chertsey, Surrey.

G4QK J. B. Roscoe, 37 Wordsworth Road, Harpenden, Herts.

G6DY C. Keith-Murray, 2 Walrond Road, Swanage, Dorset.

G6ZP J. G. Ross, 68 Geraldine Road, Malvern, Worcs.

VHF BANDS

Excellent Conditions Late in The Season—

Many Good DX Contacts on Two—

New Progress on Seventycems—

Station News and Reports—

Movement in the Achievement Tables

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

SO many contacts in the 500-600 mile range have been made during the past month that it has become quite impossible to keep pace with the calculating of distances for the Marathon Table for Two Metres, and your conductor must therefore start by apologising for some omissions from that Table this month. It is hoped to catch up on things by next time, and in order to assist in keeping this record right up-to-date it would be appreciated if all who wish to make claims for the DX Marathon would send such claims *immediately* they arise, and not wait for the "latest" date; a post-card will do. The point is that there is a good deal of checking and calculation to be done; and it would help if this could be avoided during the period when "VHF Bands" has to be prepared for press.

The best contact we can spot amongst the many good ones is that between G5YV (near Leeds) and F8MG (Meachon, near Bordeaux). According to the latter, the distance involved is 1079 km, which comes to 670 miles, but your conductor only makes the distance 620 miles. Admittedly, the exact QTH of Meachon is not known, but it is in the Gironde and, according to the map supplied by F8MG, is on the coast. The most southerly coastal point of the Gironde is only 630 miles, and Bordeaux is just less than 620, so unless further evidence arrives we are listing this new record at 620 miles—and in any case congratulating G5YV and F8MG on an outstanding performance. This contact was made on October 9 at 1845 GMT. Another excellent QSO was that between G3EHY and OZ2IZ on phone over a path of 580 miles. G3EHY thinks this is probably a European record for a phone contact. Many other stations worked OZ2IZ, particularly on the night of October 8, when his signals were peaking up to S7, even in the Isle of Wight. However, G3FAN was no luckier than G2XC or G3BNC in attracting his attention.

The VERON Two-Metre Contest produced a high level of activity over two week-ends and coincided during its opening hours with a really excellent spell of conditions. Many contacts were made with DL by those who stayed up until 0100 BST to be in at the start, and EI2W achieved an excellent 455-mile phone QSO with ON4BZ. Some of the scores claimed by participants in this Contest are given elsewhere in this piece, and we want to thank those who sent copies of their entries in to us, as requested. How many G's did enter seriously is not yet known, but it appeared during the actual event that only a very few of those exchanging numbers were actually in the Contest. A number of non-competitors have, in fact, sent us a copy of their logs, but these cannot, of course, be shown in the list herewith. GW5MQ made seven contacts in the 15-point zone, his best being the 525 miles to DL4XS.

Auroral Session

As if these outstanding tropospheric conditions were not enough to satisfy the most ardent VHF enthusiast, a short burst of auroral reflection effects occurred in the middle of the month. At 2215 BST on September 25 G4LX (Newcastle) was in contact with GM3EGW on a regular schedule. Signals were T9. At approximately

In that hen-house on Rivington Pike, with G3BKS (left) and G2HGR operating G2BTO/P. This was an enterprising effort which gave very encouraging results, as reported in recent issues.

2230. GM3EGW's signals suddenly sounded hollow (like W6 on the DX bands). In spite of tests, however, no auroral reflections could be obtained from the North. At 2305, GM3EGW's note went abruptly to T5. The QSO was just finishing, and G4LX's beam was aimed about west of north. Several T2 to T5 notes were heard in the Scottish zone, but could not be decyphered, the modulation being unreadable. At 2315, G4LX called CQ, and GM2FHH (Aberdeen) came back at RST576 and reported G4LX as RST582. Contact was quickly lost. At 2320 there were several S9 T2 phone signals between 144.9 and 145.3 mc. GM3BDA and GW5MQ were received on CW with auroral notes. By 2325 conditions were normal. G4LX and GM2FHH were both heard by SWL Towgood in Bournemouth at 2319 at T2. G3CYY (Newcastle) saw the aurora and reported that it reached its peak intensity at about 2310 BST.

Other news of the auroral session comes from G3EHY (Banwell), whose signals were logged by GM2DRD (Forfar) at RST562, with the beam at Forfar looking north. It is also understood that GW5MQ was hearing signals from G4HT while beaming north.

TWO-METRE REPORT

Starting in the extreme south-east, G5MR (Hythe) has obtained a noticeable improvement by substituting some Telcon K35 feeder for his previous "green ex-Government" type. G3DIV/A (Eastbourne), between his 70 cm activities, has managed to work OZ again. In Southsea, G3BNC, at sea-level, has been making the most of the good conditions and has had excellent contacts with G3CFK and PAØPN, as well as some stations that G2XC has not yet worked! He finds the 4-over-4 beam about 6 dB up on his old single-tier Yagi. He mentions that he often listens on Two at 6.30 a.m., but so far he has had the band to himself.

Apologies to G2NH (New Malden) for omitting him from the last Activity List. He tells us he spent 130 hours on Two during the last two months. G2FVD (Morden Park) raised three new counties during a short spell of activity over the VERON contest. Like many others, he found October 8 exceptionally good and, in spite of screening by a water-tank in the loft, managed to hear his first PA. G2FVD is a new member of the Five Band Club. G5MA (Ashtead) has worked EI2W twice, and heard weak signals from OZ2IZ; some good contacts have also been made with the Cornish stations. G3ENI (Kew Gardens) is rebuilding his controlled carrier modulator with the idea of incorporating a number of new features; he has been working duplex with G2NH and G3GHI, the controlled carrier being a great advantage. G4CI (Worcester Park) has worked three GW's and so

pushed up his county score. G3BLP (Selsdon) has been finding conditions good but activity appalling; when the band has been known to be wide open, with G5YV and GW5MQ both at S9, there is often not a sign of another signal. G3BLP also remarks that at the start of the VERON contest GM3BDA was an excellent signal in the London area and about 20 stations called him, but no one was lucky. G5NF (Farnham) operating from a new QTH, but with no mains, has been doing very well; the aerial is a 12-element stack fed with 300-ohm circular feeder. He has worked nine F's, one ON, two PA's and OZ. His call was inadvertently omitted from the VHF CC list published recently—sorry, OM.

G2BRR (South Woodford) was surprised at the level of activity during the VERON contest week-ends. He was using an SCR522 minus PA stage with 15 watts input. The 3-element beam was inside the shack and an RF26 did

TWO-METRE ACTIVITY BY ZONES AND COUNTIES

Based on reports for last two issues only

Zone A (144 to 144.2 mc)

Aberdeen: GM2CAS, GM2FHH, GM3FKS
Ayr: GM3DDE, GM3DIQ
Angus: GM2DRD
Dumbarton: GM3DAP, GM3FOW
Dumfries: GM3OL
Fife: GM3EGW, GM3ENJ
Lanark: GM3BDA, GM6WL

Zone C (144.2 to 144.4 mc)

Cumberland: G3BW
Durham: G2DKH, G2FO, G8AO
Isle of Man: GD3GMH
Lancashire: G2CBR, G2DCI, G2HGR, G2OI; G3AGS, G3AOO, G3DA, G3GPT, G3GUU, G3HII, G5VN/A
Northumberland: G3CYY, G4LX
Yorkshire: G2CPT, G2IQ, G3BXO, G3COJ, G3DMK, G3DVK, G3UV, G4JJ, G5QU, G5YV, G6YO, G8GL

Zone D (145.8 to 146 mc)

Co. Down: GI2FHN, GI2GQB
Co. Dublin: EI2W

Zone E (144.4 to 144.65 mc)

Cheshire: G2CYN, G3ABM, G3ATZ, G3BOC, G3DH
Derbyshire: G2FZU, G3GUD, G5RW
Leicestershire: G2BVW, G2FNW, G3CHY, G3ENS, G4FO
Lincolnshire: G2FJR, G3AMM, G3CCH, G3DMU, G3HRP, G4OF, G5BD, G6LI
Nottinghamshire: G2XS, G6CW
Rutland: G5FF
Staffordshire: G2JZ, G3CXD, G6FK, G8KL
Warwickshire: G2ATK, G3ABA, G3BVJ, G3DJQ, G3FGT, G4RK, G5ML, G5SK, G6CI, G6SN, G6YU, G8QY

Zone F (145.65 to 145.85 mc)

Caernarvon: GW3ENY, GW3ENY/P
Flint: GW2FVZ, GW5MQ
Herefordshire: G6NB/A
Montgomeryshire: GW2ADZ
Shropshire: G3AHX
Worcestershire: G3BGR, G4VH

Zone G (144.65 to 144.85 mc)

Bedfordshire: G3CGQ, G3FFX, G3FUL
Buckinghamshire: G2HIF, G2MQ, G3CVO, G3DQC, G3FQS, G3GBO, G3MI, G4MR, G6JK, C6NB, G8VZ, G8WV
Cambridgeshire: G2PU, G2UQ, G2XV, G3AEP, G3BK, G3CJY, G3EDD, G3FOQ, G3GGJ, G3WW, G4MW, G5IG, G5JO, G8SY
Hertfordshire: G3DJX, G3FD, G3GDR, G5SZ, G5UM, G6GR
Huntingdonshire: G2FQP, G3AKU
Norfolk: G3CFK, G3VM, G4KO, G5UD, G8AX
Northamptonshire: G2HCG, G2HOP, G3BA, G3DUP, G3GHO
Suffolk: G3AJP, G5AM

Zone H (145.25 to 145.5 mc)

Berkshire: G3EJA, G4SA, G5DF, G5HN, G5RP, G6GT, G6OH, G8DM/A
Channel Islands: GC2CNC
Dorset: G2DGB, G3ABH, G5UF
Gloucestershire: G3FRY, G3GEN, G3YH, G5BM, G8ML,
Hampshire: G2DSW, G2XC, G3ARL, G3ATT, G3AWY, G3BHS, G3BNC, G3CFR, G3CVE, G3DTT, G3EGV, G3ESS, G3FAN, G3GAV, G3GOP, G3GVC, G6DT, G6XM, G8DL, G8LY
Oxfordshire: G3AVO/A, G5TP, G6KB
Wiltshire: G2BUJ, G4AP, G8IL

Zone I (145.5 to 145.65 mc)

Cornwall: G2BHW, G3AGA
Devon: G2BMZ, G2BMZ/A, G3AUS, G3CQC, G3GAO, G3JW, G5BT
Somerset: G3EHY, G3FIH

Zone J (144.85 to 145.25 mc)

Essex: G2ANT, G2WJ, G3ANB, G3CNV/A, G3FIJ, G4HO, G6NR
Kent: G2AJ, G2AOL, G2UJ, G3CBU, G4FB, G5MR, G6AG
London: G2DTO, G2FKZ, G3BCY, G3BYY, G3EYV, G3FSG, G3FZL, G3GSE, G5KH, G5LI, G5LN, G6QN, G6TA, G6YP, G8KZ, G8LN, G8VR
Middlesex: G2AHP, G2CRD, G2DD, G2HDZ, G2YC, G3BVG, G3CWW, G3EOH, G3GXO, G3HBW, G3HT, G4HT, G4KD, G6HG, G6JP, G6UH
Surrey: G2AXN, G2BN, G2FVD, G2KI, G2MV, G2NH, G3ASG, G3BLP, G3ENI, G3GHI, G3GHS, G3GMZ, G3HAB, G3HCU, G3NR, G4CI, G5DS, G5LC, G5LK, G5MA, G5NF, G5WP, G6CB, G6HC, G6LK, G6LX, G6SC, G8OU, G8TB
Sussex: G2FTS, G2MC, G3DIV/A, G3FEX, G3GNR, G3HCK, G5RO

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

duty as receiver. G3FZL (East Dulwich) worked DL4XS/3KE through a 300-foot hill only 1½ miles away. He feels sure he could have made it on 70 cm as well, as signals were so strong. G3FZL is only 60 feet a.s.l., but his aerial is placed well in the clear; good signals have been heard from G2BHW in Cornwall. G3EYV (S.W. London) has been working late, and hence comparatively inactive on Two. G8LN (S.E. London) undertook to prepare gear for a civic exhibition at Woolwich; a two-metre Tx with 8012's feeding a stack of four folded dipoles will be run at 50 to 100 watts. G8LN says his VERON score was not worth sending in, although he did work G3ENS/P for a new county; he considers contests valuable, if only for the reason that they enable him to find where his signals are going! G3BYY (Homerton) uses DC mains and is thus restricted to 20 to 25 watts. He puts it that when conditions are bad he can have his local QSO's with the other QRP stations, but when the band opens all the "big guns" start up and "their 150 watts and 150% modulation" make his modest contacts impossible! His answer to all this is to move to 144.4 mc, which, he says, is most likely hard luck for the big boys. (It is, of course, still harder luck on the QRP man in the North or Midlands who works on or near 144.4, and will be unable to work London, due to QRM from G3BYY).

G3DGN (Wood Green) went portable with G3BPM (using the latter's call-sign) during the VERON contest. They chose Galley Hill near Luton as the site for their activities. Some 80 contacts with 26 counties were made; four countries were heard. The whole set-up of 45-foot mast, with 2-over-2-over-2 rotary head, 10/15 watts transmitter and cascode converter, together with operating tent, was erected after dark on the Friday evening. He regrets that the *Magazine* Two-Metre Contest is open to fixed stations only. (While fixed stations only may compete, there is no objection to these fixed stations making contacts with a /P. So, if anyone wishes to go /P. just for the fun of it, we are sure there is no objection.) G2HDZ (Pinner) lost his aerial in a gale, but now has it restored. He was amused at the way a certain local who usually ignores other locals was busy calling them during the recent Contest! G2HDZ was one of the lucky ones with OZ2IZ. (G2XC called him at the same time, but was one of the unlucky ones!). G3SM (North Harrow) proposes to erect a tower for his 2-metre array, and to be rather more active in the near future. G2AHP (Perivale) has reached 7 countries and has heard EI2W, so should be in the Table soon; he has at long last worked G8IL, and, to make sure of it, did it three times in three nights; he would like frequencies of stations published in the Activity List. (Space required for this would be excessive). G3HT (Edgware) is active on the band, almost within sight of G4HT. G3HBW (Wembley) is finding it easier to work stations nowadays, although he cannot raise G3BA or G3DAH even when they are S9 plus. G5LI (Hampstead) has built himself a new exciter to eliminate TVI troubles; a new converter, using the cascode circuit, is also being planned.

G5DF (Reading) decided to get a good night's sleep prior to settling down in earnest to the VERON contest. His feelings next morning when he learned that DL4XS and others had been putting over S9 signals during his slumbers may well be imagined if not described! G4SA (Steventon) has heard GM3BDA more than once. but has not had any luck with the Europeans; he sends a long list of calls worked since September 1st. G8IL (Salisbury) suggests a scheme, rather too elaborate to describe in the short space available here, by which stations could exchange information on screening in various directions. G8IL agrees with our previous com-

TWO-METRE DX MARATHON

Station	Miles
G5YV (F9MG)	620
G3EHY (OZ2IZ)	580
G6LI (SM7BE)	566
G5BY (DL4XS/3KE)	540
GW5MQ (OZ2FR)	526
G2BMZ (DL4XS/3KE)	520
G3HAZ (OZ6PX)	519
G3DIV/A (OZ2FR)	501
G2HDZ (OZ2IZ)	497
G2XC (DL3MH)	486
EI2W (ON4BZ)	455
G6CW (OZ2FR)	452
G3WW (OZ6PX)	432
G3BNC (DL4XS/3KE)	420
G8VR (DL3NQ)	417
G6XM (DL4XS/3KE)	415
G5BD (DL4XS/3KE)	412
G3BK (DL3MH)	411
G4LX (OZ2IZ)	408
G8AO (OZ2IZ)	404
G3ABA (DLILH)	400

Minimum distance for this Table is 400 miles. Claimants should state NGR or Lat. and Long. for both ends of contact.

ments on the subject that height a.s.l. in itself is not necessarily a factor determining the goodness of a VHF location; it is the relative height of the surrounding country that matters, and it is not much use being 250 feet a.s.l. if most of the other ground in the neighbourhood is still higher! G8DM (Swindon), surrounded by trees, has made a "half-hearted" return to 145 mc, using 16 watts (CW) and 7½ watts (phone) to an 829B; the beam, a 3-element, is below roof level. EI2W has been heard, but no Continentals. A crystal-controlled NBFM pre-exciter has been designed and built at G8DM, and it is hoped to use it soon.

G3FIH (Radstock) found October 9 the best day of those on which he was active; he made his first contact with G5YV and thereby scored a new county. G3EHY (Banwell) has worked EI, GD, GI, GM, OZ and PA during the month, and suggests that "excellent" is hardly a strong enough word for conditions of that type. (And we have seen it stated elsewhere that September is "far too late a month for a VHF Contest"!). In passing, it might be mentioned that G3EHY does *not* operate from a mountain top. In fact, according to the maps we have available, Banwell is less than 100 feet above sea-level; OZ2IZ was worked by G3EHY on October 8 and was S6/7 on phone. G5BY (Bolt Tail) raised DL4XS/3KE and also had an excellent contact with G2FO (Durham) on October 9. G3AGA (Falmouth) was receiving DL4XS/3KE for over two hours on the night of September 21/22 with signals up to RST579, but could not attract his attention. G3AGA is at

TWO-METRE ACTIVITY REPORT

G3CYY, Newcastle-on-Tyne, Northumberland. NGR. 45/242693.

WORKED: G2DKH/P, 2FO, 4JJ, 8GL, GM3BDA, 3EGW, 3DAP, GW5MQ.
HEARD: G3AMM, 3AOO, 3BLP, 3ENS/P, 3WW, 4OF, 5BD, 5QU, 5YV, 6LI. (*September 8 to October 8*)

EI2W, Dublin. Eire.

WORKED: EI2P, 3L, 8G, 8L, 8P, 9N, G2AOK/A, 2BTO, 2HDZ, 2HGR, 2HIF, 2MV, 2NH, 2OI, 3AAK, 3BA, 3BCY, 3BLP, 3BOC, 3CCP, 3DH, 3EHY, 3ELT, 3FMI, 3FRY, 4HT, 4SA, 5BM, 5BY, 5CP, 5DF, 5HB, 5MA, 5TP, 5WP, 5YV, 6CW/P, 6NB, 6XM, 8OU, 8SB, GD3DA/P, GI2FHN, 3GQB, GM3BDA, 3DDE, 3DIQ, 3FOW, 6WL, GW2ADZ, 3ENY/P, 5MQ, ON4BZ. (*June 10 to September 28*)

G2HDZ, Pinner, Middlesex.

WORKED: G2AHP, 2ANT, 2NH, 2OI, 2PU, 2XC, 3ABA, 3BCY 3BPM/P, 3CWW, 3ENI, 3FAN, 3FEX, 3FSG, 3GBO, 3GHI, 3GHO, 3GHS, 3GSE, 3GVC, 3MI, 3WW, 4MR, 4VH, 5DF, 5DS, 5HB, 5HN, 5LC, 5TP, 5UF, 6HC, 6JP, 6NB, 6NB/A, 6TA, 8KZ, 8OU, OZ2IZ.
HEARD: F8MX, 9DI, G2BMZ, 2HBW, 2HGR, 2XV, 3AGA, 3AVF, 3BK, 3DVK, 3EHY, 3FGT, 3GUD, 5RW, 5YV, 6YO, 6YU, 8IC, GW2ADZ, 5MQ. PAØAD, ØFB, ØPN. (*September 9 to October 11*).

G2DKH/P, Stanley, Co. Durham.

WORKED: G2FO, 3DMU, 3BLP, 5QU, 6LI, 8GL, 8AX.
HEARD: G2XS, 3WW, 3EDD, 3CCH, 3AHX, 3VM, 4OF, 5MA, 5UD, 5BD. (*October 2 to 9*).

G3EHY, Banwell, Somerset.

WORKED: EI2W, G2AHP, 2AJ, 2ANT, 2AOO, G2ATK, 2BTO/P, 2BZ, 2DCI, 2FNW, 2FQP, 2FVD, 2HCG, 2JZ, 2NH, 2XC, 2XS, 3ABA, 3ABM, 3AHX, 3AKU, 3ASG, 3ATZ, 3AVO/A, 3BA, 3BGR, 3BK, 3BLP, 3BNC, 3BOC, 3CCH, 3CXD, 3DA, 3DAH, 3DH, 3DJQ, 3DMU, 3DUP, 3EBK, 3FFX, 3FIH, 3FKO/P, 3FRE, 3FSL, 3FUW, 3FZL, 3GFV, 3GOP, 3GUD, 3GVC, 3HCU, 3NR, 3VM, 3WW, 3YH, 4AP, 4CI, 4HT, 4MR, 4RG, 4SA, 4VH, 5BY, 5DF, 5DS, 5HB, 5LI, 5MA, 5UD, 5YV, 6AG, 6CB, 6FK, 6GT, 6LI, 6NB, 6XM, 6YU, 8DM, 8GL, 8KZ, 8IL, 8OU, GD3GMH, GI3GQB, GM3BDA, GW2ADZ, 3EJM, 3ENY/P, 3HCH, 5MQ, OZ2IZ, PAØPN.
HEARD: G2FO.
(*Period September 16 to October 13*)

G3HBW, Wembley, Middlesex.

WORKED: F9DI, G2FTS, 2XC, 3WW, 5LK, 5MR, 5UF, 5UM, GW2ADZ.
HEARD: F8GH, G2FQP, 2OI 2PU, 2XV, 3AKU, 3AUS, 3BA, 3BNC, 3CFK, 3CJY, 3DIV/A, 3DVK, 3EHY, 3ENS/P, 3FAN, 3FEX, 3GAO, 3GAV, 3GGJ, 4MW, 5YV, 8DM/A, ON4HC. (*September 21 to 30*).

G3WW, Wimblington, Cambs.

WORKED: DL3FM, EI2W, F3DC, 8MX, 9DI, 9MX, G2ANT, 2BHW, 2BN 2BVW, 2DSW, 2FJR, 2FKZ, 2FNW, 2FO, 2FQP, 2FTS, 2FVD, 2HCG, 2HDZ, 2HOP 2LW, 2MV, 2NH, 2OI, 2PU, 2UJ, 2UQ, 2XC, 2XS 2XV, 2XV/P, 2YC, 3ABA, 3AGA, 3AGS, 3AKU, 3AUS, 3BA, 3BCY, 3BLP, 3BK, 3BNC, 3BPM/P, 3CCH, 3CFK, 3CGQ, 3CJY, 3COJ, 3CVO, 3CXD, 3DA, 3DIV/A, 3DMU, 3DTT, 3DVK, 3DUP, 3EDD, 3EHY, 3ENS/P, 3FAN, 3FEX, 3FGT, 3FSG, 3FZL, 3GAV, 3GBJ, 3GGJ, 3GHI, 3GHS, 3GSE, 3HBW, 3MI, 3VM, 4AP, 4KD, 4KO, 4MR, 4MW, 4OF, 4PV, 4SA, 4VH, 5BD, 5DF, 5DS, 5HB, 5IG, 5JO, 5MA, 5NF, 5RW, 5UD, 5UF, 5UM, 5WP, 5YV, 6AG, 6CB, 6CW, 6GR, 6JP, 6QN, 6UH, 6YP, 6YU. 8AX, 8GL, 8KZ, 8OU, 8SY, 8VZ, ON4BZ, OZ2FR, 2IZ, PAØAD, ØEO, ØFB, ØFC, ØNO, ØUP, PE1PL. (*September 16 to October 13*).

G5MR, Hythe, Kent. NGR 61/153352.

WORKED: F3CT, 8EC, 8GH, 8LO, 8OL, 9DI, 9MX, G2UQ, 3AUS, 3CFR, 3ENS/P, 5UF, 8IL, GW2ADZ, ON4BZ, PAØPN.
HEARD: G2BMZ, 2DSW, 3AVF, 3BA, 3BK, 3FAN, 3GAO, 3WW, 5YV, GW5MQ. (*All over 100 miles, September 19 to October 14*).

G3VM, Norwich, Norfolk, NGR 63/182101.

WORKED: G2AHP, 2CPL, 2FJR, 2FNW, 2NH, 3BCY, 3BLP, 3CFK, 3DIV/A, 3DUP, 3EHY, 3EQS, 3FGT, 3FUL, 3FZL, 3WW, 4KO, 4PV, 4VH, 5DS, 5UD, 5UM, 6NB, 8IL, GM3EGW, GW5MQ, PAØFC, PE1PL.
HEARD: DL3FM, G2FKZ, 2XC, 2XS, 2XV, 3BK, 3BNC, 3FAN, 3FGT, 3GDR, 3GSE, 3GVC, 3HCG, 4MW, 4OT, 5CH, 5TP, 5UF, 5YV, 6AG, 6LI, 6XM, 8AX, 8SY, GW2ADZ, PAØBP, ØPN. (*September 12 to October 14*).

the HF end of the band (145.6 mc) and remarks that DL4XS did not appear to work anyone higher than 145.25 mc that evening; the distance from Falmouth is around 600 miles. G3AGA sends some interesting meteorological comments on conditions that night and also during the VERON contest. On Sunday, September 23, at 2200, it was noticed that the noise level was not constant across the band, but was peaking at certain spots about 70 to 80 kc apart. The only signals that were audible were in the troughs of the noise. By 2234 conditions were normal again—and *all* signals disappeared. G3FRY (Cheltenham) on 145.35 mc has worked EI2W.

G3GDR (Watford) has been working Continentals, including OZ2IZ; he is using 18 watts to an 832 and a 12-element co-linear stack. G4MR (Slough) found time insufficient to make a serious entry in the VERON contest, but worked 14 counties while it was on. He suggests a new contest scoring system, whereby no points are given for distances less than 40 miles, but the final score is multiplied by a factor which is a function of the number of stations worked in the less-than-40-miles range. The multiplier he suggests is

$$(1 + n/20)$$

where n is the number of stations.

G6YU (Coventry) has nothing exciting to report, although he did hear PAØFC on October 16. Activities continue at G5ML (Coventry), where the 4-over-4 has been raised to 60 feet and some modifications made to the converter. European DX has been logged and cards are now nearly sufficient for a VHF CC claim. G3HAZ (Birmingham) writing from *R.M.S. Queen Mary*, says he had a good time over in W6. He was impressed with the results they are obtaining with mobile 2-metre outfits in their cars, using quarter-wave whip aerials.

G3GHO (Roade) is a newcomer to two metres and finds the band fascinating; as he says, you never know what is going to turn up. On October 8 he was so busy logging F, ON, OZ and PA that he nearly forgot he had a transmitter. G3BA (Daventry) is about to move to Shotts, which is up in GM. (No prizes for guessing the reason for this move.) This should make it easier for him to work GM3BDA. Regarding VFO's, he says: "By my actions so you shall judge me." Commenting on aerials, he draws attention to the way in which different districts show preferences. In Northants, the Turnstile is favourite; in Lancashire, the City Slicker; on the Sussex and Hampshire coast it is becoming the 4-over-4. G3BA, himself, of course, uses a multi-element stack, which he tells us is quite a topic of conversation locally.

On October 8, G3BK (March) went round 6 countries and followed up with a seventh on the next evening. G3WW (Wimblington) continues to be one of the most active and consistent stations on the band. It is quite impossible, within the limitations of our space, to give anything like an impression of what he has heard and worked. The ground at G3WW is only 10 feet a.s.l. No doubt much of the success which is being obtained from this location is due to the height of the aerial above ground, and this is, of course, aided by an efficient beam and the 140 watts input; but a study of the map indicates that there are no major obstructions in the vicinity of March. G3WW has, in fact, helped himself by raising his beam above the level of local obstructions (buildings and overhead lines) while the flat East Anglian country allows the low angle radiation to get away over the horizon. Having worked EI2W, G3WW now wants GC and GM; he reports that there is once again activity in Rutland, G5FF having started operations in that county.

Activity in Suffolk includes G3AJP (Fritton) and G5AM (Ipswich). The latter runs a converter with EF54 RF stage and mixer, but is having trouble

VERON TWO-METRE CONTEST

SOME CLAIMED SCORES

1.	G3BLP (Selsdon)	519
2.	G3WW (March)	436
3.	G2NH (New Malden)	406
4.	GW5MQ (Rhosesmor)	372
5.	G5YV (Leeds)	362
6.	G5DS (Surbiton)	295
7.	G2XC (Portsmouth)	293
8.	G5DF (Reading)	273
9.	G5MR (Hythe)	221
10.	F9DI	187
11.	G3CWW (Hendon)	176
12.	G3CQC (Torquay)	170
13.	G2DSW (Southampton)	147

These are scores as claimed, as it will be for the Organisers to make any amendments called for by the rules. Several other operators sent in check longs, which have not been classified as entries in this list.

with a poor note from the EC52 oscillator. The Tx at present uses an 807 tripler as final, but an RK34 is to be added as PA. The aerial is a 6-element broadside array. He has heard G5BD and ON4BZ.

G5UD (King's Lynn) continues active and says we can assume he is busy on Two until he writes to say he is not! He is definitely anti-VFO and says that is his main reason for writing. G5UD would like to see an Activity List in order of call-sign. G3VM (Norwich) is there mainly in the early evenings. He has worked GM3EGW and PE1PL, the latter being a very consistent signal. G3VM claims to have one thing in common with G4HT, namely, that he has worked some stations twice!

On October 8, G5BD needed but one more country for inclusion in the Table. He then proceeded to work two new countries, F and OZ, and, what is more, two stations in each! G6LI (Grimsby) has found the period immediately after sundown to be the best. G6LI does use a VFO, and he challenges all comers on the quality of his signal; however, he sticks to one rule, namely, to stay within the frequency area for his Zone; the VFO consists of a 7500 kc crystal plus a 400/1000 kc oscillator. G5YV (Leeds) heard SM6QP on October 9, and on the following evening found southern G's very strong. He says that GW5MQ always seems to hear the Continental stations an hour or so before they are audible at G5YV. Further, when they are peaking at G5YV they are almost out at G5BD. and usually GW5MQ can continue working them sometime after they have faded out at G5YV.

G3BOC (Willaston-in-Wirral) likes to see the Calls Worked and Heard each month. G2OI (Eccles), although active on Two, is mainly interested in 70 cm work. G3AGS (Manchester) was unable to receive the OZ signals when G2XS and GW5MQ were working them; he has, however, raised G6XM and G2FQP to help along his counties total. GW5MQ (Rhosesmor) considers the first week-end of the VERON contest the peak period with him, although the whole month was very good. In all, GW5MQ has worked OZ2FR *six* times, and OZ2IZ *seven* times, all on phone! Only four English counties have not yet been worked; these are Rutland, Monmouth, Westmoreland and Cornwall.

G2DKH (Stanley) has been on the band for over two years and had only worked semi-locals; he recently went /P ½-mile from his home QTH, but on the top of a ridge with a clear view to the south, and there was the DX! He will be /P on 144.208 mc so long as he can stand the cold. His transmitter runs 10 watts, and there is a 5-element Yagi. G3CYY (Gosforth) writes that unless he can hear a station at S5, at the least, it is a waste of time for him to call; he asks for more Sunday morning activity, and also early evening. He saw the aurora on September 26, and rushed home, but was unlucky enough to have

TWO METRES

ALL-TIME COUNTRIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
54	G2OI
53	G3BLP (500)
52	GW5MQ
51	G3EHY (310)
48	G2AJ (408)
47	G2NH, G3BW (122), G5WP, G6NB, G8SB
46	G4HT (428), G5BY
45	G5YV, G6XM (356)
44	G3ABA (222), G5MA
43	G2XC, G3WW, G3COJ (131), G5DF
42	G5BD
41	G3BA, G3DMU (192)
40	G3BK, G3CGQ, G5BM, G5DS (297), G8OU
39	G2IQ, G4SA, G5LI (285)
38	G3APY, G3VM
37	G6YU (118)
36	G2FNW, G3CXD, G6CB (289), G8IP (258)
35	G6LK, G8IL (212)
34	G2CPL (288), G3FAN (218), G4AU, G4DC, G4RO, G5JU
33	EI2W, G2HDZ, G2XS
32	G2FQP, G3AVO/A, G3FZL, G6CW, G6UH (267), G8WV
31	G2AHP, (249) G2CIW (231), G3HAZ, G5RP
30	G3BHS, G3BOB, G5NF, G8SM
29	G5UM (218), G6CI
28	G2DLJ/A
27	G3AKU, G3DAH, G3GSE, G3HBW, G3HCU, G5ML, G8QY
26	G2FVD, G3BNC, G3FIH, G4NB, G5SK
24	G2AIQ, G3FXG, G3GBO, G8KL
23	G2NM, G3FD, G4MR, G5PY, G6GR
22	G3AEP, G3BPU (189), G3CWW (206), G4RK, G8IC, G8VR, GM3BDA
21	G3AGS, G3FMF
20	G2ANT, G3EYV, G5MR, G8KZ
19	G3SM, G5LQ (176)
18	G3GOP, G4LX
17	G6XY
16	G2AOL, G3FRE
15	G2AVR, G2DVD, GC2CNC, GM3EGW
14	G3CYY

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

a valve in the receiver go down. Incidentally, G3CYY has a frequency meter which he claims is accurate to within 1 kc. G4LX (Newcastle) was in on the aurora session, as previously mentioned, and also was on the band for the Continental opening of October 9, when he worked OZ2IZ. G4LX asks G stations to beam north more often. G8AO also continues active on Two between his voyages up and down the coast. A new City Slicker is being erected with a screen reflector to help, and contacts have been made with GW5MQ and G8SB from Tyneside. G8AO is still hoping for a /MM permit, and then will be able to compare radar and two-metre conditions across the sea.

GM3DIQ (Saltcoats) thinks GM3DDE may have heard G5BY on September 19 and is awaiting confirmation. The aerial in use at GM3DDE at the time was the one designed by GM3DIQ; hence the keenness of the latter, who is about to erect a similar aerial at his own QTH.

EI2W has continued to work much good DX, as already reported. The best nights from Dublin were October 9, 14 and 15. Several stations owe QSL's to EI2W, who has himself sent a card to every station worked to date. EI6A (Wicklow) should be active shortly and is in a good location for working G. A further appeal is made by EI2W to all stations calling him to give their own call-signs more frequently.

SEVENTYCEMS

G3DIV/A (Eastbourne) has been making some good *Continental* contacts on 70 cm. Monday, October 15, appears to have been the best day, and ON4UV, PAØPN and F8JR were all worked. Frequencies of these stations were 434.75, 434.8 and 435 mc respectively. A QSO with ON4UV began on two metres at 2132 BST, and change to 70 cm was made at 2140; ON4UV heard G3DIV/A at RST459 with fading, and reported back on Two. At the same time, PAØPN broke in to say he was also receiving G3DIV/A on 70 cm. Both ON4UV and PAØPN changed to 70 cm, and both were heard by G3DIV/A, the former at 559 and the latter 578. Signals from PAØPN later increased to S9 plus and the contact was continued on phone. After this fine QSO, F8JR called G3DIV/A on 70 cm; signals were 569 and 589. And then ON4UV was worked again on phone at S9. The converter at G3DIV/A now uses a 12AT7 push-pull grounded-grid RF stage linked into the mixer cavity, with a CV102 crystal.

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

12	**G3BLP** (DL, EI, F, G, GC, GD, GI, GM, GW, ON, OZ, PA)
11	**G5YV** (DL, EI, F, G, GD, GM, GW, ON, OZ, PA, SM)
10	**G2HDZ, GW5MQ.**
9	**G3WW, G5BD, G5DS, G6LI, G6XM**
8	**G2AHP, G2XC, G3ABA, G3BK, G3EHY, G3VM, G5BY, G5MA, G5UD**

ON4UV (Fayt-lez-Manage), writing the day before the contacts mentioned above, claimed the first 70 cm QSO's from ON with F and PA. He worked F3LQ, F8JR and PAØPN on September 24 and October 2. The interesting thing is that these paths appear to be open under all propagation conditions. F8GH (Beauvais) has also been worked cross-band, and F8OL has heard ON4UV in Paris 20 times! ON4UV is using a push-pull tripler 8012 and a 32-element beam fed by 300-ohm twin. Soon a QQEO6/40 will be in use. The receiver is an F8OL type—namely, crystal injection on 405 mc, a GG EC80 as RF amplifier, 1N21B mixer and 3-6AK5 IF stages on 30 mc.

G3HBW (Wembley) is now running a proper 832 trebler on 70 cm and has had a number of good CW and 'phone contacts. 2FKZ (Dulwich) has worked G4LU (Oswestry) several times, and G3FZL has heard G4LU. In all, G3FZL has worked 21 stations on 70 cm, which is excellent going and a good indication of the activity of Seventycems.

G2OI (Eccles) is still going strong. A 16-element rotary stack is now in use and up at 45 feet, with a 5-element Yagi on top of that; he again strongly urges the use of a much narrower working band on Seventycems. (Most stations seem to be between 434.5 and 435.5 mc at present). GW5MQ supports this and feels that many more "accidental" contacts would occur if only a restricted part of the band were in use.

A new 420 mc world record was made on August 31, when W3AIR worked W1PBB over a 265-mile path. So once again we hand it back to the States, with our congratulations—and we feel

sure G5BY will not be content to leave it at that!

Sayings of the Month

"One thing about contests is even one's neighbours (who usually only hear DX signals) stop, nod, exchange a report and condescendingly thank you for the one point" (G8LN) . . . . "I note the November Contest. I have ordered a 5-gall. drum of paraffin, aspirins, throat tablets, ½lb. of coffee, a supply of QSL cards and a slide rule" (G2AHP) . . . . "I suggest a donation of a can of grease to G5TP so that he can turn his beam off London occasionally and aim it west" (G8DM) . . . . "Regarding the use of the VFO on Two, I sincerely hope the VHF's never get into the same state as the LF bands" (G3GHO) . . . . "If the swoopers get settled on the only clean band, I'm off to 70 cm to try my hand at the almost impossible. Or is it?" (G5UD) . . . . "I know of at least two stations using VFO on two metres whose notes are considerably better than some of the so-called crystal controlled transmissions" (G3BLP).

The Clubs

We welcome ON4BZ to the Five Band Club and congratulate him on being the first ON to qualify for membership of the VHF Century Club. Other new VHF CC members are G2DTO and G2HDZ.

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1951

Starting Figure, 14

Worked	Station
41	G3EHY
37	G5YV
36	GW5MQ
35	G3WW
34	G2XC, G5MA
33	G3BK, G5DS, G4SA
32	G2NH
29	G3FAN
26	G4HT, G8IL
25	G2AHP
24	G2HDZ
22	G3VM, G6YU
21	G2FVD, G3BNC
19	G3AVO/A, G3CWW, G3GHO
17	G2OI, G3HCU, G5ML
14	G4MR

NOTE: This Table will run for one year until August 31, 1952

SOME TWO-METRE FIRSTS

G/DL	G3DIV/A-DL4XS/3KE	June 5, 1950
G/EI	G8SB-EI8G	April 23, 1951
G/F	G6DH-F8OL	Nov. 10, 1948
G/GC	G8IL-GC2CNC	May 24, 1951
G/GD	G3GMX-GD3DA/P	July 29, 1951
G/GM	G3BW-GM3OL	Feb. 13, 1949
G/GW	G5MQ-GW5UO	Oct. 22, 1948
G/ON	G6DH-ON4FG	Sept. 25, 1948
G/OZ	G3WW-OZ2FR	June 1, 1951
G/PA	G6DH-PAØPN	Sept. 14, 1948
G/SM	G5YV-SM7BE	June 1, 1951
GC/EI	GC2CNC-EI2W	Oct. 8, 1951
GD/EI	GD3DA/P-EI2W	July 30, 1951
GD/GM	GD3DA/P-GM3DAP	July 29, 1951
GD/GW	GD3DA/P-GW5MQ	July 28, 1951
GI/EI	GI3GQB-EI2W	June 13, 1951
GI/GM	GI2FHN-GM3OL	July 1, 1949
GI/GW	GI2FHN-GW3ELM	July 8, 1949
GM/EI	GM3BDA-EI2W	June 12, 1951
GW/EI	GW2ADZ-EI8G	April 19, 1951
DL/OZ	DL6SW-OZ2FR	March 4, 1951
DL/SM	DL2DV-SM7BE	March 10, 1951
ET/ON	EI2W-ON4BZ	Sept. 21, 1951
ON/OZ	ON4BZ-OZ2FR	June 3, 1951

Membership of the Five Band Club is open to all those who send us a signed statement that they have a practical interest in VHF work and will support all VHF activities to the best of their ability. No fees are involved, the expenses being borne by *Short Wave Magazine*, and a certificate is issued. It is hoped to arrange Dinners in both the Midlands and London during 1952. Incidentally, a claim for a VHF CC certificate can be accepted only from a member of the Five Band Club.

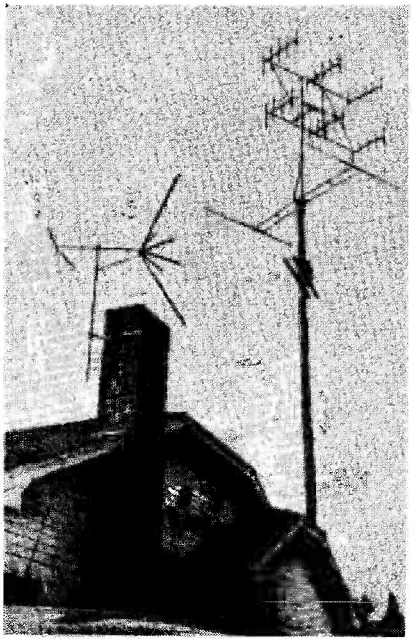
The Tables

May we remind those whose calls appear in the Counties-Worked Tables that we require a complete list of the counties on which their claims are based. The Tables will be thoroughly revised at the end of this year. (Many thanks to those who have already complied).

The chief engineer of the Netherlands Physical Laboratory informs us that their station PE1PL will be on 144 mc. (exactly) every day between 1100 and 1130 GMT, running 45 watts into an 8-element beam, with a triple-conversion laboratory built receiver. Three operators are available so that schedules can be arranged at other times, but *not* on Saturdays or Sundays. Reports and correspondence can be forwarded through *Short Wave Magazine*.

In Conclusion

It has been an extremely heavy mail



W6ZL, Glendale, Calif., has a multi-element 2-metre beam (top right). The other shapes are for TV reception. Below, W6ZL himself with his radio-equipped auto for mobile operation.

again this month, and our apologies if we seem to have been too brief with your own particular activities—but once again, it has been difficult knowing what to put in and what to leave out! To those who were on for the *Short Wave Magazine* Two-Metre Contest, may we urge you to send in that entry, however disappointing you own score may seem to be. In that way you will help us to assess the extent of activity and interest on this VHF band. The latest date for next month's reports is again a bit tight, and is **November 14.** As usual, the address is E. J. Williams, G2XC, *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. And so 73 till December 7.

CARDS IN THE BOX

Cards are reposing in our Bureau for the operators listed below, in respect of whom no address is held on our files. If they will be good enough to send a large S.A.E., with name and call-sign, to BCM/QSL, London, W.C.1, the cards will be forwarded on the next G clearance. If publication in our "New QTH" feature, and subsequently in the *Radio Amateur Call Book,* is also desired, that should be mentioned at the same time.

G2AOC, 2BPY, 2CVB, 3CLJ, 3FYI, 3FYR, 3HKN, 3HRI, 3HRM, 3HSV, 3ISW, 4PV, 5AA, 8BI.

CITY & GUILDS HONOURED

On September 21, His Royal Highness the Duke of Edinburgh, K.G., F.R.S., was elected President of the City and Guilds of London Institute for the Advancement of Technical Education, and has been graciously pleased to accept office. It is the Department of Technology of the Institute which is the governing body for the Radio Amateurs' Examination.

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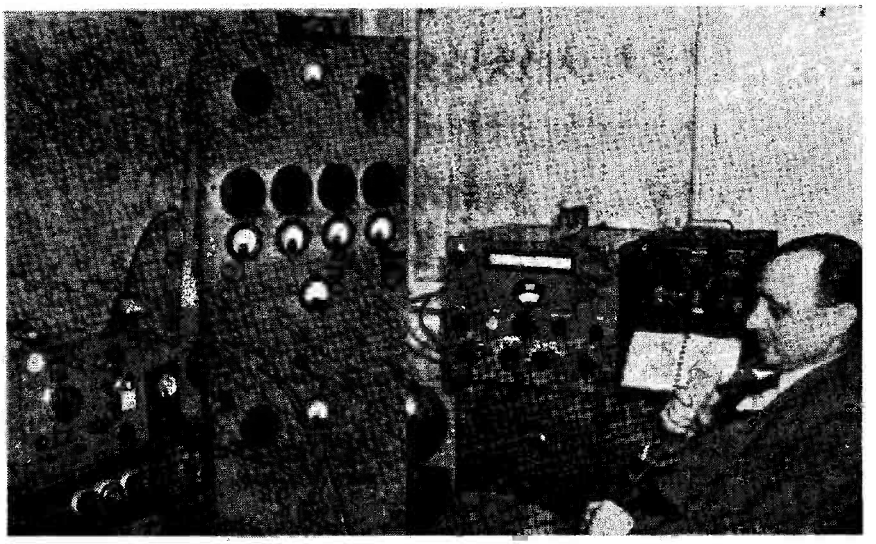
Readers who wish to be sure of their copy of *Short Wave Magazine* each month are reminded that they can place a direct subscription order with us. This costs 24s., home or abroad, for a year of 12 issues, and despatch by post on the day of publication each month is guaranteed. Orders, with remittance, to The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

The other man's station • G6FV



OWNED and operated by C. Kirby (5 Station Road, Teynham, Sittingbourne, Kent), G6FV was first licensed in 1931—and for five years after that the power supply was batteries only, the lot of many an old timer in the early days.

Our photograph shows the equipment, mainly home-constructed (including the rack itself) now in use at G6FV. There are two transmitters—a modified CNY unit for 1.7 and 3.5 mc, in the left-hand corner; and a four-stage job for Ten and Twenty. The latter is driven from a 6AG7 VFO, into 6AG7 BA-6V6 FD-P/P 807's. The speech equipment, in the fourth chassis up the rack, comprises 6J7-6C5-6L6-807's in AB-2.

The whole station is relay controlled, and auxiliary items include a phone monitor, a BC-221 frequency meter and a harmonic checker. The main receiver is a CR-100. Aerials at present provided at G6FV are a 20-metre dipole, a 10-metre vertical dipole and a 66-ft. wire for the two LF bands.

No spectacular DX claims are made, and it is evident that G6FV is one of those stations operated comfortably on various bands as opportunity offers and fancy leads—which, indeed, typifies the outlook of many an active amateur.

PRESSURE OF EXAMINATION

It is frequently put forward that the Radio Amateurs' Examination could usefully be held twice a year, instead of once only in May. The City & Guilds of London Institute has explained that its examination calendar is already overfull. When it is seen that no less than 75,638 candidates were examined in 170 different subjects at some 1,000 centres in the year 1950 alone, their explanation seems reasonable enough!

IDEAS FOR A GIFT

Useful suggestions might be a subscription to *Short Wave Magazine* (24s. post free) either for yourself or an overseas contact; a *DX Zone Map* (6s. post free) to put up on the wall to remind you how the world looks from the radio point of view; or (for an SWL) a subscription to *Short Wave Listener* at 18s. for a year. Orders, with remittance, to The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HERE & THERE

Naval Handbooks—Notice Withdrawn

With further reference to that paragraph on p.472 of our October issue, we are asked by the Admiralty to say that they are unable to provide for all comers information of the kind suggested. A large number of requests were received following our notice—we understand that all these have been dealt with, but it will not be possible to accept any further such enquiries.

Amateur Radio Exhibition

This takes place under the auspices of the Radio Society of Great Britain at the Royal Hotel, Woburn Place, London, W.C.1, the dates being Wednesday, November 28, to Saturday, December 1st. As on all previous occasions, we shall be there and readers will be welcomed to Stand 11; staff members will be present throughout the period of the Exhibition. So come and see us and sign the visitors' book. It is interesting to note that this year the Exhibition is to be opened by a well-known personality, Ian Orr-Ewing, Esq., O.B.E., M.P. for Hendon North, who in the late 20's made his mark in the Amateur Radio world as G5OG.

New Soldering Tools

An interesting new range of soldering tools and accessories is now being marketed by The Automatic Coil Winder & Electrical Equipment Co., Ltd. (manufacturers of the world-famous AVO instruments). Known under the brand-name of "Zeva," these tools have been specially designed for safe, quick and easy soldering, and cover all requirements connected with the radio, instrument making, telephone and light engineering industries. Of particular interest to amateurs will be the Zeva Type PO iron, with adjustable isolated copper bit, weighing less than 14 ozs.

Bending Copper Tube

The article in our October issue on a "VHF Corkscrew" has aroused considerable interest in the design and construction of beams of this type. From G3FCT (Faversham) comes a useful suggestion on the bending of copper tube: It is to fill the tube with dry silver sand before starting the work, with temporary seals at both ends; this will prevent any tendency for the tubing to flatten at the bends, and will result in a neat and symmetrical job. After bending, the ends of the coil should be unsealed and the sand shaken out.

Useful New Catalogue

We commend to the attention of readers the new edition of the Southern Radio (Salisbury) catalogue, No. 8 in the series. Its 50-odd pages list and illustrate a wide variety of components, parts and constructors' accessories, and will be of interest to every experimenter. Over the years, the firm has built up a considerable mail order clientele, and their aim is a by-return service on all postal business. This catalogue costs 9d. post free and can be obtained from Southern Radio & Electrical Supplies, 85 Fisherton Street, Salisbury, Wilts.

The Club Contest

This takes place over the nine days November 10-18 on the 1.7 mc band and, this year, is open to Club stations *only*. They will endeavour to work one another during each of the nine sessions —so those who may hear the mystic signal "CQ MCC" will know what it is all about.

Fall Call Book

The Autumn 1951 issue of the *Radio Amateur Call Book*, No. 3 of Vol. 29, is now available and contains the call-signs, names and addresses of amateurs operating under nearly every prefix throughout the world—Russia and some of her satellites excluded, needless to say (but only because they want it that way). The G Section, more complete and up-to-date than ever before, incorporates all additions and corrections up to and including those appearing in our "New QTH" feature for August 1951. The price of the current edition is 21s. post free, from Gage & Pollard, sole agents for the U.K. and all European countries.

The Month with the Clubs

FROM REPORTS RECEIVED

Club activity is decidedly on the increase once more, and this month we have reports from 39 Clubs—a great improvement on the figures for the past few months.

One or two Clubs have written expressing the opinion that the rules for MCC do not make for an interesting contest, and stating that therefore they will not be entering. May we point out that if everyone assumed in advance that a contest would not be interesting, the result would be assured? In fact, there would be no contest!

It is hoped that as many Clubs as possible will *enter* for MCC—and after the event, as in previous years, we shall welcome any amount of criticism of the rules.

For those who may have forgotten, MCC (the Sixth Annual *Magazine* Club Contest) will take place between the hours of 1800 and 2300 on the dates November 10 to November 18. Any Club still wanting copies of the rules may obtain them by writing to the address shown below.

Deadline for next month's reports is **first post on November 14,** and for the following month *first post on December* 10. The address for all material for this section is "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

And so to this month's reports . . . .

Scarborough Amatuer Radio Society—This Club has been active throughout the summer but has found very little to report. Meetings continue, however, every Thursday at 7.30 p.m. and new members and visitors will be welcomed.

Acton, Brentford & Chiswick—With a view to forming a properly organised Club in these districts, meetings have been arranged in the A.E.U. Rooms, 66-68 High Road, Chiswick, W.4. These will take place every Tuesday at 7.30 p.m., and will be devoted to theory, practical constructional work, and Morse practice. All are welcome, and are invited to get in touch with the organiser (see panel for QTH).

Leeds Amateur Radio Club.—Meeting fortnightly, they opened the present season on October 10 with the first of a series of lectures on Television. A course of six of these lectures will be spread over six months. Other forthcoming events: November 21, A Simple 160-metre Tx and Rx, with demonstration, by G3CML. December 5, No. 2 of the TV lectures. December 19, Surprise Lecture, by G3CML. (Note Secretary's QTH, in panel).

Barnet & District Radio Club.—A new Chairman and Secretary were elected at a recent special meeting. Ordinary meetings continue, every Wednesday, 8 p.m. at Hopedean, The Avenue, Barnet. The Club station G3FFA is now on the air on the Top Band.

Kirkcaldy & District Amateur Radio Society—Meetings take place on the first and third Wednesday of the month at the Clubrooms, 285 Links Street, Kirkcaldy, 7.30 p.m. It is hoped that the Club Tx, GM3GOL, will be on the air soon. At the September meeting a member lectured on types of modulation, and at the October meeting a modulator was built. New members will be heartily welcomed on November 21, December 5 and 19.

Sunderland Radio & Television Society—This Club has been renamed, and the new season's Chairman and Secretary elected. Future meetings will be held fortnightly on Wednesdays at 8 p.m. A programme of talks and demonstrations is being arranged, time being divided between Amateur Radio and practical television.

Wirral Amateur Radio Society.—At the recent AGM the committee was re-elected, and they hope to provide an interesting programme for the season. New members will be welcomed, the next meetings being on November 7 and 21. They begin at 7.30 and are held at the YMCA, Whetston Lane, Birkenhead.

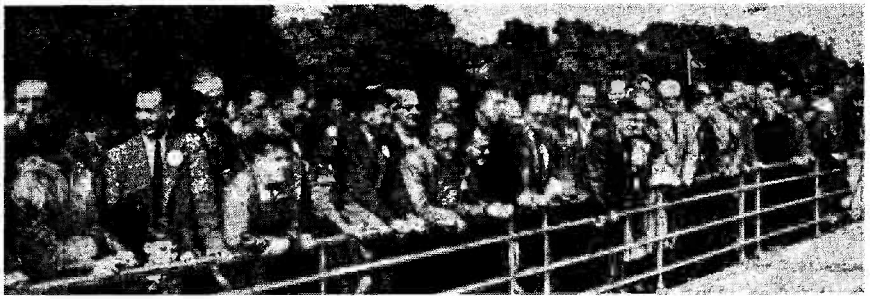
Edinburgh Amateur Radio Club.—The AGM was held in September, new officers and committee being elected. The Club now meets every Wednesday, 7.30 p.m. at Unity House, 4 Hillside Crescent, Edinburgh. Next meeting after publication is November 14, with the Club Tx GM3HAM on the air. On November 21 GM3FUU will lecture on "Something New in Radio." Visitors and prospective members will be welcomed.

Warrington & District Radio Society.—This Club has now moved its HQ to the King's Head Hotel, Winwick Street, Warrington, where it will meet on the first and third Tuesday in every month. A full winter programme has been organised. The Annual Dinner and Social will be held at the Fir Grove Hotel, Latchford, on November 30, and tickets may be obtained from the Hon. Sec. Membership is growing and the new headquarters are more conveniently situated than previously. Everyone interested will be welcomed.

Southend & District Radio Society.—At recent meetings a film strip illustrating the manufacture of television CRT's was shown, and a very successful D-F Contest was well backed by members. At the lecture there were several representatives of official and commercial interests, and members of Cathodeon Ltd. answered technical questions. Another event was a lecture and demonstration on projection TV.

Reading Radio Society.—This Society took a day off from radio to visit Whipsnade, but is now back to technical topics again! At a recent meeting a very interesting lecture on Metal Rectifiers was well attended. The Hamfest (a stag party this year) is being held at the end of October, and the winter programme is being drawn up.

Torbay Amateur Radio Society—Meetings take place on the



And there they all were for the Worthing Bucket and Spade Party, which was such a success that next year's date has already been booked, with a general invitation to other Clubs to make up parties for a trip to Worthing on the afternoon of Sunday July 20, 1952.

third Saturday of the month, the next being November 17 (Principles of TV) and December 15 (Basics of the Transmitter). In the New Year there will be talks and demonstrations on Audio Amplifiers, Modulation, Microphones, VHF Aerials, and Weather Charts. Meetings are at 7.30 p.m., YMCA, Castle Road, Torquay.

Ravensbourne Amateur Radio Club.—Another branch has been opened at the Downham Men's Institute, Durham Road School, meeting on Wednesdays at 8 p.m. under the chairmanship of G2DHV The Club Tx, G3HEV, will be operated from there, and an exhibition of gear is to be held early next year, including a transmitter in operation. Beginners and SWL's will be particularly welcome at meetings.

Midland Amateur Radio Society.—" MARS " celebrates its 21st Anniversary during the coming season, and has elected as its President G2AK, who is a founder-member and has held a licence for 25 years. Messrs. W. Butler and A.W. Rhodes have been elected Vice-Presidents, in appreciation of their valuable services over a long period. Members are reminded to take along a piece of home-built equipment to the November meeting, to compete for the Constructors' Cup.

Bury Radio Society.—A series of lectures, now being held, covers the RAE Syllabus. Forthcoming events are: November 22 (Valves and their Uses), December 20 (Receivers), January 24 (Transmitters). These are all on Thursdays, 8 p.m. at the YMCA, The Rock, Bury.

East Surrey Radio Club.—This Club would be very grateful to hear from anyone knowing of a room to let in the Redhill-Reigate area, for use as a permanent Clubroom. Meetings at present are held monthly at the Barn Room, Lensbourne Road, Reigate. An interesting programme of lectures and talks has been organised, and new members will be welcomed. The Annual Dinner is arranged for November 17; tickets are now available.

Spen Valley Radio & Television Society.—Forthcoming events are as follows: November 21, Film Show; December 5, Police Radio; December 19, Open Meeting. The meetings begin at 7.30 p.m. at the Headquarters, Temperance Hall, Cleckheaton.

Albany Radio Club.—Membership is over the 20 mark and the future seems to be bright. A qualified LCC instructor is running the class in Radio Theory, and beginners are heartily welcomed, as well as more experienced members. The Club Tx is in use on three bands, with an S.640 to take care of the receiving side.

Brighton & District Radio Club.—Attendances are now so good that the " Standing Only " board was out at a recent meeting! The Hon. Sec. has been very energetic and a first-class programme has been arranged for many weeks to come. Three well-known manufacturers are coming down in November, the subjects being VHF Telecom gear and Instruments. A fresh series of Film Strips will also be started this month.

Ilford & District Radio Society.—One of the oldest radio societies in the London area, Ilford has been in continuous existence for some 30 years—and their subscription rate is still at the pre-1930 figure. Meetings are held every Thursday at 8.00 p.m. in St. Albans Church Rooms, Albert Road, Ilford. Visitors are always welcome, and may attend several meetings before they decide to join! An interesting series of lectures and other activities is on the programme for November, including an exhibition of members' home-made apparatus, in respect of which premiums of two guineas are being awarded for the best items, judged by ballot.

Cambridge & District Amateur Radio Club.—On October 12 G3CJY gave a talk on Electronic Instrumentation in Nuclear Physics, followed by a demonstration. G2PU was presented with the Granfield Trophy for a recent Contest run on the lines of the *Magazine* "Twelve Best". Next meeting, on November 9, will be a Junk Sale.

Clifton Amateur Radio Society.—There has been an influx of new members and the Club is flourishing. D-F Contests and talks took place during last month, the AGM also being held. The future programme includes a talk and demonstration on Tape Recording, a Junk Sale and a Two-Metre demonstration. The Club station G3GHN is entering for MCC.

Coventry Amateur Radio Society.—Forthcoming events are November 12, Film Strip on CRT's November 19, " Sausage-and-Mashed Supper " at the Hertford Arms; February 29, Annual Dinner. Regular meetings are held on alternate Mondays at the YWCA, Queens Road, 7.30 p.m.

Hounslow & District Radio Society.—The Headquarters has recently been moved to 206a, Great West Road, Heston, next door to the " Shack," and in future the Club will concentrate mainly on transmitting and receiving. G3FHD is active on Ten most evenings and on Sunday mornings; new members

will be welcomed, especially those interested in transmitting activities. Meetings are on alternate Thursdays, the next being on November 8 and 22.

Sanderstead & Purley Amateur Radio Society.—The November meeting takes the form of a lecture and demonstration on Oscilloscopes. This will be at the Club HQ at the Railway Hotel, Purley, where the Club is in session on the fourth Thursday of the month.

Sheffield Amateur Radio Club.—The Annual Dinner has been fixed for January 16, at the Sheffield and Eccleshall Co-Op. Society Restaurant. Applications for tickets (price 7s. 6d.) should reach the Secretary before December 19.

South West Essex Radio Club.—The Club shack has now been re-arranged, and transmitters are in use on all bands. Much interest is shown in VHF apparatus, and construction of a Two-metre Rx and Tx is proceeding. Meetings are on Tuesday evenings, 8 p.m. at 357 Rush Green Road, Romford.

Tees-side Amateur Radio Club.—This Club now has its own call, G3HUG, and will be on the air as soon as possible on 3.5 mc. The Field Day film show at the October meeting was a great success. New members are welcome, every Thursday at 7.30 in the Joe Walton Boys' Club.

W.F.S.R.A. (Bedfast Club).—Once more the Hon. Sec. and Librarian wish to express their gratitude to the many readers who have sent books and magazines for distribution. Many more are still needed, and they should be sent to John Gill, 30 Sholebrooke View, Leeds 7. Any bed-ridden amateur or SWL who would like a line from fellow-enthusiasts is asked to write to Mr. G. Swan, 452 Wortley Road, Rotherham, who manages the correspondence section of the Club.

Worcester & District Amateur Radio Club.—Members and intending visitors are asked to note that until further notice the meetings will be held on the first Thursday in the month at Rainbow Club, Rainbow Hill, Worcester and to watch this space for further announcements.

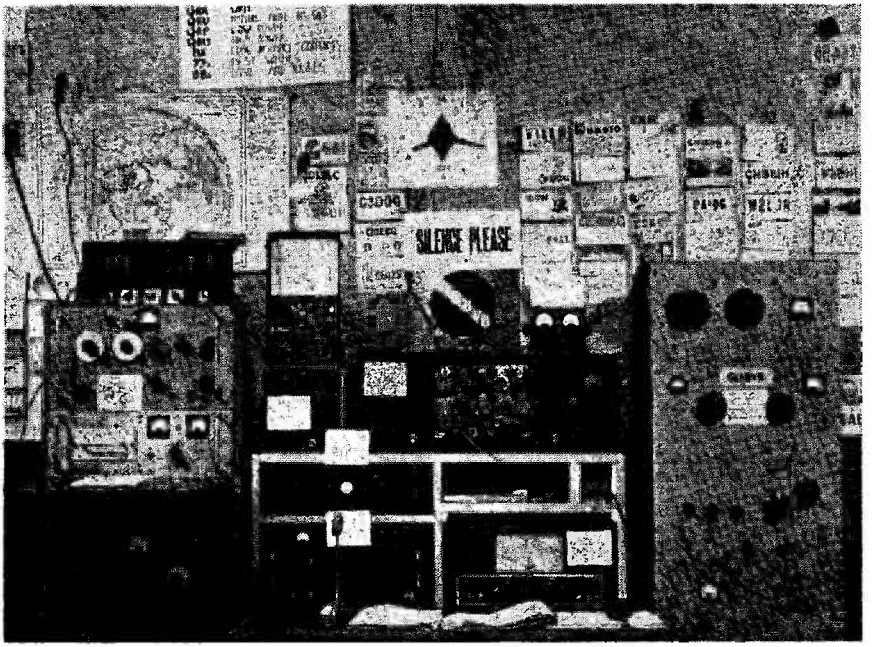
Surrey Radio Contact Club (Croydon).—At the October meeting G3CU lectured on SSSC and gave a fine demonstration, the gear working without a hitch. A recent *Magazine* article on the subject was read as a test while tuning procedure was demonstrated, the controls being adjusted to produce the effects mentioned. Next meeting is on November 13 at the Blacksmiths Arms, 1 South End, Croydon.

Association of North Western Radio Societies.—The next meeting of this Association is convened by the Wirral Amateur Radio Society, the Hon. Sec. of which becomes Secretary for the Association during the next three months. Club representatives present at the last meeting were those from Chester, Northwich, Wrexham, Merseyside and Wirral, with Wrexham as the hosts. Many ideas for talks and meetings were suggested, and solutions were found for problems facing some Clubs.

Army Apprentices' School Radio Club.—Meetings are now on Thursdays instead of Tuesdays, and the Club Tx, G3HOS, is on 80-metre CW during these sessions. Attendance has dropped somewhat but it is hoped that Thursdays will prove more suitable. All visitors temporarily in the Reading area will be most welcome.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE.

ACTON, BRENTFORD & CHISWICK : R. G. Hindes, 51 Rusthall Avenue, Bedford Park, London, W.4.
ALBANY : A. Meyers, G3EYE, 33 Old Kent Road, London, S.E.1.
ARMY APPRENTICES' SCHOOL : A/CSM M. Flynn, "A" Coy., A.A.S., Arborfield, Reading.
BARNET : D. Cliff, 1 Manor Road, Boreham Wood, Herts.
BIRMINGHAM : W. V. Shepard, 174 Gristhorpe Road, Birmingham 29.
BRENTWOOD : G. L. Turner, G3LA, 59 Crow Green Road, Pilgrims Hatch, Brentwood.
BRIGHTON : R. T. Parsons, 14 Carlyle Avenue, Brighton 7.
BURY : J. E. Hodgkins, 24 Beryl Avenue, Tottington, near Bury, Lancs.
CAMBRIDGE : T. A. T. Davies, G2ALL, Meadow Side, Comberton, Cambs.
CLIFTON : J. Lambert, G3FNZ, 28 Canadian Avenue, Catford, London, S.E.6.
COVENTRY : K. Lines, G3FOH, 142 Shorncliffe Road, Coventry.
CROYDON : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, S. Croydon.
DARTMOUTH : B. Farleigh, G4RJ, Montpelier, Lower Contour Road, Kingswear.
EAST SURREY : L. Knight, G5LK, Radiohme, Madeira Walk, Reigate.
EDINBURGH : C. L. Patrick, 19 Montgomery Street, Edinburgh.
HOUNSLOW : A. H. Pottle, B.Sc., 11 Abinger Gardens, Isleworth.
ILFORD : H. T. Stott, 10 Gordon Road, Chadwell Heath, Romford, Essex.
KIRKCALDY : J. Taylor, GM2DBX, The Pharmacy, Methilhill.
LEEDS : W. Hawkridge, 7 Langdale Gardens, Leeds 6.
LEICESTER : L. Milnthorpe, G2FMO, 3 Winster Drive, Thurmaston, Leicester.
MANCHESTER : H. Marshall, G4ND, 14 Greenway Close, Sale, Manchester.
MIDLAND : H. B. Bligh, 52 Norman Road, Birmingham 31.
NEWBURY : A. W. Grimsdale, G3CJU, 164 London Road, Newbury.
RAVENSBOURNE : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
READING : L. Hensford, G2BHS, 30 Boston Avenue, Reading.
ROMFORD : D. L. K. Coppendale, G3BNI, 9 Morden Road, Chadwell Heath, Essex.
SANDERSTEAD & PURLEY : T. R. Young, G2AYM, 41 Lansdowne Road, Purley.
SCARBOROUGH : P. Briscombe, G8KU, 31 St. Johns Avenue, Scarborough.
SHEFFIELD : E. Walker, G2LT, 11a Welwyn Close, Sheffield 12.
SOUTHEND : J. H. Barrance, M.B.E., G3BUJ, 49 Swanage Road, Southend.
SOUTH WEST ESSEX : L. G. Barrett, 367 Rush Green Road, Romford.
SPEN VALLEY : N. Pride, 100 Raikes Lane, Birstall, near Leeds.
SUNDERLAND : C. A. Chester, 38 Westfield Grove, High Barnes. Sunderland.
TEES SIDE : H. Walker, G3CBW, 64 Ayresome Street, Middlesborough.
TORBAY : W. A. Launder, B.Sc., G3FHI, 15 Cambridge Road, St. Mary church, Torquay.
WARRINGTON : S. Wood, G3EZX, 12 Thelwall Lane, Latchford, Warrington.
W.F.S.R.A. (Bedfast Club) : J. Beavan, G3GBL, 296 Fore Street, Edmonton, London, N.9.
WIRRAL : A. H. Watts, G3FXC, Woodend, 14 Grange Crescent, Hooton, Wirral.
WORCESTER : P. Sealey, 1 Sandys Road, Worcester.



At the Festival Exhibition and Trade Show in the Guildhall, Londonderry, the North-West of Ireland Amateur Radio Society operated GI3GFH/A. The gear was loaned by GI3BVB, and the building up and manning of the station was in every was a joint effort by Club members. Amongst the equipment was a wire recorder for the amusement of visitors, and also a display of amateur-built gear and converted surplus items. The historical section consisted of a fine collection of very early radio apparatus loaned for the occasion by the City Electrical Engineer.

Birmingham & District Short Wave Society.—The October Film Show was well attended in spite of fog. Next meeting is on November 2 at the Colmore Inn, Church Street, and will take the form of a Mock Autcion. We are asked to express the Club's appreciation to its President, G6KW, for his gift to the Tent Fund and for his continued assistance and advice at the monthly technical lectures. Final meeting for 1951 will be at the Colmore Inn on December 10; this will be the AGM.

Brentwood & District Amateur Radio Society.—The new Clubroom at the Parochial Hall, Ongar Road, Pilgrims Heath has proved very satisfactory, and fortnightly meetings will continue there, the next being on November 9 and 23. The Club station G3FSM will be taking part in MCC.

Dartmouth & District Amateur Radio Society.—Fortnightly meetings continue, and a Field Day has been held. The winter programme will include constructional work in the new Clubroom, finishing up, it is hoped, with a Club Tx. (Please note new Secretary's QTH, in panel).

Leicester Radio Society.—A Film Show was given at the October meeting, and the housefull boards were up. A similar show is being given on November 6 to cater for those who could not get in. The Annual Dinner and Dance has been arranged for January 11, and the number of tickets will be limited. Further details next month.

Manchester & District Radio Society.—At the October meeting a good gathering saw a TVI demonstration by the GPO. The November meeting takes the form of a talk on Receivers, by G5YD, followed, in December, by one on Speech Clipping from G2HW. Meetings are on the first Monday, at Manchester College of Technology, 7.30 p.m. New members will be welcomed.

Newbury & District Amateur Radio Society.—The AGM was held in October, and the new officers and committee appointed. It was decided that from October 26 the meetings would be held on the last Friday of the month. Other activities are also arranged for other dates. The November meeting, on the 30th, will take the form of a Film Show on the Ship-to-Shore Radio Service, and the use of Radar for British Merchant Shipping.

Romford & District Amateur Radio Society.—The Final D/F Contest, organised by this Club for September 30, proved a great success. Fourteen competitors started from the village green of Havering-atte-Bower, and the first transmission from G4KF/P went out at 2 p.m. At 2.51 p.m. the winner, Mr. G. Peck of High Wycombe, arrived on the spot at which the transmitter was exceedingly well hidden, complete with "invisible aerial" of No. 40 gauge wire Fifty-nine people finished up for tea at Great Warley.

A modified form of an article, variously rejected, is printed below at a personal cost of £40 for general benefit :—

CONSISTENCY IN LONG DISTANCE COMMUNICATION

Those old-timers present at a certain convention in the early 'thirties may recall the writer's advocacy of the crystal-gate superhet in the days when the one-valver was almost universally accepted among British amateurs as the best DX receiver ; who was right has been proved in the intervening years. But, considering the even more densely-populated DX bands of today, practically all are still using out-of-date methods and apparatus inadequate in selectivity and stability, whereas every amateur worthy of the name should possess a receiver capable of holding in tune stable signals tuned to the utmost practical selectivity, and a transmitter having frequency stability beyond reproach. It must be understood that the frequency of any oscillator will vary *slightly* from second to second, and even a crystal is not free from this failing, though better than any other type, due to the high Q of the crystal. Y cuts are worst, mainly owing to high temp. coeff. *Tx Osc.* The VFO is a practical necessity, but most of those in use have insufficient freq. stability for selectivity *achievable* with a *good* Rx. On 28 and 14 mc it is necessary to retune the average signal several times during a transmission when using sharp crystal selectivity—a needlessly irritating feature of the contact. The stability of any well-designed self-excited oscillator is a function of its frequency—the lower the better, but freq. multiplication accentuates any variation, a disregardable 20-cycle change at 1.75 mc becoming .32 kc at 28 mc. But by combining the output of a crystal oscillator with that of a carefully-designed variable L.F. osc. in a mixer, much higher stability than normally obtained is achieved, while by using AT-cut crystals, the natural tendency of the self-exc. osc. to drift to a slightly lower frequency, due to increase in room temperature when operating, is off-set. By keying the mixer, output from neither osc. will show up in the band in use (assuming well-shielded construction), so provision for break-in and band searching with Tx live is provided —a useful feature for contests ; C.O.-3340, 3440, 3540, or to band desired ; L.F.O. 160-460 kc. *Receiver*: Easy compensation for inevitable slight freq. drift of Tx and Rx by BFO control makes " intelligence tuning " the best method for phone, and for this reason and because it is possible to set the controls, in a way which compared to " carrier notching " with the crystal gate, is by no means so critical, to pick out a portion of a side-band free from QRM, it is preferable. A simplified method is for a Rx with gate in action to be tuned on to one side-band—carrier rejected by phasing control, and replaced by carrier from BFO, tuned exactly so that it will replace the carrier. Main disadvantages of normal crystal gate operation are instability of tuning and apparent reduction of modulation. Using medium gate

Worth Communications Services

selectivity, a band of some 1,500 cycles, sufficient for excellent intelligibility to the practised ear, is passed with least attenuation at the centre audio frequency of the speech. Further equipment advantageous, but not essential to the method, is an LF IF adaptor, and a band pass audio filter 500-2000 cycles with sharp variable freq. cut-out around 1250 cycles; the latter to clear up crystal resonance distortion noticeable on high gate selectivity. On 14 mc and higher, a CC converter *free from breakthrough* is worth while. (A combined model for 14 and 28 mc is available). High Q coils should, of course, be used, *but doping should not be practised.* To set up the Rx for this method, the BFO should be tuned to zero beat, giving minimum noise on no signal with gate in action, and a prolonged speech transmission chosen and tuned accurately on the carrier to zero beat, with RF gain at a convenient level to avoid overloading BFO. News bulletins are convenient. The BFO should now be moved to give a beat note of some 1200-1300 cycles; then RF tuning reset to zero, noting whether tuning has been above or below original setting. After carefully noting the BFO setting, move its control still a little further from the original zero beat position to produce another beat note, and adjust phasing control for minimum strength. Repeat last operation on a lowered setting and set phaser on midpoint. Return BFO to noted setting and adjust RF gain for convenient strength. If good, clear speech is not obtained, repeat with identical movements of RF tuning with BFO on the opposite side of zero setting. Finally, to show use of the other side-band, repeat with opposite movements of both RF and BFO tuning. Adjustments to eliminate QRM by slight readjustment of BFO and main tuning, or moving to the other side-band, will show the worth of the method, as, by control of selectivity, the choice of any band of AF on either side-band is available at will. Cure for resonance distortion has been given.

Modulation Notes: Continuous experiment on reduced AF band-widths proves a band of 1500 cycles from 500-2000 adequate for context intelligibility, and, in fact, descending gain from 1000 to 500 cycles is advantageous for cutting through QRM. Speech is not "full," but the personal characteristics of any voice are retained. Attenuation of unwanted frequencies with generally recommended audio filters can be much improved on, with gain in signal to noise ratio. Lack of popularity of single side-band is surprising in view of the high signal to input watts ratio. *Aerials*: The average amateur is limited by garden size, but a quadrilateral in the roof space will give excellent results on 28 mc; on 14 mc, reduction in side length by about one-third can be accomplished with little loss of gain by coiling at voltage nodes. A 132- or 66-foot top will give a good account of itself in all directions if sloped 25-40 degrees to the horizontal. Years ago, the writer was limited to a garden just sufficiently long to take a 66-foot span from the house chimney to the end of the garden, running in the least useful direction in this country—approximately West to East. Limited by DC mains to less than 10 watts to an LS5, outstanding DX was not expected, but a 55-foot pole at the garden end enabled a 66-foot zepp. to be erected at an angle of some 30°, which gave consistent contacts with W5 and 6 and the Far East on 7 and 14 mc. Raising the aerial at the house end resulted in no contacts in these directions, which merely proves that what at first appears to be a poor situation can be made good by a little thought. Where space, etc., permits, multi-element beams are ideal, though band-limited; but if conditions are only even fair for DX, 100 watts or less fed to the choice of aerials suggested will produce contact—if the receiver at the other end is up to the job. High power and beams at 100 feet or so do increase the strength of the received signal, but not in proportion to their additional cost.

It is regretted cost will not permit publication of fuller details.

SMALL ADVERTISEMENTS

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ROTARY-BEAM Antenna indication. Magslip Transmitters from 10/-. (Listed £16). Stamp for circuit and full details. Engineering Facilities Ltd., 29 Rea Street, Birmingham 5.

VALVES. Ex-Government. Large quantity wanted. Highest prices paid instantly; Types IR5, IS5, IS4, IT4, 805, 807, 813, 832, 6V6, 5Z4, 6K8, 6Q7, 6J7, Pype-Hayes Radio, 606 Kingsbury Road, Birmingham 24. (*Phone: ERD.* 4942).

REQUIRED URGENTLY. AR88's, SX27-28's, S38's, BC221's. All test equipment. Tape and Disc Recorders. Contact us before selling. Highest prices paid. Universal Electronics, 27 Lisle Street, Leicester Square, London, W.C.2. (*GER.* 8410).

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WANTED. RCA speech amplifiers Type MI-11220 J or K. Offers stating quantity and price to PCA Radio, The Arches, Cambridge Grove, W.6.

WANTED. BC-610 Hallicrafters, ET-4336 transmitters, SX-28's, AR-88's. Receivers and spare parts for above. Best prices. Write Box 864, c/o Spiers Service, 82 Centurion Road, Brighton, Sussex.

AMATEUR RADIO PANEL TRANSFERS. For full details send S.A.E. to K. Norvall, c/o H. Norvall & Sons Ltd., 5 Torrens Street, City Road, London, E.C.1.

G3CSD. 6J6 10/-. 6AG5, 6F12, 6AL5, 6C4, 6F33, 9D2, 6/-. Hundreds of others. Skillman, Franchise Street, Weymouth, Dorset.

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

ASK for free list valves, IFT's, transmitting and receiving condensers, chassis, etc. Old or reduced prices. The Radio Services, Ltd. Bullingham, Hereford.

WANTED 4336 Tx. C43Tx. Valves for both types Tuning items for 4336. Rotary tuning coils. B2 power packs. Tx frames with access doors. QRO Tx components. G2NU, 82 Church Street, Staines. (*Tel.*: 3999).

OFFERS wanted for 200 ex-equipment 725A valves. Buyer collects. Box : 999.

SITUATIONS VACANT

ELECTRONIC Circuit Engineer/Draughtsman required with sound knowledge of circuitry and component specifications, to work at Luton. Graduate Brit. I.R.E. or equivalent an advantage. Applications from Engineers with limited draughting experience will be considered. Apply to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London, S.W.1.

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

TECHNICIAN'S Test equipment, tools and spares, comprising Signal Generators R/C Bridge, Multi-range AC-DC meter, Valve volt-meter, Oscilliscope, R1155 Receiver and Power Pack. Valued £125. 29 St. Thomas Road, Newquay, Cornwall.

MARCONI Admiralty B21 Rx, in new condition. Two HF and three IF stages. Tuning 1-20 mc. All valves metered. Webb, 50 Addington Road, West Wickham, Kent.

HRO with coils 160-80-40-20 broadcast. No power pack or cabinet. Front panel complete. Good condition, £13/10/0. G3CDJ, 121 Bellingham Road, Catford, S.E.6. *(Phone: Hither Green* 3743.)

SALE. Brand New No. 19 Tx/Rx, power supplies and diagram, £9. R.208 Receiver, £7. Offers, or exchange S640. G2DFH, Pendennis, St. Erth, Cornwall.

EXCHANGE Brand-New German Voigtlander Pocket Camera (F3.5 1-1/500 sec. Leica Film) for AR88 in good condition. London Area. K. G. Thomson, G3AMF, 44 Malvern Drive, Woodford Green, Essex. *(Tel.: BUC* 5918).

SELLING out. Valves (new unused), 813 £1. Pair TZ40, 35/-. KT66 8/6. 6J6 7/6. 807 5/6. Many more—¼in. Co-ax, meters, 1155 £8, etc. S.A.E. for details. G3EI.C, 201 Tamworth Road, Newcastle-on-Tyne.

HALLICRAFTERS S.20. Communications receiver, 8 valves, stabilised HT, 540 kc to 44 mc, good working order, cash refund if not satisfied. £16 or nearest offer. R.V. Aldridge, Aprillis, New Road, Amersham, Bucks.

48 SET :—4 VALVE Tx AND 6 VALVE Rx, 6—9 mc SWAP FOR COMMUNICATIONS Rx CONDITION UNIMPORTANT. J. BOYCE, NEWICK HOUSE, CHELTENHAM.

WANTED : Marconi Magnetic Detector ; D. E. and Multiple Tuners ; 101, 106, 107 and 112 Receivers ; Fleming valves ; Coherers ; and other early wireless gear, valves and literature. FRANKLIN WINGARD, Rock Island, Illinois, U.S.A.

T1131 rack cabinet urgently required, will pay any reasonable price and carriage. G3GIQ, 65 Leyborne Avenue, London, W.13.

WANTED COLLINS MODEL 32V-1 or 32V-2 TRANSMITTER. ALSO COLLINS 75A-1 or 75A-2 RECEIVER. ADVERTISER PREPARED TO PAY A GOOD PRICE FOR APPARATUS IN FIRST CLASS CONDITION. ALL REPLIES WILL BE ANSWERED. WRITE BOX: 992.

WANTED rectifying valves type CV128 (Cossor SU750). G3BXI, J. C. Farlow, 6 The Avenue, Wanstead, Essex. (*Tel.: WAN.* 4681).

YOUR Offers. Power Unit 1000v at 500 mA, 7.5v, 6.3v 5v. Modulator 6J7-6J5-P/P6J5 P/P6L6-TZ40's-100 watts of audio. Both ex-T1131. Complete with valves. Make ideal foundation for 150-watt PA, but will separate. Box: 989.

R1224A for sale. Good condition, £4 carriage paid. Sidwell, 7 Abbotsfield Cotts, Wareside, Nr. Ware, Herts.

BC348 with P/Pack. All built in transit case. Snip at £12/10/0. B2 Tx/Rx and power pack, perfect, £15. Rowallan, Canada Drive, Rawdon, Leeds. (*Tel.: Rawdon* 983).

WANTED. Rx 6-9 mc battery or mains. Sell, or exchange 2-metre convertor, G2IQ. 2-metre G.S.V. omni directional array. 8 Grainger Avenue, Prenton, Birkenhead.

WANTED, several TCS transmitters and receivers, also accessories. Good price paid. Box No. 990.

G2HNO moved to small flat must sell 150 watt Phone/CW transmitter complete in standard rack. VFO etc., 813 PA, TZ40's Mod. S.A.E. full details. Might sell stage by stage. 25a Wentworth Avenue, Southbourne, Bournemouth.

OFFERS for 2½ pairs B.T.H. Selsyns, 240 volt AC 14 Church Street, Burslem, Stoke-on-Trent, Staffs.

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CLASS-B 807 modulator, UM2 transformer, power supply, £4/10/0. Pair American EF8 telephones with ringers, £3. Collins 46159 7 valve superhet, £4/10/0. Two Klystrons 723A/B, £1. 106 Knowsley Road, St. Helens, Lancs.

358X 9-2000 metres, flywheel tuning, handbook, £20. 1224A, 30-300 metres converted mains. External P/Pack, £6. 16 Coniston Road, Reddish, Sotckport.

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AR88 in perfect condition, offers above £50 Please write A. Farrar, 131 Broom Hill Road, Strood, Rochester.

BC221 by Zenith—brand new condition with stabilised power supply. Offers over £18. Also SX28 with Hallicrafters speaker in metal case and manual, new condition, £38. Buyer collects or delivery arranged. Yorks. area. Box No : 995.

BC348R, power pack, AC mains speaker, phones, circuit diagram. 27 RF Unit. 26 RF Unit converted 10 metres. *Short Wave Magazine* complete March 1946 to June 1951. Useful oddments. £25 or offer. G. Hastings, 134 Grand Avenue, Berrylands, Surbiton, Surrey.

AVO 7, £12. Pye communications receiver PCR 2, built in P/Pack, 10ins. ext. speaker, £12. RF26 new, 30/-. RF24 modified, 10/-. TU5B Top Band Tx, 50/-. R1196 converted to Top Band, P/P 6V6 output, 50/-. Partly built 'scope (Test Set 74) 2½in. tube, P/Pack 8 valves, 60/-. 38 set and accessories 40/-. 807s, 6K8, 6SQ7, GTIC, etc. 5/-. 6L6 metal, 7/6. Transformer 1500v 10 mA 800v 100 mA, 6.3v 7A, 4v, 5v, 2v, 20/-. VCR97 10/-. Meters, chokes, condensers, etc. List. Box : 994.

WALKIE-TALKIE Type 38 for 2-volt operation, headphones, junction box and aerial, 55/-. Briscombe, G8KU, 31 St. John's Avenue, Scarborough.

RECEIVER Hallicrafter S41W 550 kc - 30 mc, built-in speaker, noise limiter, etc. £14, offers considered. Transmitter 1154M, £4/10/0. G3EXP, 87 Craven Road, Newbury, Berks.

PUSH-PULL 807 PA, 19 by 8½ins. Black cracke panel, 7ins. chromium handles, 0-200 MA meter, coils for 3, 5, 7 and 28 mc, £6 *Short Wave Magazine* Dec. 1946, July to December 1947, January, February March 1948, June to December 1949, 1950 complete, January to September 1951, 1/- each, or offers for lot. 12 Westborough Road, Westcliff-on-Sea, Essex.

WANTED BC-348 unconverted, with 24-volt generator, T.C.S. Remote Control Box and set of Plugs and cables. Marcuse, Bosham, Sussex.

BC610 spares, cables, junction box, T50 mike, manual, relays, condensers, resistors, aerials, bases insulator guys, 250TH, two type EE8 telephones; USA Type 1-177 Valve tester with manual and charts, new condition; BC376H oscillator, BC906 freq. meter, Terry's anglepoise lamp, two 230v Selsyn motors, kit brand new boxed valves for Rx/Tx BC-659. Many other items. S.A.E. for lists. Box 997.

100w Phone/CW Tx in 5ft. rack, delivered near London. Offers around £35. Must sell, or exchange camera or Tape Recorder. Box 996.

WANTED-Class-D wavemeter, cheap. For sale, few copies of V.R.L. receiver manual (with circuit). G3COI, 59 Darlington Street, Wolverhampton.

SALE. Large quantity of Tx, Rx and test equipment. Mainly new, all high quality manfacture, low prices. S.A.E. list. Box : 988.

SMALL ADVERTISEMENTS
READERS'—*continued*

COSSOR Double Beam oscilloscope 339A, in perfect condition. Offers to W.C. Parker, 22 Castle Gardens, Dorking, Surrey.

BC 342-N Receiver in perfect condition. Offers to W.C. Parker, 22 Castle Gardens, Dorking, Surrey.

B2 Transmitter, AC, P/Pack coils, xtals, manual, spare valves, £7/10/0. 18 Spennithorne Drive, Leeds 6.

AMPLIFIER/MODULATOR. 40 watts, power supply, UMI transformer, 19in. panel, £8. Type 3 power supply, (with meters), 55/-. BC453 converted Q5'er, 50/- P40 receiver complete, 50/-. Volumes 22, 23, 24, 25, 26 *RSGB Bulletin*, 6/- per volume. 1946/7 *Radio Handbook* 10/-. Wanted S27 receiver cheap and 829. Prefer buyer collects. Carriage extra. Reply envelope please. G2BVN, 51 Pettits Lane, Romford. Essex.

FOR Sale. BC 348-0, 150 valves, transformers, coils etc., etc. Must clear. Send S.A.E. D. Parvin, 20 The Byeways, Surbiton, Surrey.

HT-19 Hallicrafter or similar Tx wanted. New condition. Fullest details to 18 King Street, Richmond, Surrey.

AR88 LF with instruction book, £40. Set new valves for above, £4. BC 348L, 250-50 cps internal P/Pack, £25. Bendix Rx's RA-10 FA, 40-80-15 and LW, £5. Bendix Rad. Compass MN26C, medium and LW, £3/10/0. Bendix Rad. Compass BC433, medium and LW, £3. Two Paxolin Telescopic Masts, 30ft., with pulleys, guys and all fittings, £2/10/0. each. £4/10/0. pair Test Set Type 74, less CRT, £2. Tx/Rx Type 1133G, £1/10/0. Indicator Unit Type 116H, £3. Wave Meter Type W.1191A, £5. Wave Meter Type 1117W, £2. Vibrator Power Units, 12v input, £1. Rx 1124C, £1. Monitor Crystal Type 4, less P/Pack, £1. BC453B Q-Fiver, £2/10/0. BC Modulator 456B, 12/6. TUB5B, £1/10/0. TUB9, 10/-. Type 195 Rotary Convertors, 24v DC to 250-50 c.p.s, £3/10/0. Petrol Pump for Garden Fountain, 24v. £1/10/0. Rectifiers 250-50 c.p.s. Input, Stab. VS110 120v out, £3/10/0. Rx Type 3515, 21 valves, includes Pye Strip, £3. Pye Strip for Television unit, £1/10/0. (2) Radio Compass Selsyn Motor 5in. dials, 15/- each, £1/5/0. pr. Tuning Unit Type 207B, 10/-. Amplifier Unit Type 3562, 15/-. Switch Unit Type 207B, 12/6. G.E.C. Fan Motor, 250 AC shaded pole, .01 HP, £2/10/0. Reversing Motors Type 74, £1. Voltage Regulators Type 11, includes AC rectifier, 10/-. Motor Generator Type 28, 15/-. High-Low Phone Transformers with switch, 1/6. 1-2-3 and 4 way Terminal Blocks, 3d., 4d., 6d. each. Morse Keys; 1/- each. 22ft. Lens 5-way Multi Coloured Flexibles, new, fittings on both ends, bargain 5/-. Flush and panel meters: Amps, mA, volts, etc. state requirements. CRT and valves, new boxed, some obsolete types, Stab VS110, etc., state requirements. Useful wood tool chests fitted with Tx/Rx gear, etc. bargains at £1 each. Standard Rack and panel with screening boxes on Roller Bearings. LF chokes and condensers, resistors, etc. all values. Offers required for "Weststat" Constant Potential Power unit 230-50 c.p.s. input 24v 6.25 amps DC out. **Wanted** (3) 12A6 valves. (1) 500-0-500 volts 250 mA transformer, rectifier and 12 or 6.3v. heater winding. Reasons for selling, having to curtail activities owing to ill health. Satisfaction or money refunded return post. Complete description of above gear on receipt S.A.E. Please add to cover carriage post etc. Stainsby, G3HJQ, Fairmoor, Morpeth, Northumberland.

SMALL ADVERTISEMENTS
READERS'—*continued*

LABGEAR 40 watt Phone/CW transmitter covering 10, 15, 20, 40, 80, metres, Clapp VFO. switched wide-band couplers, 100/1000 kc Xtal, modulator, power packs, WAC/WBE phone, very fine condition, specially built at £80. Accept £35. Buyer collects. (4) 809, £1 each. (4) 866, 10/- each. (2) J36 Bugs, 25/- each. (1) Marconi 365A key, 20/- DIO4 mike, with table stand, 50/-. Variac, 220v output 1.65 KVA, £4. Buyer collects. Wilcox Gay VFO, £3. 1000-0-1000 volt power pack, choke input, £2. Buyer collects. G2CNN, QRT, write Fairfields, Studland, Dorset. (*Phone Studland* 224).

1 box, 8 meters assorted valves, £1. 1 Type 37 oscillator, 6 valves, self powered, 22-70 mc, circuit and tuning chart. J. Holland, Bk.82, Grimsby Road, Cleethorpes, Lincs.

BC221, £12. S.640 £16, or exchange for car radio. K. Eldridge, 65 Fenton Road, Southbourne, Bournemouth.

BC342, internal 230v, noise limiter, provision external S-meter. Good condition £17/10/0, C/P. Heaps, Toll Gavel, Beverley, E. Yorks. (*Phone: Beverley* 160).

WANTED ! UHF Transceivers. For sale *Wireless World* 1945-50. *Short Wave Magazines*, July 1946—December 1950. 30A Fore Street (*Saltash* 2395), Cornwall.

UNUSED, boxed HRO Senior, power pack LS, coils. Fine job. Spare valves. S.E. London Area. £30 Box No. 1002.

SALE. Avo Universal Minor brand new condition, complete with leather carrying case, £6/10/0. Blacklaw, 8 Greenfield Place, Dundee, Scotland.

FB BC221M, fitted with AC power pack, new condition with manual, in original canvas carrying bag, £20. G3BCW, 4 Estcourt Street, Devizes, Wilts.

832's (10) new, unboxed, but fully guaranteed by replacement or money refund. Best offer over £10 or singly. Box No. 1000.

TN16/APR4, Manual, and autosweep tuning 38-95 mc. Mint and spotless. With or without valves, wanted BC221, or cash offer. Box 998.

BC433MW Rx, 230/50 AC £5. 144 mc PA, AM-14/APT, containing two HK257B's, brand new, £12. 1154 Tx, new in transit case, complete £5. R.C.A. S/A and modulator Type MI-2894A, four 6L6's output 15 ohms or 500 ohms, 100v 50c, speech limiter and compression brand new, store soiled, £12. SCR522 Rx/Tx, with valves, £5. SCR522 Tx complete, £3. SCR522 Rx, less valves, £1. BC633 FM Rx, with valves, 20-28 mc, £6. RT-3/ARN 1 70 cm Tx/Rx, 30/-. Also AR88LL and BC221 with internal modulation, both as new and unmodified, best offers. Wanted Leica or similar camera-view Huddersfield. (*Tel. : Honley* 248), or Box No. 1003.

RECTIFIER R.34F, spares and case, £25. SCR 522 Tx/Rx, complete in rack FT/244A, no xtals. Antenna loading unit MT/36C/24. Unused, unmodified, Offers. Box No. 1001.

COLLINS T.C.S. Transmitter modified amateur use, link output, 40 watts phone, seventy watts CW 1.5 to 12 mc VFO/Xtals, complete dynamic microphone £10, power supply for same £5. Webb's MX50 transmitter, 50 watts, Phone/CW, all bands, 31½in. rack, complete £25. Murphy MI AC Signal Generator, 100 kc to 60 mc, with manual, £10. 1155 receiver, perfect, £7/10/0. DIO5 xtal mike, £2. Want good frequency meter and 144 mc gear, 5 Highwood Road, Parkstone, Dorset.

25 watt table-top transmitter, CW 40/20 metres, 6L6/807, with Type 247 power-pack in transit case. Got my first 50 countries with this rig. Offers around £10 to GM3DNQ, Fernlea, Bellevue Road, Kirkintilloch.

WANTED—AR88 chassis, stripped, with or without case. C.H. Bell, 55 Westfield Road, Hull.

AN/PRC5 American version B2. 30w Tx/Rx 4—16 mc with P/P, coils, book, £6. New boxed valves 832's (4) 25/- each. TTI5/CV415 (4) 30/- each. 24G/3C24 (4) 25/- each. 811 (2) 25/- each. 6F5 (2) 10/- each. New unboxed. 829B/3E29—60/-. RK34/CV18 10/- each. Wanted: Bug Key, junk communication Rx. Box No. 1004.

SALE/EXCHANGE, oscilloscope kit, AC S/W superhet, 100 micro-amp meter, 4½" vice. Wanted 1§ Lathe, metal stock, mocroscope, R1155. 5 John Street, Cambridge.

EIGHT pounds offered for BC610 aerial tuning unit Type BC729—A. Baynham, 9 Oak Avenue, Pennypot, Harrogate.

R.C.A. AR77—Bendix compass SCR 269/G complete with gen book—Altimeter Unit RT7/APN/1—Eimac 35T's—Few gross Sprague Condensers. Offers ? Box: 1005.

£6 Marconi Receiver, Type RG 34c, 9-valve, 1.2 to 22 mc in 5 bands. Require 6.3 at 3 amps and 160 to 200 volts HT and speaker. £5 Marconi Wavemeter, type GL/T, No. 3, 50 to 90 mc. Both items £10. Purchaser pays carriage. Bryce, 27 Dalblair Road, Ayr, Scotland.

SALE. Amateur clearing rotary convertors, transformers, condensers, valves, CRT's, meters, microphones, books, periodicals, etc. S.A.E. for list J. Hayes, Harcourt, Stanton, Salop.

FOR Sale. Hambander. Been used 8 hours. Great bargain at £12. Must sell. Box 991.

832 (4) 25/-. QVO 4/7 (6) 20/-. 811 (2) 30/-. 6V6 (4) 7/6. New ten-meter crystals in ½in. holders. 28800 kc 28731 kc 25/-. Genemotor 12-14v input, 1000v 75 mA output, new, 30/-. Enclose S.A.E. for return cash if sold. G2XV, 89 Perne Road, Cambridge.

EDDYSTONE 640. New condition with fitted internal S-meter. £20 or offer to Berry, 30 Lynton Avenue, West Ealing, London, W.13.

WANTED. Chassis, front panel, and tuning mechanism for AR88 (D). Usable condition. Montague, 93 Fleckney Road, Kibworth, Leicestershire.

SMALL ADVERTISEMENTS
READERS'—*continued*

FOR Sale. 2-1150v. power units (866 rectifiers), £4 each. 450v. plus 750v. unit, delay switch, mic. current, £6. Speech amplifier, 6C5-6C5-P/P 6A6, with power unit £6. Modulator, p/p TZ40's, 3½in. meter, £4. 3-band switched Tx, 6C5-6N7-807, 5, m/c meters, £12. 140-watt final, P/P 4304B's (304B) three 3½in. meters, aerial coupler, £3/10/0. All above on 19in. panels with chassis. Carriage extra. The complete 140-watt Tx in rack £35. Beaumont, 102 Sydney Street, Chelsea, S.W.3.

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