The SHORT WAVE Magazine

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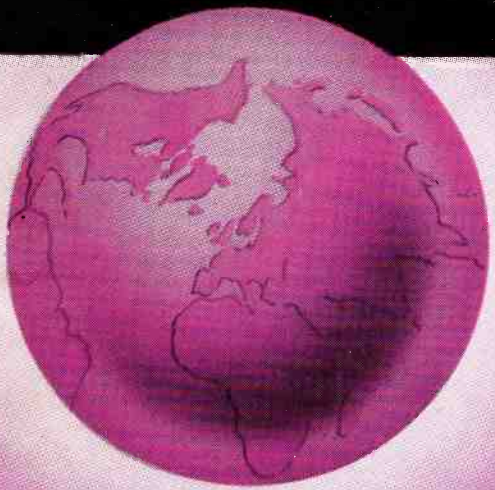

EXCLUSIVELY FOR THE RADIO EXPERIMENTER & TRANSMITTING AMATEUR

VOL. VIII No. 8 OCTOBER 1950

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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

Vol VIII OCTOBER 1950 No. 87

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Published the Friday following the first Wednesday each month at 53 Victoria Street, London, S.W.1 *Telephone: Abbey 2384.*

Annual Subscription: Inland 20s. Abroad 22s. post paid

AUTHORS' MS

Articles submitted for editorial consideration must be typed double-spaced with wide margins on one side only of quarto sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and a figure quoted in the letter of acceptance. It is a condition of acceptance that copyright of all material used passes to the Short Wave Magazine Ltd. on publication.

SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

E D I T O R I A L

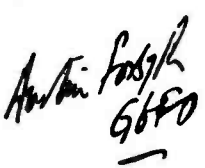
Conditions

At about this time of year, we begin to look forward to what is regarded as the winter DX season. The HF bands should be opening again, and altogether there is a feeling of expectancy and a sense of anticipation.

But this season things will be a little different. We are likely to find that the LF bands, 1·7 and 3·5 mc, will be more interesting, in the DX sense, than Ten and Twenty. For we are still on the down-slope of the sunspot cycle which, judging by previous experience, tends to produce better and more consistent DX working on the longer wavelengths.

It is a curious fact and a remarkable coincidence that the shape of this curve was just about right when exploration of what were then the higher frequencies started, 'way back in 1922-23. We now know that the early DX working in the 90-180 metre region would not have been possible if the peak of conditions, in terms of the sunspot cycle, had not happened to coincide with the first tentative efforts to open up amateur working on wavelengths below 200 metres. And as the pioneers went lower in wavelength during the years following, they were in effect chasing this peak—until it almost seemed that "the shorter the wavelength the better the DX" could be regarded as the axiom for the future.

In general terms, what we shall find this season is a reversal of this tendency. A band like Eighty will give DX results even better than it did last year, and real DX should also be possible on the Top Band. Present indications are that the cyclic variation is being well maintained and that the HF bands will not be as reliable as they were during the winter of 1949-50.



SUPER MODULATION

Some Notes on the System

By **D. ABBOTT (G6TA)**

The principle of "Super Modulation" is being more and more discussed on both sides of the Atlantic. Fundamentally, it enables a high level of modulation to be obtained with reasonable output but low audio power ; this is one of the factors that make Super Modulation an attractive proposition from the amateur point of view.—Editor.

WITH any normal method of amplitude modulation the average power used when modulating 100 per cent. is one-and-a-half times as much as that used in the unmodulated condition. For this reason it is impossible, whatever system is used, to get "something for nothing". The additional power must come either from the modulator in the form of audio, or from the HT unit which supplies the power amplifier.

The four usual methods of modulation are effected by altering, at audio frequency, the voltage which exists on the control grid, the screen grid, the suppressor grid or on the anode. The last of these methods, which is the best, is unfortunately much the most expensive.

To the new comer who has just received his 150-watt telephony licence, the cost of a modulator capable of producing about 80 watts of audio is quite formidable. Built with good components, it may be anything up to £30 or even more. The beginner, therefore, oftens turns to one of the first three systems mentioned above.

Some Comparisons

Unfortunately, in order to obtain a good percentage of modulation with these systems, it is then necessary to run the PA valve or valves comparatively inefficiently. As an example, the figures in the table are given for a British-made pentode. In each case the HT is 1,000 volts.

Type of Modulation	RF Carrier in Watts
Anode	60
Screen grid	40
Control grid	16
Suppressor grid	15

As these are the actual figures given by the manufacturer, it appears that unless anode modulation is employed, the chances of working that elusive DX station on 'phone are much less than they could be.

For the past 18 months, the writer has been carrying out experiments with various systems which fall under the heading of what is now colloquially called "Super Modulation". Attention was at first directed to the methods of Doherty, Terman and Woodyard. Fig. 1 shows a simplified circuit diagram of one of Doherty's methods. The general principle is that V1, which is called the carrier valve, supplies the unmodulated carrier, and V2, known as the peak valve, supplies about half of the positive peak of the modulation cycle and also during this part of the cycle lowers the anode load of V1, thereby enabling V1 to supply the other half of the positive modulation.

During the negative half of the audio cycle V2 is idle and contributes nothing while V1 is controlled by the modulated RF grid drive.

The operation of the circuit is involved and will not be given in full in this article. For any reader who is interested enough to wish to try out this system, it can be pointed out that L3 acts as a quarter-wave transformer and introduces a $\pi/2$ phase shift between the anodes of V1 and V2, hence the necessity of the phase shift network in the grid circuits. V1 is biased to cut-off and V2 is biased so that it just draws no anode current with unmodulated drive. It is not possible to give component values as these depend on the frequency to be used. The data below Fig. 1 will enable them to be worked out, however.

It will be appreciated that changing frequency from one amateur band to another will, unless extensive alterations are made in component values, result in different phase relationships between V1 and V2, thereby upsetting the whole system. Although this type of circuit is capable of excellent results on one spot frequency, for the reasons just mentioned it seems of little use to the average amateur.

The Taylor System

In all "Super Modulation" systems the procedure is the same, in as much as they employ a carrier valve and a peak valve. Various methods have been advocated for changing the power on the peak valve. The best known is that due to Taylor, which has received some publicity in the U.S.A. When the Taylor system is used on frequencies such as 14 and 28 mc it has the disadvantage that the two valves are in parallel.

In the method to be described, although the valves cannot accurately be said to run in push-pull as they work asymmetrically, the advantage is that their inter-electrode capaci-

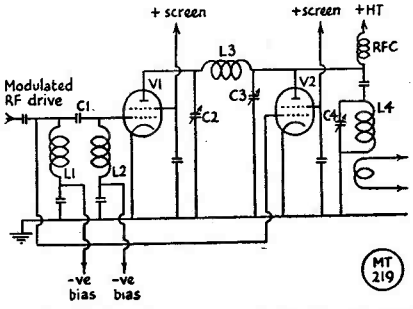


Fig. 1. If the effective load of L4, C4 with aerial connected is Rl ohms, then ωL3 = 2R ; 1/ωC2 = 2R ; and 1/ωC3 = 2R. If the grid input resistance of V1 is Rg ohms, then ωL1 = Rg ; ωL2 = Rg ; and 1/ωC1 = Rg. There should be no mutual inductance between L1 and L2.

ties are in series across the tuned circuits.

Fig. 2 shows a normal push-pull power amplifier using two 807 valves running at about 100 watts. It must be emphasised that when employing 807's there is a danger of parasitic oscillations occurring, and for this reason it is recommended that the circuit of Fig. 2 be wired up first and thoroughly tested out for any instability before proceeding further. The usual screening precautions should be taken including metal "collars" placed round the lower parts of the 807's. The use of spilt-stator grid and anode condensers and the symmetrical placing of components is essential. The anti-parasitic chokes may consist of 20 turns of 30-gauge enamel on 100-ohm ½-watt resistors. The particular lay-out will, of course, control the self-inductance and capacity of the wiring, and a slight change in the APC's may be necessary.

Complete stability must be obtained without any neutralising being used as when the circuit is modified for "Super" modulation the valves do not work symmetrically and any form of neutralising will be rendered ineffective.

The Modifications

Having got the normal PA working absolutely satisfactorily the necessary alterations should be made to convert the circuit to that of Fig. 3. To start with, condenser C6 should be omitted and the modulation transformer secondary impedance adjusted to work into an impedance of about 15,000 ohms. With a grid drive of 6mA, and using a dummy load in place of the aerial, the HT should be switched on and the anode tuning condenser rapidly tuned to resonance by watching for a dip in the reading of the milliammeter in the cathode of V1, which is the carrier valve. The coupling to the load should then be varied until V1 draws about 75 mA. It will be noticed that V2 takes very little current due to the fact that its screen is at earth potential.

If audio power is now supplied from the modulator, the cathode current of V1 will fall slightly, but that of V2 will increase considerably. It will be very convenient if the RF output can be checked on an oscilloscope. If sufficient audio is applied the modulation will expand the envelope satisfactorily but it is improbable that a perfect trapezoidal pattern will be obtained. The condenser C6 should now be connected in circuit and the variable resistor R5 adjusted for the best wave form.

If an oscilloscope is not available a phone monitor may be used. It should be borne in mind, however, that with this system, too much audio or an incorrect adjustment of R5 can cause serious overmodulation and distortion. For this reason an early check-up with an obliging local amateur should be carried out.

Only a comparatively few watts of audio are required and a 6N7 valve run in Class-B with zero bias and about 275 volts HT would make a suitable final valve in the modulator. Although it is not intended to give a detailed

Table of Values

Fig. 2. Push-pull 807 PA Circuit for Modification

C1, C4 = 50 + 50 μμF
C2, C3 = 0·001 μF
R1, R2 = 100 ohms
APC = Anti-parasitic chokes (*see text*)
RFC = RF choke 2½ mHy
M1 = 0-10 mA
M2, M3 = 0-100 mA
V1, V2 = 807

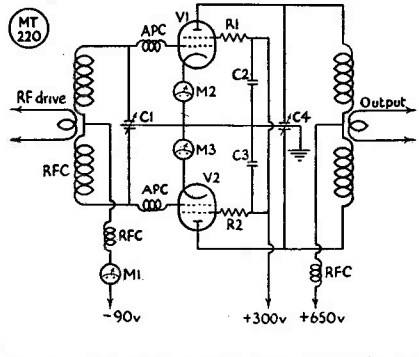


Fig. 2. Basic circuit to which Super Modulation can be applied by the modifications shown in Fig. 3. As explained in the article it is better to get this circuit working correctly before attempting the modifications— and the anti-parasitic chokes APC are essential.

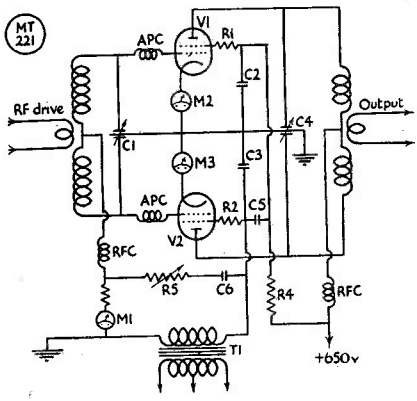


Fig. 3. The circuit as used by G6TA, derived from Fig. 2. All necessary values are given in the tables and results discussed in the text.

Table of Values

Fig. 3. Circuit modified for Super Modulation

C1, C4 = As Fig. 2
C2, C3 = As Fig. 2
C5 = 2 μF
C6 = 0·1 μF
R1, R2 = As Fig. 2
R3 = 20,000 ohms
R4 = 50,000 ohms
R5 = 20,000 ohms variable
RFC = As Fig. 2
APC = *see text*
T1 = Modulation transformer
M1, M2, M3 = As Fig. 2
V1, V2 = As Fig. 2

description of a possible modulator, the writer (using a transverse current microphone) employed a 6SJ7-6J5-6N7 line-up quite satisfactorily. For other microphones giving less output another stage of voltage amplification might be needed.

It will be realised that the load on the modulator over an audio cycle varies considerably and for this reason a fixed bleeder resistor, if placed across the modulation transformer secondary, will improve the speech quality slightly. This resistor should be 5-watt rating and values from 20,000 to 50,000 ohms may be tried. Altering this resistor will of course change the impedance into which the modulation transformer "looks" and it will be necessary to vary the ratio of the latter.

As different makes of 807 valves differ somewhat in their characteristics a further slight improvement in the speech quality may be effected by altering the 50,000-ohm resistor in the screen of V1 a little. Incorporating a speech clipper in the modulator would enable a high level of modulation to be maintained without the risk of going "over the top."

Some Results

Having described this method of modulation a few facts on its performance will be of interest. It will be noticed that the quiescent carrier power is only about 50 watts and a few of the QRO fraternity may look askance. However, it must be remembered that the difference, at a distant receiver, between 50 watts and 100 watts is only half an S-point.

Consider now what happens when modulation is applied. When using that 100 watts to a normal pair of 807's anode modulated with say 50 watts of audio and assuming an RF efficiency of 75 per cent., the aerial power will increase from 75 to 112½ watts when 100 per cent. modulation is taking place. In fact, the power being used to convey intelligence is 37½ watts. With "Super Modulation" however, assuming an efficiency of only 60 per cent. for screen-plus-grid modulation, our RF power on full modulation will increase from 30 watts to 45 watts due to V1 and from zero to 35 watts due to V2. In other words, the difference between the fully modulated and the unmodulated output is as much as 50 watts—and that with only a few watts of audio. This "controlled carrier" effect will be found most effective in minimising heterodyne interference.

During the period September 1949 until March 1950, the writer carried out extensive tests with two transmitters. The circuit just described was used in one and a normal anode-plus-screen modulated arrangement in the other. Although the quiescent carrier of the second was just double that of the first it was found that the transmitter using "Super Modulation" was nearly always considered easier to read by the distant station.

R.A.F. AT THE RADIO EXHIBITION

One of the exhibitors at the recent Radio Show at Castle Bromwich was the Royal Air Force, the exhibit being designed to show how radio communication and radar are used to control and direct flying operations, in both the offensive and defensive roles. In appearing at the Exhibition with demonstrations of this kind, the Service was acknowledging the great debt it owes to the scientists and technicians who have made—and are still making—such a large contribution to the fighting efficiency and technical superiority of the R.A.F.

SINGLE-VALVE VFO DRIVER

An 807 Exciter

By **R. YOUNG (G3BTP)**

The author offers a design for what is in effect a two-stage all-band transmitter, in that the exciter unit described here will give sufficient output to drive a tetrode RF amplifier to 25 watts without the use of buffer stages. This is not usually held to be good practice, but it is also true that an under-run 807 in a suitable circuit, constructed for stability, can be made to give entirely satisfactory results.—Editor.

DURING the construction of some thirty different VFO drivers, one difficulty constantly experienced was the obtaining of sufficient power from existing packs to supply the buffers and doublers necessary to get RF output on all bands up to ten metres. To overcome the necessity of building additional power packs and yet retain the most desirable features of an all-band driver, the VFO described below was projected, and the results obtained found to give every satisfaction.

It provides a variable frequency drive on all amateur bands up to and including Ten, capable of driving an 807 PA to 25 watts.

Circuit Design

The driver consists of an 807 valve in a series-tuned Colpitts circuit, output being taken from the anode circuit via choke coupling. Due to the operation of the screen at RF earth potential, and the inherent isolating properties of the grid circuit, the frequency remains substantially constant under the normal variations encountered in in a driven stage.

Plug-in coils are used in the frequency-determining circuit, allowing this to operate either in the band 1·7-2·0 mc or 7·0-7·3 mc. The series condensers in this circuit are larger than usual in order to obtain good operation at 7·0 mc, but not so large as to effect the frequency stability to any extent.

Two variable condensers are used, one to preset the frequency calibrated dial, and the other for the main tuning.

The calibrated dial is marked in 10-kc steps on the band 1·7-2·0 mc over one half, and in 20-kc steps on the band 7·0-7·3 mc on the other half, the main tuning condenser being capable of complete rotation. Direct drive is used on the frequency presetting condenser and a 4-to-1 reduction drive on the main tuning condenser.

The screen is fed from a stabilised source at 140 volts and the anode from a normally regulated power supply of 300 volts HT. Choke capacity coupling to the driven stage is used, a small parasitic stopper being included in the circuit.

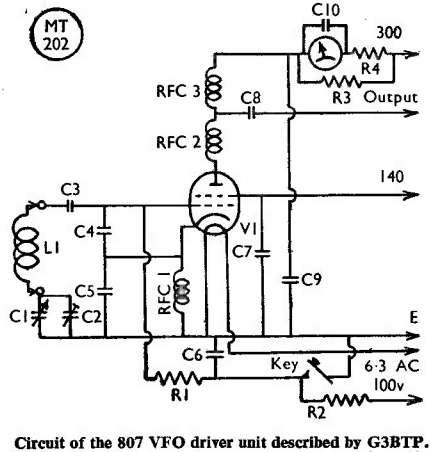
Grid block keying with an over bias of 100 volts controls the operation of the VFO, together with the necessary decoupling network. Anode current is 26 mA with a voltage of 300, screen current being just under 1 mA.

(over)

Table of Values

Driver Unit Using Single 807 Oscillator

C1 = 140 $\mu\mu$F, tuning
C2 = 30 $\mu\mu$F, tuning
C3 = 200 $\mu\mu$F mica, high stability
C4 = 400 $\mu\mu$F, high stability
C5 = 500 $\mu\mu$F, high stability
C6 = 0·002 μF, paper
C7 = 0·001 μF, paper
C8 = 150 $\mu\mu$F, 600-volt wkng.
C9, C10 = 0·005 μF, mica
R1 = 27,000 ohms, 1-watt
R2 = 56,000 ohms, 1-watt
R3 = 470 ohms, ½-watt
R4 = 2,000 ohms, ½-watt
RFC1 = 2·5 mHy, pie-wound
RFC2 = 15 turns 20 DCC on 1-megohm resistor
RFC3 = As RFC1
L1 = 1·7 mc; ⅜-in. close-wound on 1½-in. form, 24 DSC. 7 mc: 9½ turns 20 SWG enamelled on 1½-in. former.
V1 = 807



Circuit of the 807 VFO driver unit described by G3BTP. By the use of two coils, for 1·7 and 7 mc, at L1, stable output is obtainable on all bands 1·7-28 mc to drive a following 807 to 25 watts.

Construction

The driver is built into the chassis and case of a dismantled Wilcox-Gay crystal multiplier —although any sturdy case lending itself to rigid construction would be suitable.

Existing components were used where possible, the tuning condenser and meter being retained *in situ*, but the valve holder and supports required inversion to bring the 807 anode above the chassis. Under chassis components are those associated with the screen and frequency-determining circuits, and those above the chassis with the output circuit. An exception is the plug-in coil, which is above the chassis, but no complications arose due to its position. Power is fed to the driver by the original Jones connector, which protrudes through the back of the case.

All wiring the vibration of which might cause frequency variation is carried out in 14 SWG tinned copper, other wiring being in 14/36 flexible PVC-covered wire.

Setting Up and Operating

At the writer's station, the VFO driver is used to excite an 807 PA to 25 watts input. This PA has a tuned grid circuit capacity coupled to the driver, permitting doulbing in the PA grid circuit to obtain 3·5 mc drive from a 1·7 mc fundamental, and doubling to 14 mc or quadrupling to 28 mc from a 7·0 mc fundamental. To obtain drive at 7 mc it is usual to quadruple from 1·7 mc to keep the PA grid current to a reasonable figure.

The PA and driver are connected by 3 in. of large-diameter co-axial cable, a greater length seriously affecting the drive obtainable at 28 mc.

Results

In practice, no noticeable drift has been observed after a warm-up period of ten minutes. During this period the drift is some 300 cycles or less at 1·7 mc. No keying filters have been found necessary, the grid decoupling network being sufficient to reduce clicks to negligible proportions. The figures given in the table are representative of the drive obtained when operating an 807 PA with 80 volts fixed bias, 20,000-ohm grid resistor and choke, and 400 volts at the anode, the PA being unloaded.

To date, the only reports received, in more than five months' operation, have been T9 or T9x, with no sign of clicks or chirp on any band.

Conclusion

The construction and handling of the VFO have brought out three points not normally discussed in the considerations of VFO design. These are :

(1) That a dial of greater reduction ratio than 4-to-1 is a handicap in contest work;
(2) Buffers are not essential, providing that a power oscillator with good isolation is used, and
(3) An accurately calibrated VFO is not necessary, since the terms of an amateur licence call for an accurate independent frequency check on all transmissions.

Consequently, providing reasonable care is taken in the design and construction, a single-valve driver with moderate power drain will cover the most rigid requirements of the majority of amateur transmitters.

VFO Freq. Band	PA Grid Circuit	Grid Current	Output Freq.
1·7 mc	Choke only	2·5 mA	1·7 mc
1·7 mc	3·5 mc	5 mA	3·5 mc
1·7 mc	7 mc	2 mA	7 mc
7 mc	Choke only	1·5 mA	7 mc
7 mc	14 mc	2·5 mA	14 mc
7 mc	28 mc	1 mA	28 mc

★ ★ ★

COMMERCIAL TRANSMITTING EXHIBIT

One of the Stands at Castle Bromwich which attracted the attention of a number of interested amateur operators was that on which Standard Telephones and Cables, Ltd., were showing a complete 20 kW transmitter, typical of the equipment supplied on many foreign contracts. The design of this transmitter is such that it can be used either for straight sound broadcasting, high-power CW working or picture transmission. In fact, all that one would need to complete "the rig" would be a few rhombics firing in the right directions and a couple of decent receivers !

BIT OF HISTORY

The Derby and District Amateur Radio Society is fortunate in having on its present roll one of the founder members of the original Derby Wireless Club, which first came into being in 1911. On June 14 last, this member (Mr. A. T. Lee) gave the Society a most interesting talk on his experiences and the methods of those early days, describing among many other quaint devices that of having two buckets, one on the floor and the other let down into it by a cord over a pulley, to form a variable condenser. Members of the Club were readily accepted by the Services during the first World War, and amateur activities were commenced again in 1922. We acknowledge the July issues of *Experimental Radio Derby* as the source of these notes.

FEEDER DESIGN AND TUNING

Getting the RF Into the Aerial

It is possible to get results of a kind with almost any sort of aerial conforming approximately to established designs, and generations of amateurs have been misled thereby. But much better results can be obtained by proper attention to the layout of the aerial and its feeder system, if the principles involved are thoroughly understood. This article deals with the subject of feeder design from the practical point of view.—Editor.

A TRANSMITTING aerial system is erected for the purpose of radiating signals of the greatest possible strength. The directional properties of the various types of aerial are well known and the average amateur invariably studies their polar diagrams and chooses an arrangement which suits both the particular geographical layout of his garden and also gives him optimum radiation in certain directions which he requires. The result is the erection of a dipole, W8JK, parasitic beam, rhombic or one of the other well-known types. Whatever type is finally decided upon has to be fed with RF power from the transmitter and the purpose of this article is to give some practical advice on feeder line installation. The writer is particularly concerned with lines of the "600 ohm open-wire" type, but the points made about these apply almost equally to tuned feeders, the popular 300-ohm and 75-ohm ribbon feeders and, of course, feeders constructed from coaxial cable, although the latter have certain problems of their own, notably concerned with "balance."

A perfect feeder system would transmit all the available power from the transmitter to the aerial and would not in any way modify the radiation pattern of the aerial nor would it contribute any radiation itself. Feeder line radiation gives rise to strong local RF fields within the station, with consequent pick-up on house wiring and so on and this, in turn, can produce TVI and BCI to an alarming degree as well as wasting power which should be going into the aerial proper. A tremendous number of TV and BC interference complaints could have been avoided by careful feeder design.

Conductor Spacing

One point must be made quite clear at the outset. If exactly equal and opposite currents flow in the two conductors of a feeder line no radiation will occur provided that the spacing between the conductors is kept to a small fraction of a wavelength, *e.g.* 1/50th of a wavelength or less. In other words, the standing-wave ratio on the line is immaterial from the point of view of feeder radiation, but any unbalance between the two wires is of vital importance and cannot be tolerated. The whole aerial and feeder system should therefore be symmetrical throughout; Zepp feeds, Windoms and the like, whilst admittedly they can be balanced, are definitely prone to feeder radiation troubles; if at all possible, they should be avoided in preference to symmetrical systems. Dipole, parasitic beam, W8JK beam, rhombic, two half-waves in phase, lazy-H aerials and similar systems can all be symmetrical and are therefore a first choice in amateur work. Incidentally, "End-ons," W3EDP's and all forms of "AOG" radiate from their point of connection to the transmitter and their use merely invites BCL and TVI complaints. In the interests of symmetry it is very important to bring the feeder away from an aerial at right angles for at least the first half wavelength; obviously, the feeder must lie in the radiation field of the aerial and currents will thus be induced in the feeder wires. These induced currents are only of no consequence if they are equal and opposite in the two conductors, and this can

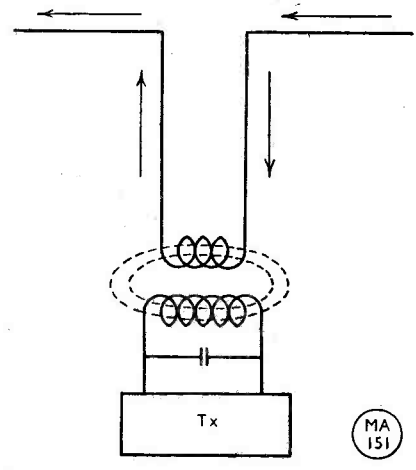


Fig. 1. Dipole and feeder system excited by inductive coupling. Instantaneous current distribution is as shown by the arrows. Note that equal and opposite currents appear in the feeder line.

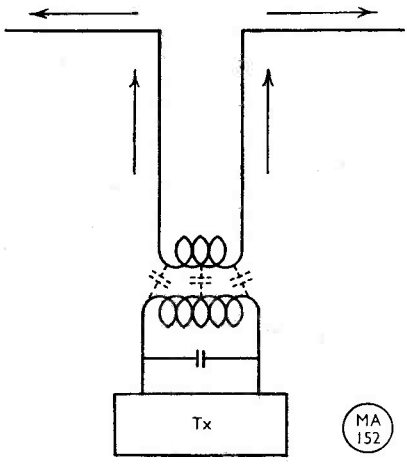


Fig. 2. The effect of stray capacity coupling from the transmitter ; the dipole and its feeder are excited in a spurious mode, with in-phase currents appearing on the feeder line.

only be the case when the feeder leaves the centre of the aerial at right angles.

Practical Cases

Consider the simple case of Fig. 1, which shows a dipole and feeder inductively coupled to a transmitter, the current distribution being shown diagrammatically by the arrows. This is the theoretically correct arrangement, but it cannot be achieved in practice merely by inductively coupling the feeders to the transmitter tank circuit. What actually happens is shown in Fig. 2. Inevitably, capacitative coupling must exist between the tank coil and the coupling loop and it will be seen that in-phase currents occur on the feeder system and the whole length of the feeder plus aerial tends to operate as a Marconi against ground. In practice, of course, a combination of inductive and capacitative coupling exists and whilst the aerial itself is excited as a dipole there is considerable unbalance in the feeder currents with consequent feeder radiation. Obviously, if the coupling coil and the tank coil could be electrostatically screened from one another without upsetting the inductive coupling, the capacity coupling shown in Fig. 2 could be removed and the system would work correctly.

Fortunately, a device known as a Faraday Screen has just the required property—it forms an electrostatic shield without modifying the inductive field. Basically, a Faraday screen consists of an earthed "comb" which is placed between the coils to be coupled. Naturally a complete metallic mesh cannot be used, otherwise inductive coupling would occur between the exciting coil and the screen itself and both inductive and capacitative fields would be shielded. An open metallic comb is a very inconvenient device to use for this purpose, but fortunately an effective Faraday screen in the form of a screened coupling loop can be constructed very simply as shown in Fig. 3 ; the diagram explains the construction of such a loop far more effectively than words. The length of unscreened inner conductor AB should be kept as short as possible and the earth connection at A should be stout and directly down to the transmitter chassis.

Coupling Arrangements

An aerial coupling unit should always be used to couple a transmitter to an aerial system—never be content with the lazy man's method of pushing a few turns of a link coil into the transmitter tank circuit. This is merely asking for capacity coupling with consequent in-phase feeder currents ; even with screened coupling loops the method is undesirable. From the point of view of harmonic radiation it is almost the worst possible arrangement simply because the link

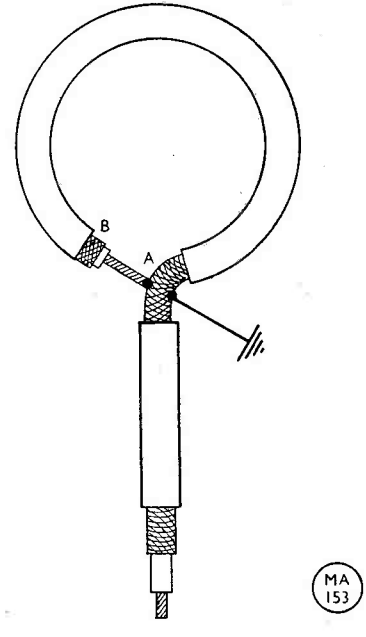


Fig. 3. Suitable screened coupling loop constructed from a length of coax, as described in the text.

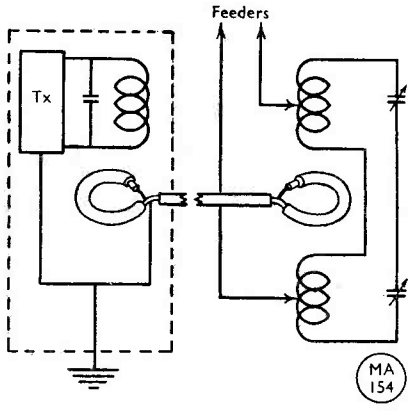


Fig. 4. Typical aerial tuning unit coupled to the transmitter using coax and two screened loops as Fig. 3.

coil-to-tank coil capacity offers a low impedance to the higher frequencies of the harmonics which may be present in the tank circuit and invites them to excite the aerial with in-phase currents and thus radiate. Fig. 4 shows a typical aerial tuning unit fed with a low impedance coaxial line via screened coupling loops. The length of the coaxial line is unimportant but multiples of a quarter-wave should be avoided, if possible, because a quarter wavelength of cable grounded at one end has a high impedance at the other end and thus the whole aerial running unit could be "live" to RF. This state of affairs could excite the system as a Marconi.

Incidentally, all link coupled stages within the transmitter itself should be coupled by means of screened pick-up loops earthed at one end, as in the case of the aerial tuner coupling. This has a very beneficial effect on harmonic reduction and general transmitter stability.

Cutting to Resonance

It is clear that if the total length of wire from one end of an aerial system to its centre, where the feeder is connected, and down the feeder to the aerial tuning unit happens to be a half-wave or a multiple of a half-wave, the whole system could be resonant in a manner for which it was not designed. Furthermore, the impedance at the aerial tuner end in this spurious mode of resonance would be high and any very small capacitative coupling from the transmitter or tuner would excite the spurious mode with the greatest of ease. One's immediate reaction would be to adjust the feeder length so that the total length of wire from one end of the aerial right down to the tuner terminals becomes an odd multiple of one quarter wavelength. This would, of course, prevent a resonance at the spurious mode on the fundamental frequency but, unfortunately, an odd number of quarter waves on the fundamental is equal to a number of half waves on the second harmonic. This fact is inescapable and the only thing which can be done is to cut a compromise length of feeder in the hope that neither fundamental nor harmonics will excite the spurious mode. As a result of experiment it has been found that the best compromise total length from the end of the aerial back to the feeder connection and down the feeder to the aerial tuner is slightly less than an odd multiple of one-eighth wave on the fundamental. This is, of course, a compromise length but it does, in practice, take care of the possibility of high impedance points (at the spurious mode) appearing at the aerial tuner end of the feeders.

Having discussed briefly the steps which should always be taken to ensure correct functioning of an aerial feeder system, a note on a simple method of detecting the presence of spurious modes of resonance may be of interest.

Detecting Spurious Effects

The first indication that something is amiss is unbalanced current readings in the two legs of the feeder, but it is unwise to accept meter

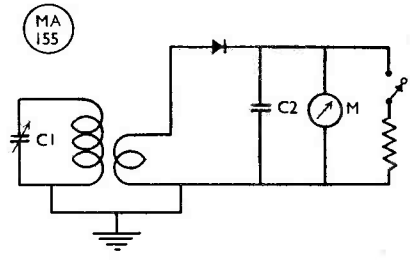


Fig. 5. A simple RF detector for investigation of current distribution along feeder and aerial systems, as discussed in the article. C1, C2 are ·0001 μF and M is 0-1 mA

readings taken at one place only in a feeder system. Circumstances may give rise to readings which appear to be satisfactory even though very bad out-of-balance is present. Always add in, temporarily, an extra one-eighth wave of feeder and take a second pair of readings—these may be quite revealing !

A small RF detector of the type shown in Fig. 5 (built in a screened box apart from the plug-in coil) is an extremely useful piece of test gear. A set of coils can be made to cover a wide band of frequencies and the presence of

fundamental and harmonics can be checked with ease. The switch and resistance across the meter serve to reduce the sensitivity when required and the rectifier X may be of the crystal diode type.

To test for in-phase feeder currents with this instrument, merely short circuit the aerial tuner coil and the end of the aerial feeders, thus removing all inductive coupling and leaving any capacitative coupling unaffected. Switch on the transmitter at low power and explore the feeders for fundamental and harmonic RF. Any readings obtained are clearly due to aerial operation on a spurious mode and the steps outlined in this article should be put into effect; the improvement in general "handling" and the reduction of TVI and BCI, to say nothing of RF feedback and other objectionable effects within the station, will be really well worth while. There is something very satisfying in the knowledge that all the usable RF generated by the transmitter is really getting into the aerial system proper and not being squandered in power lines, local telephone lines or being shot skywards from radiating feeders.

STATION CONTROL

Switch-Relay System For Speedy Operation

By **G. P. ANDERSON (G2QY)**

We all have our own ideas about station control —which means, essentially, change-over switching. Since no two amateur stations are alike in detail, each problem is an individual one. But descriptions of control methods used by others are always helpful and frequently inspire improvements in one's own system.—Editor.

DURING a recent station overhaul, considerable thought was given to operating control, and in this article the system adopted is outlined. It has proved very satisfactory, providing push-to-talk control, enabling break-in to be used, and including a means of adjusting the VFO frequency without interfering with reception or energising the transmitter, a signal from the VFO just strong enough to be identified being heard in the receiver. It also allows of remote operation of the transmitter.

Control is obtained by means of a 3-way switch of the type found on the surplus market. Alternatively a rotary switch could be used, but the writer finds the "key" type of switch more convenient for rapid operation.

The facilities provided may be summarised by indicating the conditions prevailing for each position of the switch:

Control Position	Receiver	VFO	Transmitter
1. Receive+VFO	On	On	Off
2. Receive ..	On	Off	Off
3. Transmit ..	Off	On	On

The control circuit also mutes the receiver when the transmitter is on, and disconnects the input to the modulator when the transmitter is off, to prevent the audio feedback that can occur if a loudspeaker is in use.

Examination of the diagram, Fig. 1, in conjunction with the following notes should make the method of operation clear. A/4 is a high resistance relay, obtainable on the surplus market; the original model had a resistance of 2,000 ohms, and was provided with several change-over contacts; the exact types required will depend upon the facilities to be catered for, or the circuit may be adapted to suit the relay available. In the circuit shown, three "make" and one "break" contact are used. The resistor R is required to limit the current flowing through the relay to such a value that it just closes firmly, and can conveniently be made variable until the correct value has been found. The relay is actuated from the 350 volt (or other comparatively low voltage) HT supply to the transmitter, and the power for energising the aerial change-over relay is obtained from the same source. (In the writer's case, the aerial relay is a surplus Type 77 modified by rewinding to operate from a low current, again through a suitable series resistor).

The control unit consists of the 3-way switch (2-pole 3-way) referred to above, and is fitted conveniently on the operating desk, in the microphone preamplifier unit.

General Description

In order to describe the working of the unit, it is proposed to consider the conditions for each position of the switch, taking the normal receive position first.

Receive.—Relay A not operated, contacts as shown in Fig. 1.

(1) No HT (350 volts) on transmitter.

(2) No 350 volts on aerial relay; aerial on receiver.

(3) Input to modulator short-circuited via A4.

4) VFO off.

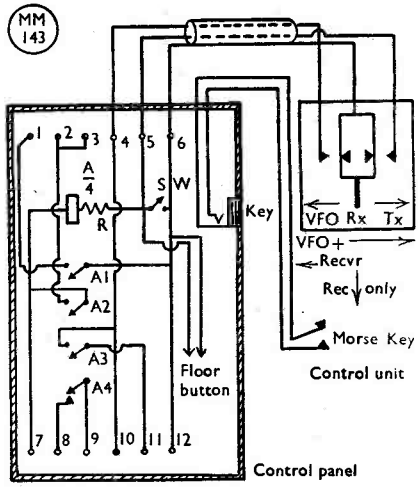


Fig. 1. General arrangement of the switching and control system devised by G2QY and discussed in the text. The key for the connections is given separately.

Receive + V.F.O.

(1) and (3) as above.

(4) VFO on, by earth on Tag 10 (via Tag 4 and control unit).

Transmit.—Relay A operated via earth on Tag 5 through control unit.

Contact A1 : Mutes receiver by applying a negative voltage from an external source to the AVC line of the receiver.

Contact A2 : Applies 350 volts HT to Transmitter (Tag 2). Applies 350 volts HT to Aerial Relay (Tag 3).

Contact A3 : Connects VFO. by earth on Tag 10.

Contact A4 : Short-circuit removed from Mod. input.

The control of the VFO may be seen by reference to Fig. 2, which shows the first amplifying valve of a VFO described recently in this *Magazine* (June 1950). The idea is equally applicable to other designs.

It should be observed here that since it is probable that the 350-volt supply that is broken to switch the transmitter will only supply the earlier stages, the PA and other stages should be biased to cut-off in the absence of drive, since the HT will be left on them when the control is in the "receive" positions.

Fig. 1 also shows connections for a Morse key ; this may be run conveniently in the same multi-way cable as the control circuits, helping in keeping the wiring neat.

It will be seen that the conditions described under the "transmit" position of the control switch are achieved by applying a short-circuit across Tags 5 and 6 of the control panel.

Control Panel Connections

Fig. 1

Tag 1 = Rx muting (*see text*)
Tag 2 = 350-volt HT, Tx
Tag 3 = 350-volt, Aerial c/o
Tag 4 = As shown
Tag 5 = As shown
Tag 6 = As shown
Tag 7 = 350-volt HT supply
Tag. 8 = Mod. input
Tag 9 = Mod. input
Tag 10 = VFO cathode } *see*
Tag 11 = VFO earth } *Fig. 2*
Tag 12 = Earth, HT—

Where it is desired to keep the hands free during operation of the transmitter, it is convenient to use a small foot-operated switch, connected as shown to Tags 5 and 6 ; a door bell-push is quite satisfactory for this purpose. The switch shown on the panel as SW is to provide local control for adjustments if the control unit is some distance from the transmitter.

Results

The control unit described has proved extremely useful in generally speeding up station operation, particularly in contests, and does enable easy push-to-talk operation. An experience with it may serve to illustrate this point. During a 'phone contact with a ZD4 during which we were much troubled by interference, the ZD4 announced the usual "QRX I'll check your channel". The writer flipped his transmitter on to offer to change frequency, whereupon the ZD4 came back and said the channel would soon be clear "as the station on there was going to QSY ! QRX again". That was sorted out quickly enough and the contact continued on push-to-talk lines, dodging interference when necessary and obviating long repeats. Semi-BK on CW is equally simple, by switching to receive (or removing your foot from the floor button) between sentences.

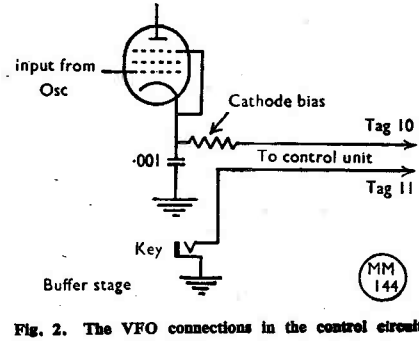


Fig. 2. The VFO connections in the control circuit.

IMPROVING SCREEN MODULATION

Further Variations on the Original Circuit

By H. J. BEACH (GM8BO)

Screen control is a method whereby good modulation can be obtained with audio driving power much lower than is required for conventional high level systems. The author discusses further the practical application of SAM control and shows how efficiency can be increased by a simple modification.—Editor.

IT will be appreciated by those who have conducted experiments with screen control that in order to maintain symmetry over the modulation cycle, the DC potential of the screen must be reduced to a lower value than would normally be used for anode modulated Class-C telephony.

The writer discussed this point in an article which appeared in the January 1950 issue of the *Short Wave Magazine*; and it was seen that owing to the necessary reduction of the screen voltage, the power output of the PA, for a given valve or valves, was somewhat reduced.

The following points, although rather in the nature of a recapitulation, are mentioned here in order to form a basis for the discussion to follow. When applying modulation to the screen grid, the audio cycle will be symmetrical only if the DC screen potential is reduced to such a value as to permit the positive half cycle excursion to be of the same amplitude as the negative half cycle.

A limitation of the positive audio peak is imposed by the anode potential; and it will be seen that if the ratio Va/Vg_2 is small, then the permissible amount of audio superimposed on the screen must also be small. From the foregoing we deduce that (*a*) Either the screen potential must be reduced to a value such that a reasonable depth of modulation, say, 70 per cent., may be applied symmetrically, with a consequent loss of RF output power, or (*b*) If the anode potential could be raised simultaneously with the application of each positive audio half cycle, then the DC screen potential could be raised in proportion, thus maintaining symmetry of the modulation cycle, and also, an equally important point, the RF output would be greater.

In order to fulfil the requirements laid down at (*b*), experiments have been carried out with a combination of screen and control grid modulation, the operation and circuitry of which is described in the following notes.

Theory of Operation

It was seen from the foregoing that if the anode potential of the PA was raised during each positive audio half cycle applied to the screen, a modulation depth of a high order could be obtained, whilst maintaining complete symmetry.

If a small proportion of the modulation is applied to the PA control grid or grids, and arranged such that it is applied simultaneously with the modulation on the screen, but reversed in phase by 180 deg., then it will be seen that the control grid becomes negative at the instant that the screen becomes positive. The effect of making G1 negative is to reduce the current through the valve and the anode load; then, by Ohm's Law, the potential at the anode will approach that of the supply by an amount proportional to the change of I*a*.

Since Va has now been raised, a larger positive audio voltage excursion is permissible on the screen, which, if Va is increased sufficiently, will enable us to reap the benefit in two directions: (*a*) The modulation cycle will remain symmetrical to a depth of the order of 95 per cent., and (*b*) The DC screen voltage can be raised, yielding a greater RF output from the PA than higherto possible with modulation applied to the screen only.

The method employed by the writer to achieve this condition is shown in Fig. 1, but the following comments will assist in clarifying its operation.

The transmitter at GM8BO consists of a VFO, coupled by a low impedance link to a remotely situated buffer/doubler push-pull PA unit, with the audio gear below; the circuit of the latter appeared in the April 1950 issue of the *Short Wave Magazine*. The modulation applied to the control grids of the 807 PA is fed via the buffer/doubler valve, V1 of Fig. 1; it will be seen that V1 is anode modulated, which results in the RF drive to the control grids of the 807's rising and falling in sympathy; this will be recognised as the well-known low level method of modulation.

At first sight, it is perhaps not quite obvious how V1 derives an audio component from the primary of the modulation transformer, inasmuch as it is connected to the "cold" end of the winding from an audio point of view. Along any load in the anode circuit of a valve, whether it is resistive or reactive, there exists an AC potential gradient, which is a maximum at the anode. In normal practice

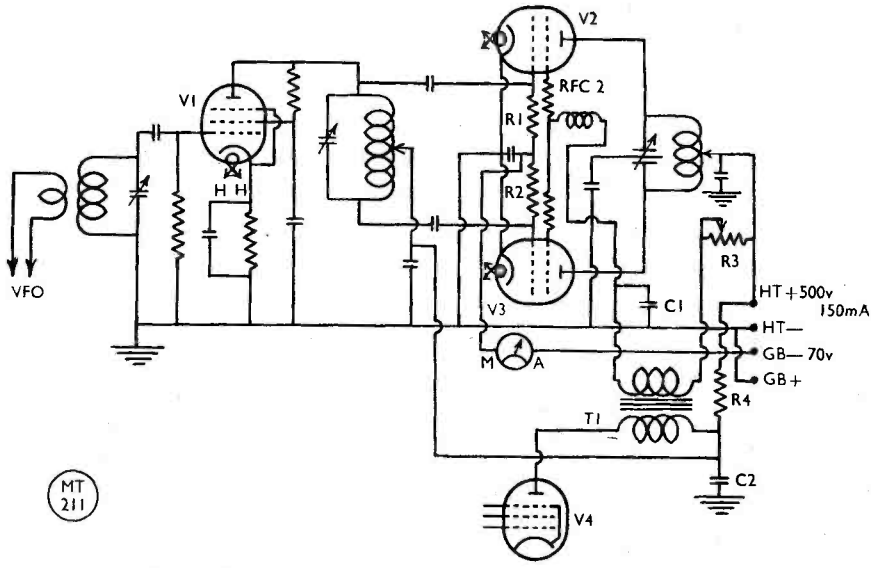


Fig. 1. The buffer-doubler PA circuit, showing connections for screen and control grid modulation of the push-pull 807's. The values given in the table are those directly affecting the operation of the system ; otherwise, the circuit follows normal practice. (See also *Short Wave Magazine*, January and April, 1950.)

one usually ensures that the HT end of the load is entirely free from residual audio potentials, by filtering via a condenser having a low reactance to the speech frequencies.

The usual precautions mentioned above are employed in the writers' transmitter (*see* circuit), but even so, it was found by examination that a small residual audio component, of the order of a few volts only, became manifest at the HT end of the modulation transformer primary, and, in the particular set-up under discussion, was found just sufficient to provide the correct amount of control grid swing of the 807's.

Having regard to the correct phase relationship between the screen and control grid audio components, it will be seen from the circuit that the modulation transformer secondary will have either a zero or 180 deg. shift with respect to the primary, depending upon which way round it is connected. The out-of-phase condition, as mentioned earlier, is the one required ; and this cannot be mistaken as the effect on the modulation is quite marked. Before commenting on the setting-up procedure for this type of modulation, further mention should be made of the method of modulating the buffer/doubler, with suggestions for alternative connections for varying the amount of audio applied .From Fig. 1 it will be seen that the 6V6 modulator (V4),

Table of Values

Fig. 1. Circuit for Screen and Control Grid Modulation

C1 = 0·002 μF mica, 1000-volt working
C2 = 16 μF electrolytic, 350-volt working
R1, R2 = 25,000 ohms 1 watt
R3 = 50,000 ohms wire wound potentiometer, 5 watts
R4 = 5,000 ohms vitreous wire wound, 20 watts
T1 = Woden UM.1 modulation transformer
RFC1 = RF choke 2·5 mH
V1 = EF50
V2, V3 = 807
V4 = 6V6

and the buffer/doubler (V1), are fed from a common HT supply, via the series dropper R4 ; now inasmuch as V1 derives its HT supply effectively from the anode load of V4, then obviously any fluctuations due to speech frequencies will serve to modulate the anode of V1. In the writer's transmitter, V1 is an EF50, but in the event of a different type of valve being used as the buffer (requiring a greater audio swing than can be derived from the HT end of the load) then provision can be made for this by tapping up the modulation transformer primary toward the anode, as shown in Fig. 2.

Setting-Up Procedure

If the PA derives its bias from grid leaks, and therefore varies with the drive, there is a

limit to the amount of drive which can be applied to the 807's.

It has been seen that 95 per cent. modulation with perfect symmetry can be obtained ; but, as is the case with control grid modulation alone, over-driving results in downward modulation ; and carried to excess, breaking of the carrier.

The system should preferably be set up by injecting a sinusoidal signal, of amplitude known to simulate the mean output level of the microphone, from an audio signal generator ; and the screen potential and grid drive for the 807's adjusted for optimum conditions. With 450 volts on the anodes of the 807's, the writer has driven the PA up to 35 watts, whilst maintaining complete symmetry over the modulation cycle, at a depth of 95 per cent. Using V1 as a doubler has no adverse effect whatsoever on the operation of the system, the output on 28 mc being quite as good as on the fundamental.

Results

The control-and-screen grid system of modulation described above, although perhaps not entirely original, offers further scope for amateurs who wish to experiment along these lines ; and, furthermore, is guaranteed to give excellent speech quality with full modulation, together with a great saving in power and equipment.

A PA efficiency of 70 per cent. has been realised with the writer's transmitter, and, having thoroughly tested the system over a period of many months, it has been decided that a 15- or 20-watt modulator is quite unnecessary to effect solid contacts.

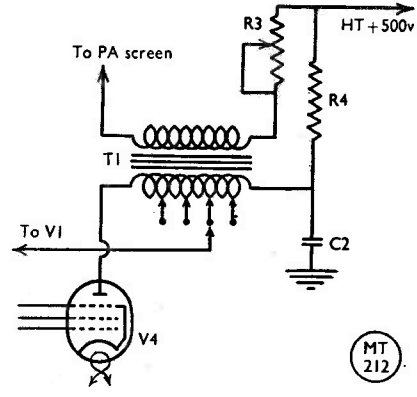


Fig. 2. The 6V6 modulator and modulation transformer as shown here illustrate the method of tapping the HT feed for V1 towards the anode of V4, thus providing a greater audio swing at the control grids of V2, V3.

All W districts, VK, and Africa were worked during the 1949-50 winter season on 28 mc, and 14 mc stations are now continuing to give excellent reports.

Although the RF output of the PA does not differ much from that claimed for screen modulation alone, the advantage is in this: That the *average* modulation depth afforded by the system described is far greater ; and it is this latter point which is so important in making one's transmission heard through heavy interference.

ONE STICK—BUT FOUR WIRES

Making the Most of Aerial Space

By **H. TEE (G8UA)**

WHEN it comes to aerials most amateurs are too conservative. They will spend months of hard work, not to mention large sums of hard-earned money on a QRO transmitter—and then are content with only one aerial. The usual reason given is that they have space for one mast only, so . . . only one aerial. Here at G8UA, there is but one 33-ft. dural mast ; nevertheless, four aerials are in use.: A 67-ft. Windom, a 14 mc doublet, a 14 mc folded dipole, and a 28 mc dipole. How is it done with the one mast ? Easy . . . . . When you enter your favourite restaurant do you see only one overcoat per coat-rack ? No. They hang the coats round the rack, don't they ? Well, do the same with your aerials—hang them round your mast.

Fig. 1 shows the present lay-out at G8UA. The distance between the mast and the chimney is just over 100 ft., so two horizontals (the Windom and the 14 mc doublet) are slung in line in the usual manner. From the top of the mast are hung two verticals—the 14 mc and the 28 mc folded dipoles. Of course, they are not perfectly vertical (the vertical line is taken by the mast) but they are near enough to the vertical to have the characteristics of vertical aerials, *i.e.* low-angle radiation, and omni-directivity.

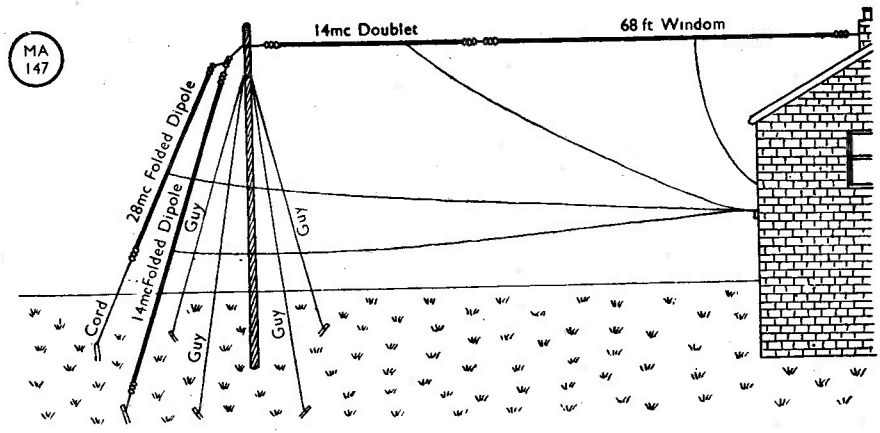


Fig. 1. Having noticed how coats can be hung round a hat-stand, G8UA decided to use his mast as a suspension for vertical aerials, somewhat in the manner shown in the sketch. His system consists actually of four separate aerials—two vertical, and two horizontal. Vertical or near-vertical aerials have the great advantage, on the HF bands, of almost omni-directional radiation.

The two horizontal aerials were first slung from one halyard at the front of the mast, to the house. From the second halyard, at the rear of the mast (Fig. 2), were suspended the two folded dipoles. These latter were anchored at the lower ends to short stakes in the ground—in the case of the 28 mc folded dipole a cord was used to secure the lower end of the aerial to the stake.

It is fully realised that many readers will not be so fortunate as to have a length of 100 ft. in the garden. But with 66 ft., or even less, a good selection of aerials is possible. For a 66 ft. length an all-wave aerial such as a Zepp or a "VS1AA" may be used, with vertical 14 and 28 mc half-waves. Or as an alternative if you do not have the space for 66 ft. in the horizontal direction, there is the excellent all-band, non-directional tilted folded dipole as described by W1BRK in *QST* for June 1949; this aerial is claimed to be effective on all bands from 7 to 28 mc, and requires only 44 ft. in the horizontal direction.

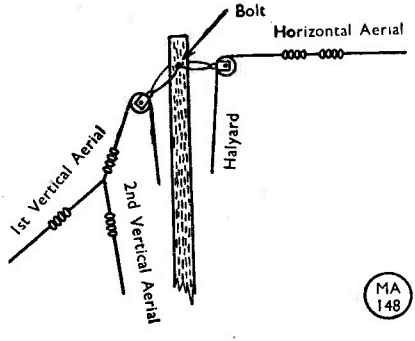


Fig. 2. General idea of the tie-up at the top of the mast, allowing independent lowering of the two sets of aerials.

An arrangement of vertical aerials in close proximity to a metal mast and metal guys will cause the theorist to purse his lips and shake a doubtful head. But if every amateur worried too much about theory our bands would be empty, except for the commercials.

And if you really want a *de luxe* lay-out, why not try some vertical beams hung from the halyards? A 28 mc beam with wire elements should present no difficulties, and even a 14 mc single-section W8JK with the ends bent inwards is quite feasible.

So if you feel your style is cramped with only one aerial, hang them round your mast. Some people collect stamps, coins, match-box covers, and even QSL cards. Why not collect aerials?

★ ★ ★

RADIO AMATEUR COURSE

A course for those in the Sussex area within reach of Brighton wishing to take the Radio Amateurs' Examination has been arranged at the Preston Technical Institute, Preston Road, Brighton. Both radio theory up to R.A.E. standard and Morse instruction are given under the direction of F. R. Canning, A.M.I.E.E. (G6YJ), and the classes will run until next May. Detailed information can be obtained from the Principal at the address stated.

DX COMMENTARY

CALLS HEARD, WORKED & QSL'd

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

ONCE again we have to report that DX conditions have been far from well. The patient shows little tendency to recover from his recent prolonged illness, and further bulletins will be issued from time to time.

All this, of course, was to be expected, and we are not yet in the trough of the long-term cycle which decides the state of our bands. We'll be worse before we're better !

One saving factor is this : That for the DX man it often happens that "bad" conditions are better than "good" ones. There is some DX there, and it is more easily heard simply because it is more conspicuous. The chief annoyance is still the prevalence of short-skip conditions, which continue to pack in the EA's, I's, OK's, UA's and Scandinavians at appalling strengths for most of the day.

When conditions are "good," however, we have the whole band full of loud DX signals, which makes anyone searching for new countries waste an awful lot of time listening to old ones. As things are now, he knows that most of the really weak signals are likely to be worth a good look.

As an example, let us quote the morning of September 15. Between 14100 and 14000 the band-population was something like this : Twenty or thirty strong Europeans ; a similar number of weakish G's ; VK9JC and three VR2's (2AS, 2BU and 2AA). Now and then, a ZL or VK, but not many. But had the band been full of ZL's and VK's in the manner usually associated with "good" conditions, those VR2's would have been very difficult to spot. As it was, they stuck out like spikes.

So, if you want cheering up, just reflect on the fact that bad conditions may be better than good ones. Dig your way through those short-skippers and see what you can find—but don't, *please*, sit down and call CQ DX on top of a VR2 who is already doing the same thing for you. Two of them, on that morning, were neatly "paired" with G's calling CQ ; both the VR2's were calling CQ Europe, too. (As we once remarked, if you can't hear 'em you can't work 'em).

DX on Twenty

The 14 mc band, as usual, bears the brunt of the attack, although Forty is attracting a little more attention at last. But Twenty is still the band for popularity, and here is the usually summary of the doings thereon.

G3BDQ (St. Leonards) worked VS1DY, ZS3R, ZS's, ZE's, VQ2 and 4, FF8JC and LP2J (Jan Mayen Island) in the course of a few days. G5FA (London, N.11) raised ZS3K for a new one, together with VS1's and 2's, ZE, KG6, YI and ZC4. (By the way, all the MD7's appear to have become ZC4's). On 14 mc phone G5FA raised EA6AR and IS1EHM.

G2BJY (West Bromwich) sums up the state of the band by saying that the Continent (of

Europe) has provided wonderful signals at all times of the day, but that there *have* been times when it was possible to work DX with 25 watts. He raised VU2LJ (1600), FQ8AC (2100) and CX6AD (2130), along with some ZS's and W's.

Reporting for the first time is G3GUM (Formby), but he is an old friend and has been a keen listener since 1926, or earlier, so we naturally don't dismiss him as a novice. In his first four weeks, using an 807, he has raised MI3, ZE, KH6, VP6, OY, YI, VS1, VU, VS7, LU and lots of VK's and ZL's 'GUM has found the band terribly unstable, with signals suddenly appearing from someone apparently about four doors away and turning out to be from the other side of the country.

G3ATU (Roker) can be depended upon to winkle something out, and this time he emerges with ZS8MK and MD9AA for new ones, but thinks Twenty has been in a "deplorable" state. Further up North, GM3CSM (Glasgow) adds all these for new ones: EA6, PJ5, LZ, VP8AK, GD, KR6, KG4, CR5AC, FY8, FP8, CR4 and YI. He has received his cards from VP7NM, EA6AF, PJ5CW, KG4AD, FP8AC and CR5AC, but would like to know if anyone has ever had a QSL from FQ8SN, F9QV/FC, AR8AB and 8MR, 3V8AG, 8AN and 8AJ, UP2AA or 2KBC, and EL3A ? (We ourselves can confess to AR8AB, 3V8AN and UP2AA !) 'CSM also worked HL1US (a few hours before the invasion started), and SU1UU, who is ex-MS4UU and MI3UU. He will, by now, be EQ3UU, and asks us to mention it so that people won't be saying "there goes another phoney."

GW2CLP (Swansea) works the band only between 0600 and 0730 BST. During that period he found a new one (YK1AH) and was surprised to have heard ZS1BV come back to a CQ at 0645. And on August 23, with a dead band at 0630, the VK's suddenly piled in at 0700 and for 25 minutes the LF end was thick with them, after which it all went dead again. 'CLP also tells us that HZ1KE informed him that H.H. Prince Abdullah Feizal will shortly be on the air as HZ1AF. This is confirmed by the fact that some SWL's have reported hearing H.H. on the air from HZ1KE.

G8PL (London, N.W.3) has worked YA2B, who has all the marks of being a genuine YA (for a change !) He is said to be W2SN, working in Kabul, and says QSL to Box 25 in that city, or to W2SN in U.S.A. He has been heard quite a lot, so let us hope he turns out O.K. Others worked by 'PL were CM2PD, 6OK and 6NF, FM8AD, FQ8AC and TG9AD—all with the indoor aerial.

G2HKU (Sheerness) collected ZE3JL and 3JQ, VQ4KRL and ZC4XP. He has heard ZS7C several times, but no luck as yet. G3ESY (Hereford) raised VP8AO, VP5AL, KH6, 3V, OX, ST and others including LX1JW who, we believe, is genuine *and* QSL's. Another unusual one was ZD4AB at 0700 GMT.

And that seems to be all the 14 mc news, the only other snippets worthy of mention being that HV1A is on both phone and CW and appears to be genuine; that 9S4AR and 9S4AX are supposed to be in the Saar, but we refuse to count them as a separate country; and that W's have been heard calling 6V6AA, whoever *he* may be.

Forty Livens Up

You could have knocked us out with a sledge-hammer when we heard VP8AK and VP8AP QRM-ing one another on 7 mc at 2300 one hight, but since then it has become quite a commonplace event. From G3BDQ comes some useful gen: All the following are active on 7 mc, mostly from 2345 GMT onwards—VP8AJ (Port Lockroy), 8AQ (Port Stanley), 8AK (Deception Island), 8AL (Argentine Island) and 8AP (South Orkneys). They are very active and keep a good watch; we were again somewhat knocked out when we called a PY on about 7050 and had VP8AK come back to us instead !

G5FA heard VP8AP and worked LZ1KZ, KP4KD and CN8XD; G3ATU was lucky and worked the first-mentioned (with 5FA

The subject of this photograph is amateur station PZX, of South Norwood, London, and was taken in 1912. The owner is now better known as G3HT of Edgware. At that time, his "non-synchronous rotary discharger," energised from a home-built transformer giving 3,000 volts across the secondary, was tuned to 450 metres. And somewhere in the photograph is that "Marconi-type sliding jigger." Those were the days !

FOUR BAND DX

Station	Total Score★	3·5 mc	7 mc	14 mc	28 mc	Total Countries	Power
W2QHH	437	72	70	193	102	196	35
G6QB	436	41	77	185	133	207	150
G3ATU	387	26	73	188	100	195	150
G2WW	348	21	52	170	105	181	150
G5FA	318	19	95	135	69	147	150
G3FNJ	280	24	46	118	92	145	150
G6BB	256	25	61	118	52	132	10/85
G8PW	241	15	60	108	58	122	25/100
G2BJY	234	4	24	102	104	142	25
ZB1AR	233	31	45	113	44	120	150
G3FGT	222	32	37	102	51	119	60/100
G8VG	217	24	57	110	26	124	60/75
G2YS	214	24	33	117	40	130	150
G3ABG	204	22	54	122	6	123	150
G6QX	197	16	29	106	46	120	30/150
G2FYT	191	5	31	124	31	131	150
G3FXB	188	21	48	88	31	101	25
G6TC	170	11	43	98	18	107	20/75
G2HKU	166	1	42	110	13	120	4/25
G2VJ	160	4	13	87	56	104	150
G6AT	159	21	46	91	1	97	100
GM3EST	147	20	23	102	2	106	150
G2DHV	144	22	20	91	11	94	25/60

★ *Sum of the four Band Totals*

sadly listening in the background !) But 'ATU describes Forty thus-wise : "Numerous rumba bands, tango orchestras, women singing loudly in Spanish, jamming stations and other rude noises. Heard, also, a few genuine amateur stations, all CW." Worked, VP8AP, TA1T (0001), VK6DJ (2315) and numerous ZL's (around 0800 GMT).

Further comment from G3ATU : "I give a quiet smile when I read the plaints of VS1's and VS6's about replying to G CQ's on Forty and being ignored. Boy, they should listen at *this* end." Another factor, of course, is that the average G on 40 is not DX conscious, and has his receiver gain set at a comfortable "local" level.

G2HKU's 25 watts have raised YV6AO CO3BU, ZL, W and VE. And he has heard FM8AD and TI2PZ on the band. G8VG (Dartford) worked KZ5IP and had a call from LX1ZA, who says he is genuine (unlike the previous LX1ZA also worked by G8VG !) This one received his licence on September 2, and was using 0·75 watt. 'VG also complains about the state of the band, what with Broadcast (genuine) and further "Broadcast" (amateur spitch variety), service stations and all the rest.

Underneath this junk is some nice DX—sometimes. But don't *all* start getting on the band, for goodness' sake, There's plenty on it already. Now if we only had the use of that 21 mc band they promised us five years ago. . .

Top Band Topics

The big news on the Top Band is that TA3FAS is active on 1815 kc. G2PL (Wallington) worked him on both phone and CW on September 7. TA3FAS was RST 58/99 ; nice work from 'PL again, and doubtless many will follow in his footsteps ere long.

G8JC (Worcester) says that Top-Band activity is increasing in that part of the world, with G3NL, 3FQC, 3GHL, 3BGR and 8JC himself all doing their stuff. G2YS (Chester), after his victorious battle with G6AB in the year-long Marathon, has decided that he has gaps in the other bands that need filling, so he is forsaking the Top Band for a while, although he will be representing the local Club in the MCC next month.

G8NF (Huddersfield) has worked 58 counties and 14 countries up to date. We are no longer carrying a table showing these achievements, but keep tabs on your total scores, which may possibly be wanted later on !

The Month on Ten

Negative reports are the order of the day for 28 mc ; may be it will have staged a comeback by the time you read this, but it seems doubtful whether the band is really going to function at all this season. A great pity if it doesn't—if only for the fact that all its normal traffic will be spread over the other bands, to the detriment of same !

G2BJY comments that by this time twelve months ago it was wide open ; this year it has been full of short-skip and noise, mostly the latter. GM3CSM makes a plea for more CW on the band, which, of course, is logical enough if conditions are going to be bad. The average phone signal which one would pass over in good times as only being R3 and S4 would probably get a 569 report at least on CW.

Personally, we think that if only more people would *use* the CW end of the band (on CW, naturally !) some good QSO's would result. As it is, the band is full of stations

who give it one ook and then don't even bother to send a tentative CQ.

Contests and All That

You will note that the Four-Band Table has an unfamiliar look about it this month. We have added an extra column representing the "Total Score," being the sum of the country totals on the four bands. This, of course, gives a measure of the all-round work of a station and really makes a good scoring criterion for a Four-Bander. Another figure that it would be interesting to know is the number of countries worked on *all four bands* ; but before we know where we are we shall be having large country-totals on the Top Band and therefore shall have to consider a Five-Band Table.

By now the VK/ZL Contest has run half its course, but you still have time to get in and work them. Here are the details :

September 22, 1200 GMT to September 24, 1200 GMT—CW.
September 29, 1200 GMT to October 1, 1200 GMT—Phone.
October 6, 1200 GMT to October 8, 1200 GMT—CW.
October 13, 1200 GMT to October 15, 1200 GMT—Phone.

This is closely followed by the *CQ* International DX Contest, as follows :

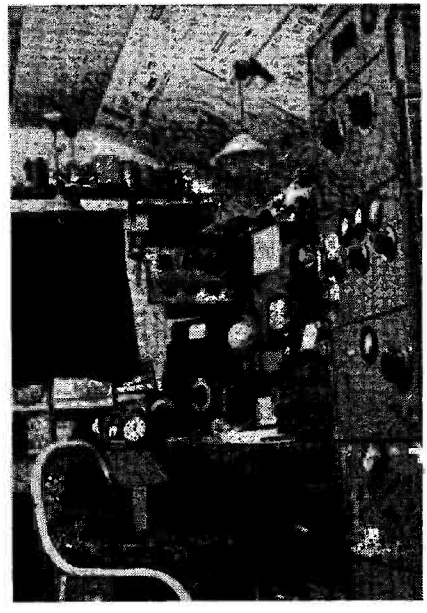
October 28, 0200 GMT to October 30, 0200 GMT—Phone.
November 4, 0200 GMT to November 6, 0200 GMT—CW

The only other Contest that we wot of in the near future is our own "MCC" (Magazine Club Contest), which runs on the Top Band from November 11 until November 19 between the hours of 1700 and 2300 each day. If you want to work lots of Top Band stations, go up there and give some points to the Clubs, but *please don't call "CQ MCC"*—leave that to the stations taking part. If *you* do it, it misleads them into thinking that you are a Club station.

Country-Counting

We were surprised, but none the less gratified, to observe the venomous comments with which our suggested methods of scoring (as quoted last month) were received. With one accord the customers cry "For Heaven's Sake leave things alone !" The consensus of opinion is that the present system is full of faults and anomalies, but it is at least widely known and accepted. Furthermore (and this we note with a little gentle amusement) the change over to another scoring system would mean hasty searching through logs to find out just what one *had* worked, and the idea of this seems to be extraordinarily unpopular in some quarters !

So, with a sigh of relief, we announce that things stay as they are. But you *may* count Newfoundland/Labrador (VO) as a separate country from Canada if you worked it before April, 1949. So stick back those "ones" that some of you deducted, and we, at any rate, will accept a VO contact, before the fusion, as a contact with a separate country.



The recently rebuilt station of G2HKU, Sheerness, Kent, who copes with 230-volt DC mains. Operating mainly on 14 mc, results at the beginning of August were 119 countries in 35 Zones, and 42 States, using 25 watts into a dipole.

Operating Habits

G6BB (London, S.W.2), commenting on The Old Timer's recent plea for some faster CW operating and cackle-cutting, suggests that "OM" saves a lot of fuss about names, is shorter, and more in keeping with the tradition of our hobby. Personally we agree, but the Christian-name habit has dug down pretty deep now ; so much so that a DX station will often tell you his name before he even gives you an RST. 'BB also suggests that it is not discourteous or even curt to sign off with "73 CUL GN OM" instead of "Best wishes and best of luck and FB DX Archibald OB."

Further suggestion : That $\overline{KN}$ should be rigidly used to denote that a QSO is in progress (as, indeed, it should be) and that $\overline{VA}$ (or $\overline{SK}$) should really mean an end to a QSO and not just the first attempt to get away, as it so often

ZONES WORKED LISTING

POST WAR

Station	Z	C	Station	Z	C
Phone and CW			Phone and CW		
G6ZO	WAZ	222	G3ABG	37	123
G6RH	WAZ	222	ZB1AR	37	120
G6QB	WAZ	207	G2GM	37	108
G2FSR	WAZ	196			
G3ATU	WAZ	195	G2FYT	36	131
G4CP	WAZ	195	G2YS	36	130
G3DO	WAZ	191			
G8IG	WAZ	181	G2HKU	35	120
G5YV	WAZ	172	G6QX	35	120
G2VD	WAZ	168	4X4CJ	35	114
G3BI	WAZ	162	GM3EST	35	110
G3AAM	WAZ	154	G6TC	35	107
G3YF	WAZ	152			
G3AZ	WAZ	133	G3FGT	34	119
G8IP	WAZ	132	G6AT	34	97
G5BJ	WAZ	126	G2DHV	34	94
G5VU	WAZ	124			
			GM3CVZ	32	100
G2WW	40	181			
G3TK	40	162	G2BBI	30	98
G3FNJ	40	145			
G6BB	40	132			
G3BNE	40	128			
G5MR	40	125	Phone only		
GM3CSM	39	158	G3DO	37	154
G3DCU	39	148	G6WX	37	128
G5FA	39	147			
G3BDQ	39	138	G2WW	36	120
G3CVG	39	136			
			G3COJ	35	115
G2BJY	38	142			
G3COJ	38	142	G2VJ	33	104
G3AIM	38	130			
G8PW	38	122	G2BBI	30	95

does now. For the record, here are G6BB's resolutions for the future :

(*a*) **To call CQ (if ever) at not less than 15 w.p.m.**
(*b*) **Not to answer a slow CQ (unless it is from a new country !)**
(*c*) **To send *singles* on receipt of an R5 report.**
(*d*) **Not to give his name unless pressed.**

Many will find fault with these ; but we have a feeling that if everybody began to observe them we should begin to see a bit of cleaning-up.

Miscellany

G3COJ (Hull) didn't find it difficult to work FP8 : he heard a station signing F ? ? and gave a half-hearted call of just that—F ? ?—and (you've guessed it) back came FP8AC. Then FP8AF returned to a CQ. He was running 6 watts to a 3D6 and the receiver was a 3A5. 'COJ has an ingenious pair of aerials. For 7 mc he uses a "one-element bi-directional fixed beam," and for 14 mc he has an array stacked "O over O over 1," the bottom one being 45 ft. high. The top one (fortunately imaginary) requires a pair of 112-ft. masts (also imaginary). Work it out for yourselves, then.

G6AT (Hampton Hill) is the proud possessor of a card from 3A1A, and adds that he has recently received one from DL4FS with "3A1B" printed on it as an alternative call—so look out. He is also W9SRB, and the name Guy Kane, for the record.

GM3CSM also supports the plea for correct use of $\overline{VA}$ and $\overline{KN}$, and would like still more QLM, QML, "10 u," "10 d" and the like. He suspects that a lot of the pile-ups are caused by stations calling DX which they haven't even heard, in the hope that they will hear it coming back to them. (We must admit to calling a DX station with a purely imaginary call-sign the other day, breaking off short and listening ; yes, there were *five* Europeans calling the non-existent station. An interesting experiment, this, and, we think, justified for the purposes of research !) Perhaps some of these guys endlessly calling CQ expect to hear a station of that name coming back to them ?

G3FXB (Hove) has realised his ambition of making his Century with 25 watts, and enjoyed a QSO with VP3YG, who was running only 5 watts. But 'FXB is now back-sliding to the extent of rebuilding for 100 watts of phone and CW with P/P 807's. Ah, well, it happens to all of us some time.

G3AMM (Scunthorpe) tells us that SU1MR is genuine (and others have said the same, his cards having arrived). 'AMM worked VK1RB (Macquarie) on 14 mc phone at 0700 one morning, and has now worked VK3ASD 100 times on 14 mc phone !

GC2CNC (Jersey) offers a slight excuse for fellows who don't answer CQ's, for he knows what local noise can be (machines and cars). Many others must be so situated, and are suspected of being rotten operators or of having punk receivers.

From Overseas

A new station on the air in Southern Rhodesia is ZE3JP, who is ex-G8JJ (see panel for his QTH). For the first time in his life he finds he has space for a rhombic or two, and his main gear is *en route*. At present he is on with 20 watts and a temporary dipole. Look out for ZE3JP after 1800 GMT on either 14050 or 14106 kc.

VU2JP (Munnar, Travancore) asks us to mention that he is in the Southern Zone of India (for those who are out after their EDXC). His frequencies are 14030 for CW and 14234 for phone, also occasionally on VFO. He will be on 14 and 28 mc from 1130 GMT onwards, and Sundays from 0800 GMT onwards.

Concerning the Top Band Transatlantic Tests, W1BB, who is doing the bulk of the organising on the other side, writes to say that the FCC has just announced the use of

the band 1750-1800 kc as a local "disaster communications service" band. This will not necessarily affect the tests, as it has not yet gone into effect. 'BB adds the rather sad news that W2WFZ (who was going to be on the Top Band with a *beam*) is now in Korea and it is hardly likely that he will be back for the 1951 Tests.

The former MD7DC is now home again (see panel for QTH) and will be on the air occasionally from G3CHR at Garats Hay Camp, near Loughborough. He says that if anyone is short of an MD7DC card he will be only too glad to oblige ; just drop him a line at the QTH given.

ZL3MH (Harewood Airport) writes that ZK1BC and ZM6AK are just as keen to work G's as we are to raise them ; but the main complication is that the W's are at a maximum in the Pacific at the sort of time when ZK1BC and ZM6AK are filtering through to Europe. The only solution, therefore, is to keep trying. Incidentally, ZL3OZ is ex-VK9NR and lives a scant 20 yards from ZL3MH.

Arising from the note in the August issue about personal contacts, an interesting letter from G2APN (VS1DK, Singapore) reveals that he has a special appointment that takes him continuously to all parts of the world ; in the space of but one month, he was able to make personal QSO with a VU7, VU2, I1, VS6, KR6 and a JA2 ! G2APN admits that this was somewhat of an exceptional journey, but nevertheless, he has met amateurs from CE to PK1 on their own stamping grounds. Now temporarily on the air as VS1DK, during August he managed 144 contacts with 37 countries—he is on most evenings and anxious to work G's, especially in Surrey and Hampshire.

Piracy Corner

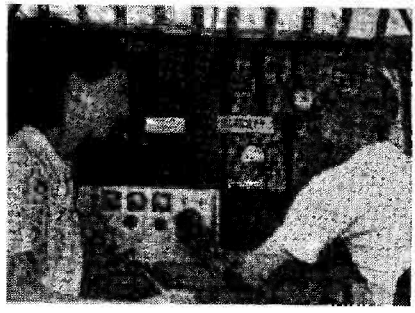
The notorious Brighton pirate (ex "SU2AF") has broken out again with the call ZA1B and the QTH of "Box 4, Tirana." He apparently succeeded in getting the W's in a panic, early in September. "Wanted" notices will shortly be pasted up for this man.

G2LX (Washingborough, Lincoln) has been in South Africa and Southern Rhodesia since 1947, but on return finds QSL's for G2LX coming in from all over the place. He hopes the pirate will leave the call alone now—the real owner will be using it.

G3BWM (Broadstairs) has been off the air for a long time, but has received SWL reports of activity. He, too, hopes to resume shortly —preferably without having to share his call with someone else.

Another Award !

Yet another one for the 'chasers is announced, this time from Cuba. A certificate or diploma will be awarded to all amateurs who work the eight radio districts of Cuba, and a similar award will be available to SWL's. The eight QSL's must be sent to the QSL Bureau, Box 136, Santa Clara, Cuba. Any band, CW or Phone. This announcement



In the "Here and There" feature for November, 1949, we mentioned G3FSZ and G3DQC, the husband-and-wife station at High Wycombe, Bucks., both operators being licensed in their own right. Here they are at G3DQC/P, with G3FSZ on the left.

DX QTH's

AR8PP	Box 49, Beirut, Lebanon.
HB9CM	P. Gander, Vogelsang 67, Biel, Switzerland.
HS1AS	Pratin Thong Thap, Signal Corps, Bangkok, Siam.
KW6AL	c/o C.A.A., Wake Island.
ex-MD7DC	Cpl. J. Howse, Cadre, 10 W.T.S., Royal Sigs., Garats Hay Camp, Loughborough, Leics.
PK5CC } **PK5JT** }	Indonesian Airways, Bandjermasin, South Borneo.
PK6LN	Box 76, Macassar, Celebes.
TF5TP	T. Palsson, Hafnarstraeti 39, Akureyri.
VP8AD	Reuben Maclaren, Radio ZBH, South Georgia Island.
VR2BG	Cpl. D. C. Rummins, RNZAF, Suva, Fiji Is.
VS1BJ	Royal Sigs. Amateur Radio Club, Tyersall Camp, Singapore.
VS1DE	Maj. A. Eden (G3HAE), R.E. Officers' Mess, Gillman Barracks, Singapore.
VS6BW	J. E. Cowley (G3AQZ), Box 541, Hong Kong.
VU7AH	K. V. C. Rajan, Box 10, Tumkur, South India.
YS1MS	57 Avenue Espana, San Salvador.
ZE3JP	Lt.-Col. C. R. Dickenson, Box 37, Causeway, Salisbury, S.R.
ZS8MK	Dr. R. L. Markham, Qachas Nek, Basutoland.

comes from Dr. Nilo S. Faria, President of the A.R.A.L.V.

Referring back to the WAE (Worked All Europe) Certificate mentioned last month, some of the keener Four-Band types have discovered that their scores already total well over the 100 mark, so they are eligible for the Certificate. We really must engage ourselves on the monumental work of compiling a master list of all the DX Certificates that it is possible to accumulate from the various parts of the world. One thing is certain : That the keener DX-chasers could paper the whole of their wall-area in the average shack by this means, without resorting to the use of QSL cards. This is just as well, because, in the course of accumulating the certificates, the QSL's would seldom be at home !

Deadline for next month is **first post on October 10,** and for the following issue, November 14. Address everything to DX Commentary, *Short Wave Magazine,* 53 Victoria Street, London, S.W.1. Until then, Good Hunting, BCNU and 73.

P.S. Conditions really do seem to be improving!

Portrait Gallery

G5BY

HILTON O'HEFFERNAN, of G5BY came on the air in 1925, and has been almost continuously active ever since. He is now best known for his VHF activities, which have brought his station a surprising number of "Firsts," but time was when he was a DX man and equally prominent by virtue of his achievements in that sphere.

G5BY was the first G to work Japan, Alaska and British Columbia, and the first British station to obtain a WAC Certificate for telephony—this, in 1930. Then, in 1935, he was the first G to work two-way telephony with the U.S.A. on 28 mc. These various laurels were gained from Croydon, Surrey, and it was from the same location that Hilton won seven consecutive ARRL DX Contests. Truly an outstanding record.

During the war he served in the Engineering Division of the BBC, and since then the station has been at Bolt Tail, South Devon. From this location another impressive array of records has been piled up, including the first 58 mc contacts with North Africa and the first and only 50 mc contacts with South Africa.

British DX records for 145 mc were set up within a few days of the opening of the band—successively 224, 236 and 287 miles ; the European record of 379 miles (with PAØZQ) came shortly after. This was later extended to 470 miles.

The most recent successes have been on the 70 cm band, on which the world's record was established at 119 miles in March, 1950. This has since been increased to 132 miles and, in June, to 161 miles.

In case one should think that G5BY has no time for other activities than radio record-breaking, we hasten to add that he describes them as "Tennis, contract bridge, and driving a fast sports car"! And he has also contributed many useful technical articles to the pages of the *Short Wave Magazine.*

FIRST CLASS OPERATORS' CLUB

Towards the end of August, another milestone was passed in the history of the FOC when the 300th member was elected to the roll.

In terms of the entire amateur fraternity this is not a large figure—but in the sense that all members faithfully undertake, before election, to uphold the best traditions of Amateur Radio (apart from maintaining a high standard of operating), the figure is not insignificant. None of us is perfect, but it can be said that within the Club there is a serious effort to respect the undertaking given upon election.

Activity

As a Club, the FOC does not enter for contests and the like, since this need is covered by events organised for members by the Club itself. But month after month we see individual members well to the fore in published reports covering amateur activities in general.

In the September issue of *Short Wave Magazine*, G2YS emerges as winner of the Top Band Marathon. In the Four Band DX Table, the first three places are held by FOC members, with others placed 5th, 8th, 9th and 10th. In the Zones Worked List those in a row near the top are all FOC members, and others also feature in the Two-Metre Achievement Tables.

It is also of interest to note that G3FEX (FOC) was able to assist in a sea rescue operation recently, once again proving that Amateur Radio has a practical side of value to the community.

Club Contests

Full details of the FOC's own Marathon and DX Contests, for members only, were included in Circular Letter 37, a copy of which has been posted to every individual. Anyone who did not receive this C/L, or who has mislaid the particulars, may have information regarding these Contests on application to G2ZC.

The FOC Dinner

From bookings already made, we are assured of a representative gathering at the annual dinner, to be held in London on Saturday November 25 next. It is probable that we shall have four of our PAØ members present in the overseas contingent. Those nearer home who intend to come are asked to make their reservations as early as possible, as we must have some idea of final numbers well before the date. While everyone knows it is usually possible to squeeze in the odd one at the last moment, when this "odd one" becomes an odd 17 who decide to appear without giving notice, it is a very different matter !

Circular Letters

G5PS is now producing a regular issue of the C/L, posted at the beginning of each month. Members on the rota system (as distinct from those who pay the small annual charge for their own individual copies) are earnestly requested to consult the new Membership List when forwarding the C/L—and to keep the List up to date by incorporating the changes of address notified in each C/L. Any member not receiving his copy of the C/L by the last week in the month is asked to notify G5PS.

Election Notice

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

E. F. Lawden, VQ3SS (Dar-es-Salaam) ; G. H. McKenzie, VE1PA (Lakeburn, N.B.) ; D. L. Wood, G3DSW (Romford) ; P. Wingrave, G3FGR (Amesbury) ; N. A. Gwynn Jones, G3BHE (Malvern) ; E. Jacobsson, SM5DZ (Linkoping) ; J. G. Stonestreet, G2JN (Canterbury) ; J. D. Heys, G3BDQ (St. Leonards-on-Sea) ; and N. A. K. Albret, OZ6M (Soeborg).

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

DX OPERATING MANUAL

Having sent a consignment of copies of the *DX Operating Manual* out to our Brazilian agents, we were interested to have a note from them that in the card block on p.27 (in which a WAC selection is shown) appears the QSL of the only Brazilian amateur who is blind—PY1AJ, who lost his sight in 1918, and is one of the oldest PY's in that country.

CHOICE OF CRYSTAL FREQUENCY IN VHF CONVERTERS

Elimination of Spurious Beats in the IF Range

By **G. B. MOSS (G4NB)**

One of the disadvantages of using a crystal-controlled oscillator in a VHF converter is the appearance of unwanted beat notes in the tuned IF range. This article suggests how the trouble can be largely overcome by proper choice of fundamental crystal frequency.—Editor.

THE opinion of leading VHF workers in this country appears to be as equally divided on the relative merits of crystal-controlled as opposed to self-excited oscillators in two-metre converters, as does that of their American counterparts upon the vexed question as to which form of polarisation they shall adopt in the design of their beam systems. Fortunately, in this country we have agreement on that. The writer, having deliberated the converter problem for some time, finally settled for the crystal-controlled type, using a Squier oscillator and dual-triode multiplier for the injection frequency

Now, it is not the present intention to add further fuel to the controversy as to which type is best, but to attempt to exonerate the crystal-controlled type from blame which can fairly be levelled at it under certain circumstances—namely, that of producing spurious beats from strong local signals. The writer is aware of at least two other cases in which this trouble is experienced.

The effect was tolerated until a DX contact was spoilt by spurious S5/6 signal wiping out the desired station. This, combined with the fact that more locals were coming on to two metres, and all improving their signals—better beams and so on, until spurious signals could be heard from at least five locals—convinced the writer that something had better be done, and quickly.

A quick check one evening using the 8 mc CO in the transmitter and the AR88 alone showed that the main receiver was beyond suspicion. The 8 mc signal was arranged to give an S9-plus signal and the image could only be detected with the BFO in

It was then noted that strong local stations produced spurious signals at various difference frequencies, and, not (as at first had been thought) by a fixed difference frequency. Stations low in frequency in the band produced spurious responses higher up, and in one case a signal well up in the band produced a lower frequency beat.

At this point it should be explained that an IF of 7·5 to 9·5 mc was in use as the means of covering 144 to 146 mc, and that the converter crystal had been carefully ground in order to measure received signals with reasonable accuracy. The injection frequency to the mixer was on the low side of the signal frequency and was therefore 136·5 mc.

Procedure

The next step was to log the frequencies of as many local stations as possible, with their spurious beats produced by the converter, and to record them for reference purposes.

Turning attention next to the crystal oscillator and its various harmonics, it becomes necessary to enumerate them to discover which may have any adverse effect. Remembering that the Squier oscillator was in use, and that it oscillates only at the third overtone of the fundamental crystal frequency, we have the harmonics shown in Table 1 all present in varying degrees in the injection coil, when the fundamental crystal frequency is 5687·5 kc.

TABLE 1

17·0625 mc
34·1250 mc
51·1875 mc
68·25 mc
85·3125 mc
102·375 mc
119·4375 mc
136·5 mc
153·5625 mc

Those harmonics still higher in frequency need not be considered in this instance.

Clearly, any oscillator harmonic which beats with a signal in the band 144-146 mc to produce a difference frequency falling in the chosen variable IF range is going to cause trouble. In the case under discussion the 153·5625 mc harmonic will do so, and in Table 3 are set out some local signal frequencies showing calculated spurious response frequencies appearing at the points shown on the main receiver.

After preparing this table it was found that the calculated spurious responses agreed very closely with those previously logged. Apparently, the relatively small amount of RF produced at 153 mc was sufficient injection

voltage to the mixer to produce in some cases unwanted signals of S5 to 6 !

Solution

It was decided that the most satisfactory solution lay in choosing a higher crystal frequency and so spacing the harmonics farther apart. Desiring to retain the same IF of approximately 8-10 mc, and so using an injection frequency of 136 mc, the next step is to 68 mc, then dividing by three twice from 22·66 mc to a fundamental of 7,555·5 kc. The harmonics are then as in Table 2.

TABLE 2

22·666 mc	
	45·333 mc
68·0 mc	
	90·666 mc
	113·333 mc
136·0 mc	
	158·666 mc

The 113 mc harmonic would produce an IF of approximately 31 mc, and the 158 mc harmonic an IF of about 14 mc with a signal frequency of 144 mc, and so should prove satisfactory.

It is possible that the 45 mc harmonic might cause TVI in the London area, but if the shielding is reasonably good and all power leads by-passed, it may not be troublesome. In any case no circuit is actually tuned to this frequency. The frequencies in bold type are those to which the various stages are tuned. The alternative is to use a crystal of the order of 5 or 6 mc with a different IF, working through the process as described until a frequency is found which clears the local TV channel and is free from spurious effects.

The Result

It was now necessary to prove whether the difficulty had been overcome and so a rapid search was made in the crystal box and one of 7,650 kc disclosed. This worked out to an inconvenient IF of approximately 6·4 to 8·4 mc, but was close enough to use without having to resort to major modifications. Surprisingly enough it oscillated correctly in the original circuit by merely adjusting the oscillator trimmer. The multiplier stages were then lined up with the aid of the station "gimmick." In a matter of minutes the locals were again S9 plus—albeit on a different IF. And there were *no spurious signals.*

The trouble expended in working out so many different crystal frequencies and various IF ranges, covering several large sheets of paper with figures in doing so, had another and totally unexpected reward—because the converter now has an improved signal-to-noise ratio. It is perceptibly quieter than before and the reason can only be that the noise brought in at the other injection frequency has at last been eliminated.

Although the process of deciding on a crystal frequency may appear somewhat laborious, it is not so in practice once the fundamentals have been grasped, and after a few false starts it becomes simplicity itself—especially where a pet IF range is in mind. If the slight disadvantage of tuning backwards on the main receiver dial is no trouble to some, then, of course, an injection frequency on the high side of the signal may be used which widens the scope of choice still more.

It should not be overlooked that the Squier circuit does not oscillate at *exactly* three times the marked crystal frequency, unless the crystal used is specifically calibrated for overtone use. This is because the mode of operation differs and the final injection frequency can be expected to be some 50 kc lower in frequency than calculated. This is of little consequence in such receivers as the S640, where a band set and a band spread dial are used, but in other receivers which have a main reading dial directly coupled to a logging dial, notably the AR88, it can prove annoying. If no crystal grinding can be contemplated the only solution is to obtain a crystal some 2 to 3 kc higher than estimated.

Alternative Solution

Another approach to the problem can be by inserting tuned traps in the crystal multiplier stages, and reducing the strength of the unwanted harmonic in the same manner as a transmitter is treated for TVI. Inserting a buffer amplifier between the mixer and multiplier output stages, and ensuring that the buffer and multipliers are running in Class-A, should

TABLE 3

SIGNAL FREQ. mc	IF or Main Receiver Readings, mc			
	True Response		Spurious Response	
144·45 ..	144·45		153·5625	
	136·5		144·45	
		7·95		9·1125
144·54 ..	144·54		153·5625	
	136·5		144·54	
		8·04		9·0225
144·584 ..	144·584		153·5625	
	136·5		144·584	
		8·084		8·9785
145·2 ..	145·2		153·5625	
	136·5		145·2	
		8·7		8·3625
145·5 ..	145·5		153·5625	
	136·5		145·5	
		9·0		8·0625

Table showing how spurious beats were produced at varying differences in frequency between wanted and spurious signals.

assist materially. The classic test to determine if Class-A operation has been achieved still holds in this case—simply insert a meter in the HT feed to each anode in turn and reduce the drive from the oscillator until there is no change in anode current with drive on or off. The buffer amplifier will boost up the injection voltage to more than is necessary for a 6J6 mixer—and this offers an excellent opportunity to insert a variable control in the HT line to adjust for optimum signal-to-noise ratio whilst listening to a weak signal.

All this is unquestionably more trouble than an SEO, but it is only straightforward practice and the dividends are undoubted. With an overtone crystal in the region of 40 mc designed to "go off" in the Squier circuit at the third overtone, our spurious beat troubles would be at an end.

In conclusion, the author would like to express his indebtedness to G3ABA for his helpful suggestions in this matter.

IF AMPLIFIER NOISE

As It Affects VHF Converter Performance

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

SOME misconceptions appear to exist with regard to the efficiency of the IF amplifier in the Two-Metre receiver. Most amateurs use a converter for Two, working into some kind of receiver at a lower frequency—usually between 5 and 15 mc. The writer has several times heard it said that a particular receiver is "noisy as an IF amplifier" and that better results would be obtained on Two if a quieter receiver (or IF amplifier) were used.

It has been explained in a previous article (*Short Wave Magazine*, June 1949) describing the method of measuring the Noise Factor of any receiver, that generally speaking by far the most important consideration determining the overall noise figure of the receiver is its first valve and the associated circuitry.

Bearing this in mind, let us consider the two-metre converter and receiver into which it feeds as one receiver; the whole then appears as a double conversion superhet with the signal frequency amplifiers and first detector embodied in the converter. The first stage in the big receiver then becomes the first IF amplifying stage and its first valve may actually be three or four stages removed from the aerial.

It can be shown that in a receiver of this type, where there is appreciable gain from the initial stages and where the band-width is comparatively narrow, the contribution to overall receiver noise from third or fourth stages is negligible.

The overall Noise Factor of such a receiver as defined by Friis ("Noise Figures of Radio Receivers," *Proc. Inst. Radio Eng.*, N.Y., 32. 1944) is

$$Nr = N_1 + \frac{N_2 - 1}{G_1} + \frac{N_3 - 1}{G_1 G_2} \quad . \quad . \quad . \quad . \quad \textit{et seq.}$$

G_1 = Gain of first stage
G_2 = Gain of second stage
N_1 = Noise Power of first stage

It can be seen from this equation that only under conditions of very poor performance in the first stage does second-stage noise become troublesome, and that the chances of third-stage noise affecting overall receiver performance are very remote.

Do not worry unduly, then, about that receiver which when used alone is noisy. It may be with aerial on, as it was originally intended to be used. But if the converter that you put in front of it is anything like a converter, there should be enough gain prior to the main receiver to overcome the initial receiver noise.

CABLE EXHIBITION—SCIENCE MUSEUM

The laying of the first submarine cable across the Channel on August 28, 1850, was far more than a scientific achievement. It gave birth to international communication in the wider sense, and it ushered in a new era of social relations which, in the course of the century, have changed the face of civilisation. The Exhibition, now open at the Science Museum, South Kensington, London, S.W.7, not only commemorates the laying of this first cable by the pioneering brothers Brett, but also illustrates the development of submarine cables and telegraph practice during the last 100 years. Many working exhibits are included and during certain hours visitors will be able to originate overseas cablegrams. The Exhibition, which is open daily from 10 a.m. to 6 p.m. (Sundays 2.30 p.m. to 6 p.m.) will continue until October 28 and admission is free. It should not be missed by those having any practical interest in telegraphy—so go and see it if you can.

VHF BANDS

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

New EDX Record on Two—
November VHF Contest—
Survey of Activity and Conditions—
Steady Progress on Seventycems

ONCE again a new 2-metre record must be recorded in these columns, and our heartiest congratulations go to G2BMZ (Torquay) and the two operators at DL4XS/3KE for their excellent 520-mile phone contact at S7 in the early hours of September 13. Conditions between DL and the South Coast of England had been good from at least 2200 BST, and possible earlier, as the London TV had been far above average strength throughout the evening in the Portsmouth area. An S9-plus-25 dB report was obtained even by G2XC when he worked the DL at 2240, over a distance of around 420 miles, but it was not until 0015 that the record was broken. DL4CK and DL4DD were understood to be up at the time but nothing was heard of them. The following evening DL4XS/3KE was worked by G6LK and others as early as 2030, but after 2230 conditions deteriorated rapidly as a trough of low pressure moved in from the West. It was gathered that the 2-metre band was open from DL into HB, I and OK. Amongst those known to have worked DL4XS were G3BNC, G3BHS, G3EBW, G3DIV/A, G4AU, G5WP and G6LK, while in a quick report from DL4XS/3KE, forwarded via G2BID, they state 19 G's as having been worked during the period September 12-13 on a frequency of 144·45 mc; minimum-maximum DX distances were 365-520 miles, with all signals S7 or better. For the DL's, the good patch reached as far North as Cambridge, but nothing was heard of Midlands stations. All this occurred when the weather was excellent, with a high pressure area over Northern Europe and the Channel.

A trough of low pressure which did not entirely wipe out DX occurred on the evening of September 6, when with a strong gale blowing and pouring rain over the whole country G2CPL (Lowestoft) was a good readable signal on the South Coast and in Somerset. G2CPL has become a remarkably consistent signal in these areas and is still there when conditions have eliminated all other DX from East Anglia. On the evening in question two other signals were heard from the Cambridgeshire area, but both so weak as to be only occasionally readable. So perhaps it would be hardly accurate to call conditions good. However, at G2XC we were just a little surprised.

Other good evenings were August 22, when GW3EJM was the star station in the London and Southern parts of the country; September 9, between East Anglia and South Coast; and September 10 between Lancashire, Yorkshire and South Coast.

This Year's Contest

In this space appears the announcement covering our VHF Contest next month, which we very much hope will have the widespread support it has always enjoyed in previous years. The only factor on which none of us can prognosticate is Old Man Condx, but with a little support from him it should be another case of "good time had by all." Anyway, please be there to join in.

Schedules

There still appears to be some doubt in the minds of a number of our correspondents as to our "official" attitude towards schedules. May we therefore, *once again*, emphasize that the operators of regular schedules on the VHF bands are making a very worthwhile contribution to our general knowledge of these frequencies. They have proved beyond all doubt that certain paths of the order of 100 to 200 miles will provide good communication under almost all weather conditions. Similar tests proved the same thing on 5 metres. (For example, the well-known schedule between G5BY and G6FO during the pre-war years.) In addition, schedules provide a consistent source of signals for a number of observers and

THE SHORT WAVE MAGAZINE

Two-Metre Contest

RULES

(1) The period of the Contest will be Saturday, November 11, 1200 GMT, to Sunday, November 12, 2359 GMT.

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

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

(4) Contacts may be made on either Phone or CW, but no extra points will be allowed for Phone QSO's as distinct from CW contacts, and only one contact with any particular station may be claimed for points.

(5) Every contestant will allot himself or herself a three-figure reference number, which will remain unchanged during the period of the Contest. This reference number will be sent before the RST or RS report, in the following manner: 342RST569, or 342R5S6 in the case of a Phone report. The reference number *must* be given with the report outwards in every counting QSO. Contacts with *non-contestants* who cannot give a reference number may be claimed, provided a report and QTH are received.

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

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

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

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

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

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

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

(10) Results should be sent to reach E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1, by November 20, 1950, latest, set out as follows :—

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

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

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

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

Results of the Contest will be given in the January, 1951, issue of the *Short Wave Magazine* with a preliminary comment in the December, 1950, issue.

so enable a rapid check to be made on new converters, aerials and so on. The logs at these stations must contain a wealth of information which it is hoped will one day be tabulated and presented to the VHF world in general.

Schedule working does not appeal to everyone, however, nor is it the only way of gathering information on conditions. Moreover it is liable, unless watched carefully, to give a somewhat misleading idea of general propagation characteristics. Results obtained by some of the schedule operators would suggest that conditions are almost uniformly good; in fact, poor conditions would seem to be unknown. But because two particular stations can work over a 200-mile path, night after night, it does not necessarily mean that *any* two stations at the same distance can do likewise. Nor is it just a case of equipment or activity. *Location* plays a major part. There is plenty of activity in South Hampshire, yet it would appear to be extremely rare for these signals to be heard in the Midlands or North.

Therefore, while agreeing that the DX schedules are providing an invaluable service, your conductor would not be prepared to castigate operators who cannot or do not keep regular schedules, nor can he agree that the reliability of the better known schedules *proves* that other stations are inactive or not enthusiastic. The list of 97 stations put in this month by one operator, covering calls heard or worked during five weeks of August and September, should refute any suggestion of general inactivity or lack of interest !

Two Metre News

The news that GC2CNC and GC3FSN are preparing to become active on two metres will be welcomed everywhere. Both of them have SCR522 receivers and are building transmitters to the G5BY design. Their frequencies will be in Zones H and I.

On the mainland, G5QA (Exeter) continues to run his daily schedule with G4RX, but most of his available time has been occupied with the construction of a stacked array. He is on 145·62 mc every night at 1900 BST beaming North-East. G3GSE (Kingsbury) would like to hear less moaning about lack of activity. He considers that all of us should accept activity in the same way as we have to accept conditions. G2AOL (Otford) found results so poor during the July 2 contest week-end that he decided to clear the decks and start again. The beam has been overhauled, and a new converter (built for his father) proved so good that a second one is now planned for his own use. It uses push-pull 6J6 RF, push-push 6J6 mixer and crystal-controlled local injection.

G3EHY (Banwell) considers conditions have been better than the weather would have suggested. The 100-mile schedule with GW2ADZ has been easy going in the early evening, while the late-evening effort with G2CPL only failed eight times.

G8IL (Salisbury) sends some interesting reflections at the end of one year's operation on 144 mc. Among his points are that the newcomer to the band nearly always underrates reliable range, and is surprised at the strength and consistency of signals up to 40 miles or so. He has found local screening, up to a mile or so, a controlling factor but more distant high

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1949

Starting Figure, 14

Worked	Station
43	G3BLP, G6NB
42	G2OI
39	G3EHY, G6XM
38	G3WW, G4HT
36	G2HCG
35	G3ABA, G3CGQ
34	G2XC, G3COJ, G3DUP, G8SB
33	G5UD
32	G3BK
31	G2AJ
30	G3BOB, G3VM
29	G2CIW, G2XS, GW2ADZ
28	G2CPL, G8IL, G8IP
26	G2FNW, G3BHS, G3FIJ, G8QC
24	G3FXG, G6VC
23	G3AVO/A, G3GSE
22	G6CI
21	G2NH, G5DS
20	G3GBO
19	G3EJL, G5PY, G6CB
17	G3ANB, G3BNC
16	G3CAZ, G5LI, G8VR, GW5SA
15	G2AOL, G4LX, G4MR, G4RK, G5MR, G5SK
14	G2HDZ, G3CWW, G3DCC

NOTE : These are the final figures for this table which was run for one year to August 31, 1950.

TWO-METRE ACTIVITY REPORT

G6PJ, Sheffield, Yorks.

HEARD: G2HCG, 2IQ, 2MA, 3EHY, 3FAN, 3FUM, 5CP, 5RW, 6NB, 6VX, 6XM.

G3AVO/A, Upwood, Hunts.

WORKED: G2AIQ, 2ANT, 2IQ, 3AEP, 3COJ, 3DUP, 5RP, 5UD, 6XM.

HEARD: G2AVR, 2LQ, 2XC, 3EHY, 4CI, 4HT, 5UM, 6YP, 6WU. (*August* 26 *to September* 6.)

G4MR, Slough, Bucks. (NGR 41/988792.)

WORKED: G2AHP, 2BMI, 2BUJ, 2CIW, 2CPL, 2DD, 2DTO, 2FMF, 2KF, 2UJ, 2XC, 2XV, 2YC, 3AHB, 3BHS, 3BOB, 3BTP/P, 3BVA, 3CDJ, 3CFB, 3CKX, 3EEI, 3EHY, 3FSD, 3GBO, 3GSE, 4AP, 4HT, 5AS, 5DS, 5UF, 5YM, 6HG, 6LO/A, 6XM, 6YP, 8KZ, 8TB.

HEARD: F8GH 8MX, 8OD, G2IQ, 2UQ, 3ABH, 3AEX, 3AUS, 3BLP, 3CFR, 3COJ, 3CQC, 3DAH, 3DGN, 3DT, 3EBW, 3ENI, 3FD, 3FIH, 3FUM, 3GDR, 3GHI, 3GTH, 3MI, 3SM, 3VM, 3WW, 4AU, 4CI, 4DC, 4KD, 4MW, 5AA, 5IB, 5MA, 5PY, 5RP, 5TP, 5UD, 6AG, 6CP, 6HD, 6KB, 6LX, 6NR, 6SC, 6UH, 6VX, 6WU, 8IL, 8GX, 8QC. (*August* 2 *to September* 10.)

G4HT, Ealing, Middlesex.

WORKED: F8MX, G2ATK, 2AVR, 2CPL, 2IQ, 2XC, 2XV, 3ABA, 3AHT, 3AKU, 3CFR, 3COJ, 3DIV/A, 3DUP, 3ENS, 3VM, 4MW, 5RP, 5UD, 5UF, 6CW, 6LI, 6ZQ, GW2ADZ.

HEARD: F8GH, G6TF. (*August* 12 *to September* 12.)

G2AOL, Otford, Kent.

HEARD: F8AA, 8LO, 8MX, G2IQ, 2XC, 2FNW, 3ABA, 3BNC, 3BMU, 3DUP, 3EHY, 3FAN, 4MW. (*September* 9 *to* 12.)

G3EHY, Banwell, Somerset.

WORKED: G2ADR, 2CIW, 2CPL, 2DD, 2HCG, 2HDZ, 2OI, 2XV, 3AHT, 3ATZ, 3BJQ, 3BOB, 3BVJ, 3CGE, 3CGQ, 3COJ, 3DA, 3DAH, 3DJQ, 3DUP, 3EJL, 3FIH, 3FMI, 3GOP, 3MA, 3VM, 3WW, 3YH, 4CI, 4DC, 4GR, 4HT, 4MR, 4RK, 5BM, 5CP, 5DS, 5LI, 5MA/P, 6LK, 6LO/A, 6NB, 6WU, 6XM, 6ZQ, 8IL, 8ML, 8SB, GW2ADZ, 3EJM, 3KY. (*August* 14 *to September* 11.)

G3GSE, Kingsbury, Middlesex.

WORKED: F8GH, 8MX, G2CPL, 2DTO, 2XV, 3ABH, 3BVA, 3CKX, 3COJ, 3DGN, 3DIV/A, 3DT, 3EIW, 3GBO, 3MI, 4CI, 4MR, 5DS, 5NF, 5UF, 6HG, 6SC, 6VC, 6WU, 8TB, PAØPN.

HEARD: G2AOK/A, 2FNW, 2IQ, 2XC, 3EHY, 8SY.

G3WW, Wimblington, Cambs.

WORKED: G2AHP, 2AIQ, 2ANT, 2FNW, 2FQP, 2HCG, 2HDZ, 2XV, 3ABA, 3AEP, 3AEX, 3AKU, 3AVO/A, 3BK, 3COJ, 3CXD, 3DUP, 3EBW, 3EHY, 3VM, 3GBU, 3GRD, 4CI, 4MW, 5BM, 5DS, 5NF, 5RW, 5SA, 5UD, 6VX, 6XM, 6YP, 8DM/A, 8KZ, 8SY, 8VR. (*August* 14 *to September* 10.)

G2JU, West Wittering, Sussex.

WORKED: G2MC, 3ARL, 3BHS, 3BNC, 3CFR, 3FAN, 5BY 5UF, 8LY.

HEARD: G2BMZ, 3AWY, 5MR, 6LK, 6XM. (*July* 8 *to August* 27.)

G3FIH, Radstock, Somerset.

WORKED: G3BLP, 3CGE, 3EHY, 3EJL, 3FMO, 4OZ, 5MA, 5UF, 6XM.

HEARD: G2CIW, 2XC, 3BOB, 3GBO, 4AU, 4CI, 4HT, 4KD, 4RX, 5LI, 5RB, 8DM/A, 8IL, GW3EJM. (*August* 17 *to September* 12.)

G3AKU, St. Ives, Hunts. (NGR 52/316715.)

WORKED: G2AIQ, 2ANT, 2FQP, 2HCG, 2IQ, 2MA, 3AEP, 3AVO/A, 3CGQ, 3COJ, 3DMU, 3DUP, 3EHY, 3WW, 4CI, 4HT, 4MW, 5IG, 5MA, 5UD, 5UM, 6LL, 6VX, 6XM, 6YP, 8SY.

HEARD: G2OI, 3AHT, 3GBO, 5DS, 5LK, 5UF, 6LX, 8GL, 8MZ.

SEVENTY-CENTIMETRE ACTIVITY REPORT

G4CG, Wimbledon, Surrey.

WORKED: G2CIW, 2FKZ, 2FKZ/P, 2RD, 2QY, 2WS/A, 3ANA, 3FP, 3FLL/A, 5DT, 5TP.

HEARD: G2DD, 3FNL.

G2RD, Wallington, Surrey.

WORKED: G2CIW, 2FKZ, 3FP, 4CG, 5TP.

G2CIW, Romford, Essex.

WORKED: G2FKZ, 2FKZ/P, 2RD, 3FP, 3FNL, 3EIW, 3FZL/A, 4CG.

G2QY, Pinner, Middlesex.

WORKED: G2DD, 2FKZ, 3FP 3FZL, 4CG, 5PY, 8GX.

HEARD: G4HT (*harmonic.*)

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ground has little or no effect. In locally unscreened directions stations up to 200 miles or so are remarkably reliable. The Zone Plan he considers to be about as good a scheme as could be devised, but feels that there is much room for improved operating technique. Lastly, he has found the year to be full of interest from both operating and experimental aspects and a pleasant change from the hectic DX bands. Among his more recent DX achievements have been G3COJ and F8GH, both at 200 miles or more. G8IL also had the pleasure of giving F9RL (Fecamp) his first 2-metre QSO.

G4MR (Slough) wishes to obtain a crystal between 8037 and 8047 kc and can offer an 8080 kc rock in exchange ($\frac{3}{4}$-in. spacing). G3GHI (Purley) has a 12-ele. beam, while the receiver consists of 9003 RF, 9003 mixer and 9002 osc. into a BC624 modified to a double superhet; 25 watts to an 832 completes the line-up. G5LI (Hamsptead) has been hearing G3EHY, G5UF and G8IL consistently, and hopes to have a 4-ele. Yagi aloft soon to replace the dipole. At G2AHP (Perivale) the new 12-element array continues to perform well. Several new stations have been heard, and a number of DX calls have been logged during the quieter early evening period. G2HDZ (Pinner) has 12 to 15 watts to an SCR522 Tx, and a modified R1132 receiver, the modifications consisting of three 6J6 stages at the front end, and adjusted IF stages to give adequate selectivity; he regrets the present tendency to

intolerance of other people's opinions !

G6CB (Wimbledon) apparently dissatisfied with his own results has been along to G3BLP to see how it is done. He says the recipe is "400 feet or so high, plus 16 elements, plus triple conversion, plus snappy gadgets." G3GBO (Denham) offers to send a second QSL to anyone who failed to receive the first ; he has just attained VHFCC. He has a schedule with G3EBW (Hurst Green) every evening at 2300, and recently worked F8MX for his first Frenchman.

G2JU (West Wittering) is active week-ends only using phone and CW. The aerial is in the loft but a contact with G5BY suggests it is not inefficient. A new converter employs two GG triodes, series injection to the mixer, and crystal-control. G3ENI (Abingdon) using 20 watts to an 832, a Cubical Quad and a 2-ele. Yagi, would appreciate contacts ; his receiver is a 6J6 mixer-osc into BC348.

G5JU (Birmingham) says conditions have been extraordinarily bad with him during the past few months. He listens most evenings but rarely hears anything except G3BLP and G3EHY. G3AEP (Whittlesey), *just* in Cambridgeshire, is running 15 watts to the usual 832 with a 5-element Yagi ; he is having his crystal reground into Zone G and will then be regularly active. G3WW (Wimblington) though busy doing much rebuilding has been active almost daily on the band, and found conditions good at times to the South and West. A midday contact on two metres was made with GW5SA at 175 miles as a result of a test arranged on 3·7 mc. In all, 22 counties have been worked in less than a month—which makes one wonder if activity is really as poor as some people imagine. G3AVO/A (Upwood) reports his cascode type converter is now giving satisfaction ; the outstanding signals with him are G6VX from London area, and G6XM on phone. G3AKU (St. Ives) has his aerial up at 30 ft., which means just 40 ft. a.s.l. His G2IQ type converter keeps the noise level down effectively ; he says he gets 90 per cent. QSL's from Russians, but only 20 per cent. from 2-metre G's ! Tips on TVI-proofing the SCR522 would be appreciated.

G3VM (Norwich) finds late evening working an impossibility, but sees no way to persuade others to come on earlier. No good periods were experienced in Norwich during the month in spite of spending more than the usual amount of time on the band. Tests to the North during the Aurora display in August produced nothing exciting.

G3COJ (Hull) points out that a number of calls mentioned in the "Two Metre Activity Report" last month were not included in the "Activity by Counties" table. The answer most likely is that we did not know what counties they were in ! This happens every

TWO METRES

ALL TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH only

Worked	Station
48	G2OI (149)
46	G3BLP (317)
43	G3EHY (192), G5WP, G6NB
42	G3COJ (129)
41	G2NH (283), G5MA
40	G3ABA (151)
39	G6XM (208)
38	G2IQ, G3WW, G4HT (284), G5BY
36	G2XC, G3CGQ, G3CXD
35	G4LU, GW2ADZ
34	G3VM, G4AU (201), G4DC, G5BM, G8SB
33	G3DMU (115), G5JU
32	G3BK, G8WV
31	G2CPL (168), G2XS (136)
30	G2CIW (221), G6LK, G8SM (172)
29	G5NF, G8IP (207)
28	G6VC, G8IL (131)
27	G3DAH, G8QY
26	G2ADR, G2FNW, G3BW, G3BHS, G3FIJ, G6UH (212), G8QC (126)
25	G6WT
24	G3FXG, G8KL
23	G2NM, G3AVO/A, G3BOB G3EJL, G3GSE (153)
22	G4RK, G6CI
21	G2FMF, G5DS
20	G3GBO (152), G8KZ
19	G5SK, G5PY, G6CB
18	G3AKU, GM3OL
17	G3ANB, GM3BDA
16	G4LX, G5LI (121), G5MR, GW5SA
15	G2ANT, G3CWW, G4RX G4MR, G8VR
14	G2AHP (125), G2HDZ, G3CAZ, G4NB

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

TWO-METRE ACTIVITY BY ZONES AND COUNTIES

(Based on reports for current issue only)

Zone A (144·0 to 144·2 mc)

Nil

Zone C (144·2 to 144·4 mc)

Durham : G2FO, G8AO

Lancashire : G2OI, G3DA, G6LC, G8SB

Northumberland : G3CYY, G4LX

Yorkshire : G2ADR, G2IQ, G2MA, G3ALY, G3COJ, G3CUJ, G5GX, G6PJ, G6TF, G8IC, G8SJ

Zone D (145·8 to 146 mc)

Nil

Zone E (144·4 to 144·65 mc)

Cheshire : G3ATZ, G3FMI, G5CP

Derbyshire : G5RW

Leicestershire : G2FNW, G2RI, G3ENS

Lincolnshire : G3DMU, G4OF, G5BD, G6LI

Nottinghamshire : G3DG, G3BPD, G6CW

Rutland : G3ALC

Staffordshire : G3CXD

Warwickshire : G2ATK, G3ABA, G3BJQ, G3BVJ, G4RK, G5JU, G5PP, G5SK, G6CI

Zone F (145·65 to 145·8 mc)

Glamorganshire : GW3EJM, GW5SA

Monmouthshire : G4GR

Montgomeryshire : GW2ADZ

Shropshire : G3AHT

Zone G (144·65 to 144·85 mc)

Bedfordshire : G3CGQ

Buckinghamshire : G3GBO, G4MR, G6NB, G8QC

Cambridgeshire : G2AIQ, G2XV, G3AEP, G3WW, G4MW, G5IG, G8SY

Hertfordshire : G3GDR, G5UM, G6LL

Huntingdonshire : G2FQP, G3AKU, G3AVO/A

Norfolk : G3VM, G5UD

Northamptonshire : G2HCG, G3DUP

Suffolk : G2APL, G4PV, G5MI

Zone H (145·25 to 145·5 mc)

Berkshire : G5RP, G6OH, G8DM/A

Dorset : G3ABH, G4OZ, G5UF

Gloucestershire : G2AOK/A, G3MA, G3YH, G5BM, G6ZQ, G8ML

Hampshire : G2XC, G3ARL, G3AWY, G3BHS, G3BNC, G3CFR, G3CGE, G3DEP, G3EJL, G3FAN, G3GOP, G6XM

Oxfordshire : G3ENI, G5TP

Wiltshire : G2BUJ, G8IL

Zone I (145·5 to 145·65 mc)

Devon : G2BMZ, G5BY, G5QA

Somerset : G3EHY, G3FIH, G3FMO, G4RX

Zone J (144·85 to 145·25 mc)

Essex : G2CIW, G3ANB, G3FIJ

Kent : G2AOL, G2AVR, G2KF, G2UJ, G3BOB, G3BVA, G3CAZ, G3DAH, G6VC, G6VX

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

Middlesex : G2AHP, G2DD, G2HDZ, G2YC, G3CKX, G3DGN, G3GSE, G4HT, G4KD, G6UH

Surrey : G2ANT, G2MV, G3BLP, G3GHI, G4CG, G4CI, G5DS, G5LK, G5MA, G5NF, G6CB, G6LK, G6LX, G6SC

Sussex : G2JU, G2MC, G3DIV/A, G3EBW, G5RO

Note : *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.*

month ; usually there are a dozen or more calls reported as heard on the band that have to be omitted as no indication is given of QTH, and they are not in the latest Call Book.

G3COJ is now using a 15-element beam, one reflector having fallen off. G2OI (Eccles) describes conditions as very poor during the last month, only the more reliable Southern stations being heard or worked. Congratulations to him, however, on taking first place in the "All-time" Counties Worked list ; this is a very fine achievement. G6PJ (Sheffield) is using a 6J6 type converter and a 5-element Yagi. He is active after TV and gives G3EHY, G6NB and G6VX as outstanding signals with him.

Seventycems

So far as is known no seventy-centimetre records were achieved during the good Continental opening on 2 metres on September 12/13, although information was obtained from DL4XS/3KE that they would be active on 70 cm in about a month's time. Other news from Europe is that PAØLU (434), PAØZQ (434·9) and PAØPN (434·7) are transmitting daily for five minutes at 2000 and 2100 GMT and subsequently listen for replies ; they are beamed on G. (This news was kindly sent on by G3ANB.) F8OL is also operating a schedule beamed on the London area ; he calls on 435 mc nightly at 1930 GMT until 1940 and

then listens for ten minutes. A test on conditions is made at 1915 on 145 mc when a five-minute call is put out, followed by five minutes' listening on that band. Horizontal polarisation is in use.

G2QY (Pinner) transmits nightly at 2215 BST (or GMT when in force) beaming West or South-West (435·13). During the tests on August 20 he was portable at Princes Risborough and worked G8QY/P near Coventry at 60·8 miles; he is anxious for schedules. G4CG (Wimbledon) has a CV53 tripler driven from his 144 mc Tx and in turn driving a CV53 PA with an input of 7 watts. The receiver is a modified G3MY circuit; a 10-element Yagi is used as aerial, and is fed with 80-ohm coax in conjunction with a detuning sleeve at the aerial end. Activity has been fair during the month.

G2CIW (Romford) has had 24 two-way contacts on 70 cm in the last four weeks with 8 different stations; he asks where are all these stations who keep promising to be on in a week or so, and wants a list of really active stations. The G2CIW receiver has been vastly improved by replacing the Lecher lines with a coaxial line. G6LK (Cranleigh) is another who has made noticeable improvements to the receiver. Cavity tuning is being used and oscillator injection is now at 408 mc. He comments that best results are being obtained with a much higher crystal current than when harmonic injection was employed, and that these results are vastly superior to those previously obtained.

G5PY (Clapham Park) has had several new contacts including G2DD and G2QY. His R1359 is performing well and a R1294 is to be tried as a comparison. G2RD (Wallington) is on 435·5 mc using a CV53 doubler as the final stage. Two receivers in use are R1294 and ASB8; he is active Wednesday evenings and Sunday mornings, and would welcome schedules for any evening.

G3DSV (Highams Park) reports having put to rest his 70 cm SEO Tx after 18 months of operation, during which its greatest DX achievement was 11 miles. A new CC rig finishing with an 832 has been built, and will feed either a multi-element Yagi or a corner reflector. The converter is much the same as that in use at G2XC. The 70 cm frequency at G3DSV is 432·4158 mc; he enquires about the stability of FT243 mounted crystals when used in power circuits.

In an interesting report G8SB (Horwich, Lancs.) says that his 70 cm signals have been received in Liverpool by G3DA at 22 miles, and G2OI in Eccles has heard G3DA—but G8SB himself could receive neither of them. So off he went down to G3AHT at Oswestry, and schedules on 430 mc were arranged with GW2ADZ and G4LU, using the 8SB 70 cm converter at the G3AHT end; this worked out as hoped, good signals being received from both stations. G8SB is now hoping to bring off his first 70 cm QSO, and will be putting up a 16-ele. beam to help matters along.

G5BY (Bolt Tail) found August 21 the only evening worth reporting when he received G3CGE (Southampton) at RST569 and worked him cross-band. G3CFR (Bournemouth) was also worked cross-band and a two-way contact was made with G3EJL. G3ABH was putting in an RST 559 harmonic all the evening, his fundamental being on 145 mc. In the Midlands, G3IS (Rugby), who has been inactive due to illness, sends a welcome report and is now operating on 433·08 mc with an 832 tripler and a 4-by-4 stack; his receiver is a copy of the G5BY circuit. G3IS has heard G3BUR/P at 36 miles and G3BJQ (3 miles). Together with many others, G3IS asks for a special 70 cm activity night each week. There is a variety of suggested periods, but Thursday (which coincides with a TV repeat evening) is requested by several. We are very glad to support the idea and suggest that as many as possible should be active on 70 cm every Thursday between 1930 and 2230 hours.

G2OI (Eccles) has spent much time on 70 cm and some crossband contacts have been made. He has found a valve diode to be much more sensitive than a crystal in a concentric line converter and a 6J6 mixer circuit is now under way; feeder losses in wet weather have also been giving some trouble. Before his beam collapsed in a gale, G3COJ (Hull) had heard G3APY/P at 65 miles, using a 6J4 RF stage ahead of a G3EJL converter. On the transmitter side G3COJ finds an 832 tripler works more efficiently when fixed bias is used than with grid-leak bias only.

Others who are hoping to be active on 70 cm before long include G2AOL (Otford), G3AVO/A (Upwood), G3GBO (Denham) and G5LI (Hampstead).

G3BUR/P was out on Walton Hill on August 20 under very adverse weather conditions, but contacts were made with G3APY/P (Ambergate, 50 miles), G4LU (Oswestry, 51 miles), G8JI (Kings Norton, 6 miles), and G8QY/P (Meriden, 19 miles). Their signals were also heard by GW2ADZ. The receiver in use was an ASB8, much modified, with 50 kc bandwidth and oscillators run from dry batteries to eliminate drift on standby periods. The transmitter was CC and the final a CV53 doubler running at 5 watts, into a "City-Slicker" type of aerial.

Those Xtal Diodes !

Last month's comments on crystal diodes have brought a number of letters of disapproval. It certainly shows that the

easiest way of obtaining information is to publish erroneous statements ! Everyone then rushes in with a mass of date which would have been quite unobtainable in any other way !

However, we must apologise to those who were misled by the remarks on p. 504, September, regarding CV numbers of crystals —and it must be said here that it was not the fault of the very efficient stand-in who wrote last month's "VHF Bands" for us. Many thanks to all those who have written to correct the error. It is hoped to discuss crystal diodes briefly next month, but in the meantime the remarks made last time on the subject should be ignored, except to note that the CV226 is not suitable of 70 cm operation, as it was designed as a "noise source." But CV253 and CV291 should, we understand, be excellent.

A number of comments have also come in regarding the equipment described last month in the writer's "Getting going on Seventycems" article. Two of them call for some further explanation : The superiority of the 9002 over the 6J6 was entirely a matter of a clean note, and nothing more ; and the degree of coupling of the aerial circuit in the converter to the mixer lines was exactly as described, namely, as tight as possible. The coupling loop is run right along the lines, separated only by the insulation on the wire. It is in fact fixed firmly against the lines.

The two-metre beam on its tower at G3VM, Costessey, Norwich.

Sayings of the Month

"I have never heard G5BY. Is this a record ?" (G3AKU) . . . "I think there's a nasty absorbing layer over my QTH." (G6CB) . . . "If the weather continues wet I may soon get on 144 and 420 mc. If it gets fine again I shall carry on gardening." (G8QX) . . . "The Band Plan is just good plain commonsense." (G3AVO/A) . . . "Regarding G4LX's remarks last month, I might say that from here *any* contact is considered as something special." (G3VM) . . . "I notice the absence of GC's on the band. They might produce some interesting DX." (G3GHI) . . . "Anyone who works, or hears me, can be certain of a card, *in return for theirs*." (GC2CNC) . . . "It's not much use people saying they won't work those in the wrong part of the band if they keep on doing it. It's as bad as promising to QSL." (G3AKU) . . ."QSL's ! ! From the correspondence, I seem to be lucky at about 40 per cent. returns." (G3AVO/A) . . . "The string broke on the 5-over-5 Yagi just when I needed it !" (G3WW) . . . "An 832 ! I don't believe it !" (DL4XS commenting on G2XC's two metre signal).

The Tables

The "Counties Worked since September 1, 1949" Table is finalised this month and next time will be replaced by the first list of the coming 12 months. Congratulations to the high scorers for 1949-50 ; it has been most interesting to watch progress as the months went by—and our own thanks are due to those who have so consistently supported this Table.

Claims have already been received for the 1950-51 listing, which rather goes to show how erroneous are some of the opinions that get around regarding activity and conditions.

It is also good to see that this month we have made an encouraging start with what one hopes will be the regular appearance of a 70 cm Calls Heard listing. Thanks G2CIW, G2QY, G2RD and G4CG.

In Conclusion

Last, but certainly not least, your conductor would like to thank "Stand-in" for the effort that enabled him to take a short holiday last month ; comments from readers tell how well the job was done. Next month's news, views, claims, suggestions, criticisms and opinions should be posted to reach E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London S.W.1, by October 11 latest. Though once again it is tight, please try and hit that date. With you again on November 3.

G1BF

All Clever Stuff !

ONCE again heavy mail including interesting letter from new DX chum, signing ANØDE—very subtle. He says: Remember meeting your pal MO1FFI out East during last war, real FB type with permanently bloodshot eyes. (*Susie, QRX?*)

Another letter, signed 73ES88, from keen beginner saying Starting new c/s sequence to make DX bands more interesting. Am in partial agreement of course but consider ample scope yet for exotic calls without confusing issue this way. In future DX chums asked apply OMØTO (this of course is me G1BF) for selection DX calls—and pse do not send in cards decorated jolly roger, sketches Susie in beach wear and similar deviations from path strict rectitude.

My T20 still pumping full bore and can now get dull red glow in loop-lamp held near filament xformer, about same as near tank coil. This shows RF everywhere as it should be. From this it is easy step forward to heat filament T20 from RF generated in tank, thus producing self-sustaining PA requiring only regular dose 2000 volts on plate at 50-cycle intervals to maintain condition. Filament T20 connected across small winding in field tank coil, with adjustment marked "Pick up Amps," and process started by connecting heater xformer to T20 through RF chokes then switching off LT when filament glowing really well. No other technical writer yet formulated this new principle valve technique. Just mention idea to show why it is imperative beginners watch this space for real gen on what makes it tick.

Am now being plagued by DX-hungry types in Zone 16 for skeds famous station OMØTO (this of course is me G1BF). All cards say "Pse pse dr dr OB OB ur ur QSL QSL tnx tnx Popoff Father of Radio." Box 88 now gummed up QSL's for OMØTO. All reports say "Ur RST589x vy vy FB dr OM pse QSL tnx". This gives lie to accusation jealous locals PP1PPP and SS5SS that signal OMØTO indistinguishable from QRM by local vacuum cleaner with loose pin connections. Laugh this off by some crack like It takes a buzz-saw note to fetch in the Real Stuff.

Editor says this feature makes him think so more sound advice next month.

(*Readers may be assured that we are doing our best to reclaim this space.—Editor.*)

"... T20 running a bit warm, OM ...."

CARDS IN THE BOX

The operators whose QTH's we want this time for the delivery of cards held for them in our QSL Bureau are as below. Please send a large S.A.E., with name and callsign, to BCM/QSL, London, W.C.1. Callsign/addresses can also be inserted in "New QTH's" if a note to that effect is made when sending envelopes; this will ensure eventual appearance in the *Radio Amateur Call Book*.

G2AOJ, 2BGA, 2KQ, 2VY, 3ABY, 3AGE, 3BQD, 3FGN, 3GDL, 3GFN, 3GLX, 3GNH, 3GPZ, 3GQW, 3GUV, 3HCC, 6GU, GM3EDY.

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MICRO-WAVE TV LINK

Contract for the new radio link for Scottish TV (Manchester to Edinburgh route) has been placed with Standard Telephones & Cables, Ltd., who first demonstrated micro-wave working across the Channel as long ago as 1931. This new link involves an overall distance of 245 miles, and the contract includes the design, construction and installation of seven unattended automatic repeater stations, arranged to work strictly over line-of-sight paths. The transmitting and receiving gear will be duplicated at each station, and the reserve equipment will be brought into operation automatically on failure of any corresponding part of the apparatus. Additionally, the system will include automatic supervision to give a complete picture, at one main control point, of operating conditions over the whole route.

ON SOLDERING ALUMINIUM

Getting the Technique

By **Rev. F. NESS, M.A. (G3ESV)**

ALL amateurs soon become adept at the soft-soldering work that is an essential part of every constructional job to-day. In fact, it is no exaggeration to say that without the technique of the soldered joint, modern radio (not to mention radar) would be virtually impossible. Those whose experience dates back to the 20's will remember the way every component had its row of brass terminals ; wiring up was done with sixteenth-inch *square* wire, arranged in fancy geometrical patterns. and with no attempt at securing short leads. But now, try to imagine a modern communications receiver with nut-and-bolt connections throughout !

So, while nobody to-day hesitates to reach for his iron and his resin-cored solder when it's a question of wiring a receiver or transmitter, most amateurs still dodge the job of soldering anything made of aluminium. Yet once the technique has been acquired, the thing is dead easy, and the result is both neat and strong.

How To Do It

Let us suppose that the corners of an aluminium chassis are to be soldered up. A chassis should always be strengthened in this way, because if adjacent sides are not fastened together somehow, they invariably show an unsightly gape when any weight is placed on the chassis. To fasten angle pieces in place with rivets or nuts and bolts is a time-consuming job.

The materials required are simple. A stick of special aluminium solder costs a shilling or so. The writer has found "Fermo" solder the easiest to use. Sometimes a sheet of instructions is given with the stick ; this should be thrown away at once. The usual instructions are calculated to reduce one to a state bordering on frenzy if any attempt is made to follow them.

Instead, select an old worn-out file from the junk box. Almost anything will do, provided it is not too big. (But once it has been used for this job, it will be no good for anything else.) No flux is needed. But it is essential to have a source of "clean" heat. An ordinary soldering iron is quite useless, as the bit temperature is far below the melting point of the special solder used. The best form of heat is a gas flame, and the writer uses a Bunsen burner. If one has gas in the house, then a Bunsen burner (available from the bigger chemists, such as Boots) is a useful tool, as it can be used for brazing and other big jobs as well. A paraffin blow-lamp should do the job just as well if properly handled, but the writer has never used one.

Setting Up

Assume then, that the materials are all ready Tap the edges of the chassis together to give a neat butt-joint. Then prop it up firmly on the corner to be soldered (make your own arrangements to avoid setting the shack on fire) so that the join lies horizontally. Play the flame on it for a minute or two to get the whole chassis thoroughly heated. Snip off half an inch of solder and drop it into place. Get the end of the file pretty hot at the same time. After a minute or two the solder will go soft and then fluid. Here is where you have to get weaving ! With the hot end of the file, start scratching at the V of the joint, to uncover clean, unoxidised metal. As you scratch, poke the solder into place with the same movement. It will be found that the solder will not adhere to any but an absolutely *new, fresh* surface. Therefore, it is no use trying to save time by filing or scraping the job first. Long before the aluminium gets hot enough, the surface will be oxidised again.

So the secret of success is to heat the metal first, then scrape the necessary area clean bit by bit, and simultaneously rub the solder into place with the end of the file. Work as fast as you can and keep the flame playing on the actual joint all the time. The solder flows into place easily and cleanly when you get the knack of it. As soon as the joint is made, remove the flame and let the chassis cool naturally. Then turn it round to the next corner and repeat "*da capo al fine*" as the I's say. Because of the scraping necessary, it pays to support the job firmly before starting. Prop it up on a few bricks ; or jam it in a corner of the fire-place. But the line of the joint must be kept horizontal or the solder will run off.

Once the trick has been learnt, a chassis can be soldered in 10 minutes. This is *far* less than the time required to cut four angle pieces, drill 16 holes and knock in eight rivets —the minimum number of operations for a satisfactory job. One word of warning may not be out of place. A mad-hot chassis looks exactly like a stone-cold one. So be careful how you get hold of the job after soldering !

Here and There

Publication Note

It is very much regretted that, in common with many other weekly and monthly periodicals, we were unable to publish the issue of our companion *Short Wave Listener & Television Review* dated October, and due out on September 21. The resumption of work in London printing offices did not come soon enough for us to catch this date. Consequently, the next issue of *Short Wave Listener & Television Review* will be combined for October-November and will appear as soon as possible after October 19, the normal date for the November issue.

As readers will of course understand, the situation is not one over which we have any control. However, we are extending the subscriptions of all who obtain *Short Wave Listener & Television Review* direct from us—and, of course, all BSWL members—by the period covering the unavoidable break.

Slight Correction

In the note in this space last month giving the 6F12 equivalents, the Cossor SP6 was included in the list. We are informed by the Technical Service Department of A. C. Cossor, Ltd., London, N.5, that the SP6 is no longer an extant type, having been replaced by the 6AM6—a change in name but not in function.

The Club Contest

The Fifth Annual 1·7 mc Club Transmitting Contest, organised by *Short Wave Magazine*, and now always known as "MCC", will take place this year, during the period November 11-19 inclusive, when the Top Band will be shaken by lusty calls of "CQ MCC". But this identification should be used by *participating Club stations only*, since bonus points are earned by Clubs working each other. In previous years, a certain amount of harmless confusion has been caused by non-Club stations calling "CQ MCC" simply with the idea of giving Clubs a contact. We shall, of course, be only too pleased (and so will the Clubs) if as many stations as possible come up with this intention, but we would also be greatly obliged if all operators not actually in the Contest keep to straight procedure.

Butler Harmonic Filter

We are glad to mention the new Butler Low Pass Filter for the suppression of TVI by amateur band transmitters. Consisting of two constant-K mid sections with M-derived end sections, very high attenuation is achieved on frequencies above 30 mc, with negligible insertion loss on the operating frequency. The in-and-out connections are for 72-ohm cable. Write Butler Radio, 17 Five Bells Lane. Rochester, Kent, for prices and further data.

Making Sure

Readers who may be experiencing difficulty in getting the *Short Wave Magazine* locally, and on time, can obtain it direct from us by subscription. This costs 20s. post free for a year of 12 issues, and mailing on the day of publication each month is guaranteed. Write the Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1. Those who prefer it can take out a six months' subscription for 11s.

New QTH's

As previously explained, we are the U.K. forwarding agents for the American publishers of the *Radio Amateur Call Book*, the remarkable quarterly compilation which lists all known amateur stations throughout the world. We undertake to airmail to them all new G QTH's and changes of address, provided they are sent in to us by the owner of the callsign. All these addresses also appear in our "New QTH" feature. And since another R.A.E. result promises many new G stations, calls should be notified immediately on issue so that they can be published as soon as possible.

Radio Courses for Amateurs

Excellent courses organised in conjunction with the Essex County Council are available for those who can get to the Ilford Literary Institute (near Gants Hill on the Central London Tube). Entitled the Radio Amateurs' Examination, Morse and Codes of Practice, Amateur Radio Refresher Course, Amateur Transmitter Course and Amateur Television, each is for two hours one evening a week, over a period of from three to eight months, depending on the subject. The fees amount to a few shillings only, and the courses provide an excellent opportunity for amateurs living in the London area to gain a sound knowledge of their hobby. Write C. H. Lamborn Edwards, A.M.I.E.E. (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex. (*Seven Kings* 7384.)

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. Pease *write clearly* and address on a separate slip to QTH Section.

EI8Y M. E. Doyle, Collins Barracks, Cork, Eire.

EI9A D. F. Cornwall, Baldwin Street, Mitchelstown, Co. Cork, Eire.

GW2BCH J. P. O'Brien, Fron Heulog, Bryn Derw Road, nr. Llandudno Junction, N. Wales.

G2COG A. A. Leith, 57 Leith Road, East Ham, London, E.6.

G2DMT A. C. H. Waters, 102 St. Johns Lane, Bedminster, Bristol, 3.

G2HJT E. J. Wellman, 306 King's Road, Hurst, Ashton-under-Lyne, Lancs.

G2KB L. I. Sidwell, 7 Abbottsfield Cottages, Wareside, nr. Ware, Herts.

GW3ANU J. L. Reid, 79 Clifton Street, Roath, Cardiff, S. Wales

G3BHQ K. Robinson, 51 Hill Top Road, Old Whittington, Chesterfield, Derbyshire.

G3DMQ A. S. Curry, M.A., F.R.A.S., 1 Victoria Street, Cambridge.

G3EQM/A J. A. Theobald, "B" Company, 5 Radar Bn., Hazebrouck Barracks, Arborfield, Berks.

G3FGZ S. J. Bearne, 60 St. Leonards Road, Newton Abbot, Devon. (*Tel : Newton Abbot* 526.)

G3FOI W. M. Gregory, 50a Tollington Park, Islington, London, N.4.

G3GEM E. R. F. W. Crossman, B.A. (*ex-J4ACA*), Whiteshill, Hambrook, nr. Bristol.

G3GLX J. Simmonds, 1 Smithfield Avenue, Hasland, Chesterfield, Derbyshire.

G3GOI E. Woolley, 12 Goldington Road, Bedford.

G3GPU J. C. East, 20 Marchmont Road, Wallington, Surrey.

G3GSH J. R. Clarke, 88 Nunsfield Road, Buxton, Derbyshire.

G3GTE C.P.O. Telegraphist A. E. Snellock, B.E.M., R.N.V.W.R., 6 Brooklands Road, Heathend, Farnham, Surrey.

G3GTW D. Kirk, 81 Middle Avenue, Rawmarsh, Rotherham, Yorkshire.

GM3GUC B. N. Ellis, 262 Colinton Road, Edinburgh, 11. (*Tel :* 87557.)

G3GUD A. Bosworth, 72 Leacroft Road, Derby.

G3GUE A. F. Dowling, M.B.E., T.D., 210 Perry Road, Nottingham. (*Tel : Nottingham* 66505.)

G3GUF A. E. Buckmaster, 9 St. Merryn Close, Plumstead, London, S.E.18.

G3GUG J. P. Bainbridge, 29 West View, Blackburn, Lancs.

G3GUK 3500323 Wheeler, J., R.A. Flt., "E" Div., R.E.U., R.A.F. Station, Henlow, Beds.

G3GUN P. S. Lansley, 211 Castle Street, Old Portchester, nr. Fareham, Hants.

GM3GUS D. Scott, 73 St. Leonard Street, Dunfermline, Fife.

G3GUT G. B. Manning, 8 Albert Road, Bolton, Lancashire.

G3GUW Capt. J. B. Lievens, R.E., Flat 5, Ardenhurst, Southborough Road, Bickley, Kent.

GM3GUY R. W. Metrustry, Feoch, Craigston Road, Johnstone, Renfrewshire

G3GVL J. S. Orme, 1 Siddals Lane, Allestree, Derbyshire.

G3MW D. Wale, 38 Morris Avenue, Wyken. Coventry, Warks.

CHANGE OF ADDRESS

EI6X B. Fogerty, c/o Cliff Power Station, Ballyshannon, Co. Donegal, Eire.

G2BUQ E. Butler, No. 603/5, Hothfield Common, nr. Ashford, Kent

G2CIX A. S. Davey, Fairhaven, Main Road, Chidham, Sussex.

G2DKH O. Ovington, 1 Catherine Terrace, Shield Row, Stanley, Co. Durham.

G2FPC D. Egan, 175 Middleham Road, Edmonton, London, N.18.

GM2HIK J. A. Clark, The Boal, Reswallie, Forfar, Angus. (*Tel : Letham* 254.)

G2LX G. G. Livesey, M.A., Inglenook, Washingborough, Lincoln.

G3AQB W. Stephenson, 53 Hedley Avenue, Blyth, Northumberland.

G3BRV R. C. Bennison, The White Lion Hotel, Great Missenden, Bucks.

G3BXU W. E. Priest, 107 Cotehele Avenue, Keyham, Plymouth.

G3EGB A. H. Hooper, 16 Letchworth Road, Luton, Beds.

G3EJR J. B. Armstrong, Wellbank Hall, Bootle, Cumberland.

G3EMJ A. J. Smith, Rowditch Lodge, Trowel's Lane, Derby.

G3FII R. S. Head, 97 Westbury Lane, Sea Mills Park, Westbury, Bristol.

G3FTJ F. Billsberry, The Street, Alderton, nr. Woodbridge, Suffolk.

G6GW J. J. Curnow, The Yews, Mapperley, Plains, Nottingham.

G6IP Major L. A. C. Lawler, Woodcote Hall, Epsom, Surrey.

G8JR N. P. Haskins, 66 Dukes Avenue, Theydon Bois, Epping, Essex.

CORRECTION

GM2FVV W. Girvan, 20 Murray Place, Stirling.

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SMALL ADVERTISING

Readers having Wants or Offers likely to be of interest in the SWL sphere are invited to make use of the Small Advertising space in our *Short Wave Listener & Television Review*, which now has a large circulation amongst SWL's. Rates are low (2d. a word, minimum charge 3s., box numbers 1s. 6d. extra) and copy for the next issue, dated October-November, can be accepted up to October 11, for appearance on October 19. For the following issue, the closing date for small advertising will be November 8. Orders with remittance to the Advertising Manager, *Short Wave Listener & Television Review*, 53 Victoria Street, London, S.W.1.

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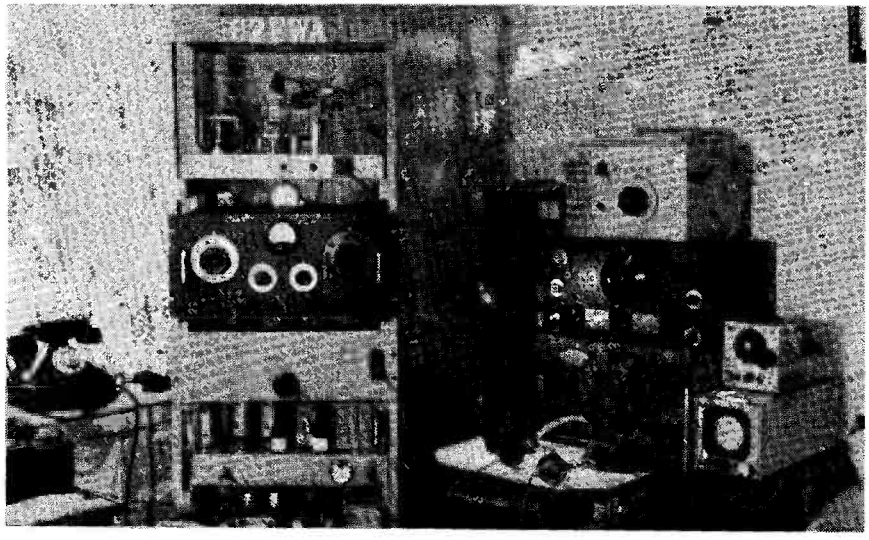
NEWS ITEM

A correspondent who is a licensed amateur and an undertaker by profession writes to say that as he has recently been put in charge of an office in a West Country district where the death rate is low, he hopes to have more time for Amateur Radio.



The other man's station G2FWA

THIS is another of those "corner-of-a-bedroom" stations which of necessity has to be kept as neat and tidy as possible. G2FWA is owned by S. E. Janes, 72 Kimberley Road, Croydon, Surrey, who was licensed AA before the war, full transmitting facilities being granted immediately upon the resumption early in 1946.

The rack on the left carries the 7-14-28 mc transmitter, normally run at 50 watts to a pair of 809's. The exciter (second shelf down) consists of an 89 ECO feeding into a switched 6N7 to give output on either 7 or 14 mc, followed by an 807 operated straight on these two bands or as a doubler to 28 mc. Next comes the stabilised power supply for the ECO driver, and below it the modulator unit complete, with a pair of 807's in push-pull at the output end. The remaining shelves in the rack accommodate the power supply units for the various sections of the transmitter.

Above the receivers is the 10-watt CW/Phone transmitter for Eighty and the Top Band ; this Tx is actually designed for portable working, and has done duty as such for field day events during the last three years.

On the receiving side, G2FWA runs an HRO with 6AK5 preamplifier, and a Q5'er is also available. The Hallicrafters "Sky Champion" is employed as monitor receiver and for listening to broadcast, and an additional item for station monitoring is an oscilloscope used as a modulation indicator, automatically brought in when the control relays are at "send."

G2FWA remarks that as he has not a great deal of spare time for radio, little constructional work is undertaken in order to leave him free to be on the air as much as possible. So his is an "operator station" with the engineering side getting less attention.

NEW COMMUNICATIONS RECEIVER GUIDE

We have recently been looking through a copy of an excellent new publication entitled *Post-War Communications Receiver Manual*, which gives all the essential data on a wide range of American receiving equipment (including Aircraft and Marine Radio receivers) placed on the general market since 1945. The treatment covers full circuit details, placement of all parts, chassis and panel appearance photographs, parts list, alignment details and dial cord stringing procedure for 30 different receiver types in the communications category and 24 in the Aircraft and Marine list. The types covered are Collins, Hallicrafters (S38-SX43 series complete), Hammarlund, National, Airadio, Harvey, Heath, Jefferson-Travis, Learadio, Motorola and Ranger. The resulting make-up is a large volume of 300 pages. The price in this country is 27s. 6d. (plus 10d. postage) and orders can be placed with Gage & Pollard, Publishers' Agents, 49 Victoria Street, London, S.W.1.

The Month with the Clubs

FROM REPORTS RECEIVED

All interested Clubs will by now be well acquainted with the full details of the Fifth Annual *Magazine* Club Contest, to be held between November 11 and November 19. If any other Clubs wish to participate, and have not received copies of the Rules and Entry Form, they still have time to do so by applying to the office at once for them.

We require advice of entry by **October 10** at the latest, stating the call-sign to be used, whether it be that of the Club or of a member's station. From this information we shall publish an acceptance list in the November issue.

Address your advice of entry, together with next month's Club reports, to "Club Secretary," *Short Wave Magazine*, 53 Victoria Street, London, S.W.1, by **first post on October 10.**

And now follow this month's reports, from 31 Clubs.

Bournemouth Radio and Television Society.—The shack has been redecorated and a new 150-watt rig will be on the air shortly (G3FVU). The first of the series of lectures for the new season will be given on October 19, 7.45 p.m. The subject will be Interference Suppression and TV Aerials. Members are preparing to take part in MCC and are looking forward to the winter season.

Brentwood and District Amateur Radio Society.—This Club is still active and plans are under way for the winter. Membership has decreased slightly, but it is hoped to rectify this tendency. On October 27 G5RV is lecturing on TVI, and a few other local Clubs are being invited. Meetings are held fortnightly and the Club Tx, G3FSM is occasionally active on the Top Band.

Clifton Amateur Radio Society.—The new session started off with a General Meeting at which the Hon. Sec. and his Assistant were re-elected. Three members were successful in the recent RAE; the Club's "rig" is being hotted up for MCC and plenty of operators have volunteered for duty. Membership now stands at 40.

East Surrey Radio Club.—The September meeting was the first in the Club's new headquarters and was well attended. G2MV lectured on Impedance Matching. The Club now plans to run a stand at a local Hobbies Exhibition; in October members are invited to visit G2AJS at Caterham; and future meetings will include a film show and the Club Dinner, when the cup will be presented to the winner of the DX Receiving Contest.

Edinburgh Amateur Radio Club.—The AGM on September 13 started the new season, and meetings will continue throughout the winter, every Wednesday at 7.30 in Unity House, 4 Hillside Crescent, Edinburgh. It is hoped to have the Club Tx on the air every second meeting, alternate evenings being devoted to lectures and the like.

Eccles and District Amateur Radio Society.—Meetings are held every Monday, 7.30 p.m., at the Eccles House Club. The Tx is nearing completion, the PMG has granted a licence and the call-sign is awaited. Members spent an enjoyable day at Castle Bromwich on September 9.

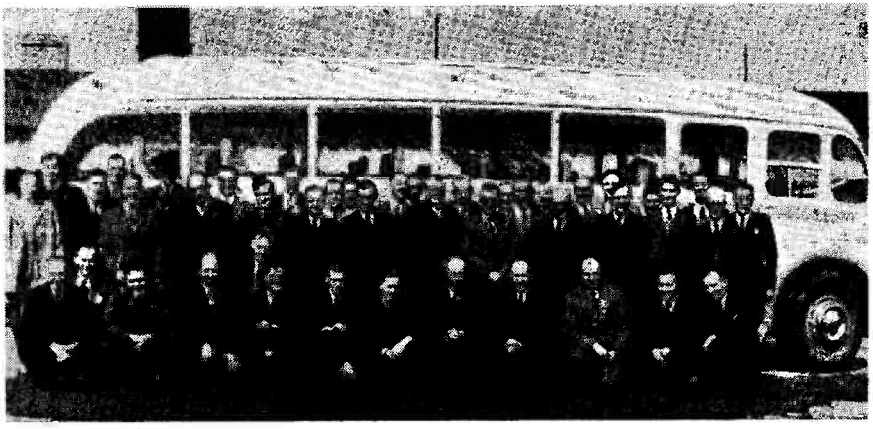
Forfar and District Amateur Radio Club.—Although adjourned for the summer months, this Club, we are informed by the Hon. Sec., is very much alive, and hopes to enter for MCC

Grafton Radio Society.—The new session has opened and meetings are held on Mondays, Wednesdays and Fridays at 7.30 p.m. On October 27 G2BCX will lecture on "Taylor Super-Modulation" and visitors are cordially invited. Morse classes are also being organised for three evenings a week.

Gravesend Amateur Radio Society.—Weekly informal meetings have been held during the summer, with occasional talks from visiting amateurs. VQ4HJP, home on leave from Kenya, has been among the members most of the time. A comprehensive programme is being arranged for the winter.

Guilford Girls' School Amateur Radio Club, Nottingham.—This Club was formed mostly from girls in their final year, and many of these have now left; the Club is being reformed round a nucleus of younger members who were enrolled during the year. The number of members is limited to 20, and keenness is such that it is difficult to select the favoured score! The Club Tx, G3FYN, is on the air, mostly at lunch times and early evenings. See panel for Secretary's QTH.

Radio Society of Harrow.—Meetings are being well attended again after the holidays, and a number of new members have joined. Nearly all who sat for the RAE were successful, including Mr. Webster, a blind member who builds his own gear. Meetings are on October 12 and 26 (Practical Nights); October 5 and 19 are given up to lectures and demonstrations. On November 2 there will be a debate on



Spen Valley always do it in style and comfort when they fix an outing. At the Cranwell Hamfest recently, the party included 20 of their fully licensed members.

QRP *v.* QRO. Visitors will be welcome any Thursday evening at Eastcote Lane Primary School, South Harrow.

Kingston and District Amateur Radio Society.—Meetings are still well attended, and a recent Junk Sale has improved the financial position a lot. October dates are the 11th and 25th, the first being the AGM, at Penrhyn House, 7.30 p.m. Winter programmes are under consideration.

Mansfield District Radio Society.—The September meeting was well attended; there was a discussion on Club activities, a Junk Sale, and final arrangements were made for a visit to Rugby Radio. A new Secretary was also appointed (see panel for QTH).

Portsmouth and District Radio Society.—Several successful meetings were held recently, the highlight being a visit to the Thames Valley Club on August 27. The Club is running a stand at the Meccano Club Exhibition, Carnegie Library, on October 4. G2DZT, a member, is busy building a transmitter-receiver for another member who is in hospital. Membership stands at 34, but additions will be welcomed by the Hon. Sec.

QAU Club, Channel Islands.—This newly-formed Club has been meeting every week since its foundation, and recently has had the company of G2FLK and a friend from London. The reason for its formation was a desire on the part of GC amateurs to enter for MCC! Prior to this, informal meetings have been held by the GC's ever since 1946. Secretary's QTH in panel.

Reading Radio Society.—At recent meetings members heard a talk on the construction of an FM receiver, which was demonstrated on the BBC's 91 mc FM transmission, and a talk on Electronics, particularly the development of the valve. October meetings are on the 12th (Film), 14th (Instructional Section) and 28th (Discussion on RAE Questions). The Hamfest has been provisionally fixed for November 19.

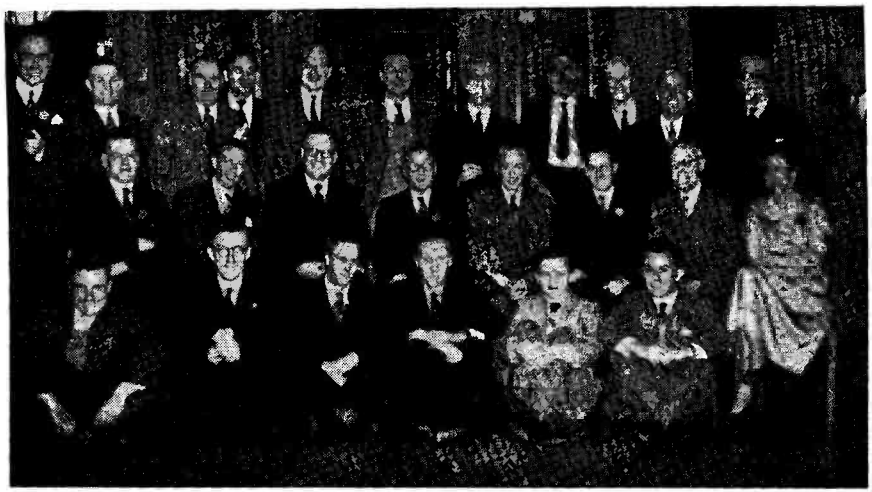
Rotherham and District Radio Club.—Meetings have continued during the summer on an informal basis, but the full winter session has now started. On October 11 there is to be a demonstration of members' gear; on the 18th a talk and demonstration on Communication Receiver Design by G6ZA; and on the 25th, Hints and Tips on Constructional Work. It is also hoped to arrange a dinner and social during November.

South-East London Technical College Radio Society.—This Club is licensed with the call G3CMQ, and meets fortnightly at the S.E.L.T.C., Lewisham Way, S.E.4, beginning on Tuesday, October 3, at 6.45 p.m. Past and present students will be welcomed in the shack at the top of the D.C.S. building. RAE courses will be run every Friday from September 29, in the main building.

Sheffield Amateur Radio Club.—Interest and attendances have been good during the summer months. A visit to the Neepsend Electricity Generating Station has been arranged for October 18; numbers are limited and applications should be made without delay.

Slade Radio Society.—Forthcoming events are: October 13, Annual Junk Sale; October 27, Lecture, "Music and Sound in Films"; November 10, Annual Dinner. Meetings begin at 7.45 p.m. and new members or visitors will be cordially welcomed.

South Manchester Radio Club.—Numbers are still on the



A group representative of the Southend and District Radio Society.

increase and regular meetings are held at the Church Schools, Northenden, every other Friday at 7.30. Results of the RAE were very gratifying, and a high proportion of members succeeded. In October there is to be a Hamfest at Parker's Cafe, Catley (on the 7th), but all tickets are already sold. In November the first inter-Club DX contest will be run, with members competing for a cup presented by G3BMF.

Sutton and Cheam Radio Society.—The Club station, G3GFA, has been on the air with a B2 loaned by a member; more ambitious gear, it is hoped, will be installed later. The Club is running an Annual Constructional Competition again this year, but full details are not yet available regarding conditions—to follow next month.

NAMES AND ADDRESSES OF CLUB SECRETARIES

BOURNEMOUTH : F. G. Hamshere, 99 Elmes Road, Winton, Bournemouth.
BRENTWOOD : J. F. Moseley, G2CIW, 45 Geoffrey Avenue, Harold Park, Romford, Essex.
BRIGHTON : L. Hobden, 17 Hartington Road, Brighton.
CLIFTON : W. A. Martin, G3FVG, 21 Brixton Hill, London, S.W.2.
COVENTRY : K. Lines, 142 Shorncliffe Road, Coventry.
EAST SURREY : L. Knight, G5LK, Radiohme, Madeira Walk, Reigate.
ECCLES : E. Rayson, 11 Hartington Road, Winton, Lancs.
EDINBURGH : D. A. E. Samson, GM3EQY, 56 Elm Row, Edinburgh, 7.
FORFAR : A. F. Ferguson, 3 Osnaburg Street, Forfar.
GRAFTON : W. H. C. Jennings, G3AHB, Grafton LCC School, Eburne Road, London, N.7.
GRAVESEND : R. Appleton, 23 Laurel Avenue, Gravesend.
GUILFORD GIRLS' SCHOOL : S. Read, G2ATM, Guilford Girls' School, Nottingham.
HARROW : S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
KINGSTON : R. Babbs, 28 Grove Lane, Kingston, Surrey.
MANSFIELD : A. W. Fowler, G3FR, Windsor, Cowpasture Lane, Sutton-in-Ashfield, Notts.
MIDLAND : A. W. Rhodes, 135 Woolmore Road, Birmingham, 23.
PORTSMOUTH : M. W. Pearce, G3BSR, 58 Hollam Road, Milton, Portsmouth.
QAU (CHANNEL ISLANDS) : Miss Valerie Hunt, Woodshiel, Millbrook, St. Lawrence, Jersey.
READING : L. Hensford, G2BHS, 30 Boston Avenue, Reading.
ROTHERHAM : R. A. Watson, G3AYS, 147 Fitzwilliam Road, Rotherham.
S.E. LONDON TECHNICAL COLLEGE : The Secretary S.E.L.T.C., Lewisham Way, London, S.E.4.
SHEFFIELD : E. Walker, G2LT, 11a Welwyn Close, Intake, Sheffield.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham, 23.
SOUTH MANCHESTER : M. I. Wilks, G3FSW, 57 Longley Lane, Northenden, Manchester.
STOURBRIDGE : W. A. Higgins, 28 Kingsley Road, Kingswinford, Brierley Hill, Staffs.
SUTTON AND CHEAM : R. I. Clews, G3CDK, 1 Hurstcourt Road, Sutton.
WAKEFIELD : W. Farrar, G3ESP, Holmcroft, Durkar, Wakefield.
WANSTEAD : R. J. C. Broadbent, G3AAJ, Wanstead House, The Green, London, E.11.
WARRINGTON : J. Speakman, Davyhulme Cottage, Dark Lane, Whitley, near Warrington.
WIRRAL : R. A. Browning, 24 Norbury Avenue, Bebington, Cheshire.
WORCESTER : J. Morris-Casey, G8JC, c/o Brookhill Farm, Ladywood, Droitwich, Worcs.

Wakefield and District Amateur Radio Society.—The winter programme started on September 20, and from that date meetings will be held fortnightly until next April. A full programme is in print, and it includes the six Mullard Film Strips on Valves, and two on TV. Remaining meetings are devoted to lectures and discussions. On October 18 Film Strip No. 2 is being shown ; on November 1 there is to be a Junk Sale.

Wanstead and Woodford Radio Society.—The AGM will be held on October 31, 8 p.m., at Wanstead House. Beginners' classes are being well attended, and some old hands turn up as well ! Future talks are on Plastics (G3AAJ) and Taylor Super Modulation (G2BCX). Committee has suggested a "Swop-Table" idea for future meetings, and has also ruled that no one may bid at a Junk Sale unless he has placed some gear for sale himself.

Warrington and District Radio Society.—The Field Day at the end of August was enjoyed by many members, and 35 contacts were made. A series of talks on Mathematics in Radio has begun, and slow Morse transmissions have also been organised. Three members have passed the RAE and hope to be on the air very shortly.

Wirrall Amateur Radio Society.—Recent talks were on Modulating the Carrier (G8BM. and TV Receivers (G3AKW)) The winter programme is under consideration. October meetings are on the 11th and 25th, both at the YMCA, Room 3, Whetstone Lane, Birkenhead, beginning at 7.30 p.m.

Worcester and District Amateur Radio Club.—Weekly meetings kept up to good strength through the summer, and now the winter programme is being prepared, with an accent on constructional work. Any reader visiting Worcester is given a warm welcome at the Club ; will all interested note that meetings are now on Fridays, not Thursdays as before. Anyone willing to give a talk is earnestly asked to get in touch with the Secretary, stating the subject and the date of visit.

The technical class at a meeting of the South Manchester Radio Club—a happy party, seemingly, with G6DN (standing, left) and G3EON (standing, right) as lecturers.

Brighton and District Radio Club.—After an informal August, the autumn programme has been organised, the October subjects being Principles of Radar and A Compact Top-Band Tx. All Sussex amateurs and their friends are invited to a Ham-fest on October 21 at the Golden Cross Hotel, Western Road, Brighton. Further details from the Hon. Sec.

Stourbridge and District Amateur Radio Society.—They meet the first Tuesday in each month at King Edward VI School, Stourbridge. At that held on September 5 a series of six films dealing with Elementary Electronics was shown, by courtesy of the Midlands Electricity Board. Members were so impressed that further film-shows have been arranged.

Coventry Amateur Radio Society.—Fortnightly meetings continue at the BTH Social Club, Holyhead Road, the next being on October 9 and 23. On the 20th G6CJ will be giving his well-known lecture on Aerials, with a practical demonstration—this should be seen by all who can possibly manage to attend. For it, the meeting will be at Priory High School, Wheatley Street, Coventry, at 7.30 p.m. and non-members of CARS should apply for tickets before October 16 (see panel for Secretary's QTH). CARS Committee has decided that Club activities should be extended to cover Radio Control of Models and Listening Groups, as well as the more usual activities of a local radio society. All members who sat for the RAE this year have passed and now await their call-signs.

Midland Amateur Radio Society.—They will be holding their annual dinner on November 4 at 6.30 p.m., at the Imperial, in Birmingham. Visitors and particularly ladies are specially welcome, as this is by way of being the social highlight of the MARS year, and is a well-organised affair.

SMALL ADVERTISEMENTS

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

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VALVES wanted for cash.—Types VU39, 6K8, 6L6, 723A/B, 829B, 832, 6J6, 6AK5, IR5, IS5, IT4.—Details to Box 786.

WANTED: New surplus valves of all descriptions, large or small quantities. Tubes type 725A, 723A/B, 829B, 1B24 or 1B22. All types of test instruments. Selsyns, Magslips. Receivers and transmitters. Best prices. Immediate settlement.—Write Box No. 810.

SURPLUS valves—all new and boxed. 6V6, 5Z4, 6J7, 6F6, 2X2, VU111, 6B8, 6AC7, 6X5, KT44, 5U4, EBC33, 41, 6SK7, 6SG7, 6N7, EF39, HP4106, 6K7, 6SH7, AC6PEN, 6Q7, all at 5/6 each. Morganite V/C w/S ¼, ½, 1, 2 Meg, 4/-. Silver Mica Condensers, all values, 3/6 dozen, ·0001, ·0002, ·0003, ·0004, ·0005, moulded, 3/6 dozen. 5" Rola L/T, 10/6. 8" Plessey L/T, 11/6. 10" Rola L/T, 21/-. 10" Plessey L/T, 17/6. Send for lists.—Alpha Radio Supply Co., 5-6 Vinces Chas., Victoria Square, Leeds, 1.

FOR PA or aerial coupler coils. Eddystone (Cat. 1091/2) frequentite base and sub-base, five plugs, three sockets, 2/9 pair.—G2CKW, 203 Hollydale Road, London, S.E.15.

BC624 Rx and BC625 Tx complete, in perfect condition, ideal 2-metre job, £2/15/-. Eddystone 640, new, £18. 1154, 4-band Tx, new, £3. BC348 modified, £13.—GI3GDN, 27 Oakwood Place, Portadown, N. Ireland.

WANTED.—AR88LF Receivers and RA34 power units in brand new or "as new" condition. Advise quantity and price to Box No. 823.

WANTED.—BC-610 Hallicrafter transmitters; SX-28's, AR-88's, receivers and spare parts for the above. Best prices.—Write Box 850, c/o Spiers Service, 69 Fleet Street, E.C.4.

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

BLACK Crackle paint, beautiful finish, stove or air dried. Enough for 10 sq. ft. 2s., post free. Satisfaction guaranteed.—Geoff. Wheatley, G8QB, 80 Millmead Road, Margate.

READERS' ADVERTISEMENTS

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

HALLICRAFTERS S.27 for sale, new valves, aligned, covers 27·8 to 143 mc, perfect. Offer wanted. Will part exchange for SX28.—Box No. 809.

BC610 wanted by W Ham. Quote reasonable price and condition. Air Mail. Lt.-Col. Chas. E. Spitz, American Embassy, Oslo, Norway.

EDDYSTONE S.640 for sale, just 3 months out of guarantee. Perfect electrical and mechanical condition, £20.—271 Chapel Street, Salford, 3.

MCR1 sale or exchange. All coils and power pack, good condition.—J. Turner, Ward 6, County Hospital, Stonehouse, Lanarkshire.

BARGAINS not to be missed. Evershed and Vignoles circuit tester resistance megger with internal battery, £2. Wavemeter 1117 brand new and perfect in transit case, £4. S.A.E. for interesting list. —102 Parrswood Road North, Manchester, 20.

RSGB BULLETINS, 83 copies, June 1943 to date. *Short Wave Magazine*, 21 copies, 1948 onwards. Vactric Vacuum cleaner. What offers ? 17 Park View, Morden, Surrey.

NATIONAL HRO American communications set, with power pack, speaker, 5 coils.—Box No. 813

FOR SALE.—Hallicrafter Sky Champion, excellent condition. 540 kc-43 mc. Built-in speaker, AVC. BFO, £15/10/-.—G3CIL, 48 Rishton Avenue, Bolton, Lancs.

SURPLUS to requirements, one Eddystone 750, absolutely brand new and unused, in original carton. £47/10/-, carriage paid.—G3CRF, Jones, 4 Windsor Road, Plymouth.

WANTED.—Service Handbooks and conversion data for converting Test Set 43 into a standard oscilloscope. Also Data on Test Sets 28 and 98, and the trans-receiver No. 3559.—Box No. 814.

NEW 58 Mk. 1 Rec/Trans. complete, power unit, etc. £7/10/- or exchange for R.1155, modified, or otherwise.—J. Graham, 555 Cowpen Road, Blyth.

SALE.—TCS5 Rx. and spares, £6. Large quantity of valves and components. Rock bottom prices. Stamp for list.—Box No. 815.

SALE.—Oscillator 145. 807 VFO/MO 2-7·5 mc and P/P, first offer, £7/10/-. Xtal P.U., mike, SM dial, meters, valves, etc. S.A.E. list.—G3GRA, 31 Byng Road, Barnet, Herts.

EDDYSTONE 358x, 31 mc-90 kc. 9 coils, power pack, 240v, as new. Radiovision 5/10 expander. BC614E speech amplifier. Type 145 oscillator VFO + power pack. R.1116 receiver. C-98/GR1-valve DF/RF pre-amp unit, 2 loops 2-4 4-8 mc. 12v DC. No reasonable offers refused.—Ness, 34B Market Place, N.W.11

B2 Transmitter receiver, power pack and all accessories, in carrying cases. As new, £12/10/-. —Styler, 15 Dalkeith Avenue, Bilton, Rugby.

BC348Q with S-meter fitted and separate RF gain, micro-dial fitted to tuning, internal P/P for mains, handbook, price £13. Also Type 145 Oscillator, fully described in April 1948 issue of *Short Wave Magazine*. Price £2/10/-. 184 Kingsway, Gatley, Cheshire.

AR88D 540 kc-32 mc. Perfect, £45 or offers —Pearce, 22 Drumbrae South, Edinburgh 12.

SMALL ADVERTISEMENTS

READERS'—*continued*

AR88D S-meter, RCA cabinet speaker, manual, an FB Rx, first offer near £50 secures. Seen any time. S.640, £18. 1155 modified, £7. Rx 1115, 300-600 mc, GG RF, bandspread, £5/10/-.—Taylor, 41 Main Road, Lake, Sandown, I.O.W.

50/75 watt Phone-CW Tx, complete with VFO and power pack, compact, ideal flat dweller, £16. S.A.E. details. New Cossor DB CRT, £3. PV1-35's, £1. DET 12's, 15/-.—G3AAK, 44 Croft Road, Swindon.

SELL or exchange, R.1116A, with eliminator rectifier, plugs, etc., £7/10/-. R.1224A, new, £5/15/-. R.1132A, new, £4/19/6. Wanted, CW/Phone Tx or AC amateur band receiver. Offers, fullest details.—Bartlett, Whitland, Carmarthenshire.

BC348O internal P/P, speaker and phones. 25w CW CO/PA Tx with 350v P/p, all circuits metered. Also 20 valves DET 12, 809, 807, 1625, 6L6, etc. £20 the lot.—Robinson, 155 Bishop Street, Londonderry, Northern Ireland.

ARMY 19 set, Tx/Rx 2·0 to 8 mc. 807 output, 15 valves, complete, good condition. £15. Tiny Tim petrol electric generator, 12v to run set, £10. 1154 Tx, modified for xtal control, £5.—Box No. 816.

WANTED.—American BC639A VHF receiver, preferably with manual.—Hollis, 143 Lymington Avenue, Leigh-on-Sea, Essex.

HAMBANDER, as new, £10. Woden mains trans. 750v, 250 mA, 45/-. C.E.G. 100 kc, bar, £1. 5-section, 42-ft. steel mast, less guys, £2.—4 Boardman Road, Manchester, 8.

R107 built-in clock, S-meter, manual, 28 mc convertor with p/p, radio globe, £12 the lot, or exchange for enlarger or good camera.—Lister, 13 Silver Royd Grove, Leeds, 12.

CANADIAN 52 receiver, 1·75-16 mc in 3 bands with loudspeaker, xtal calibrator, switched volt/S-meter. 230v power pack, EL32 output added. New condition. Prefer buyer collects. South London. Offers about £13. —Box No. 817.

WANTED AR88D or HRO, must be perfect. SX25 part exchange or sell £25 or offer. BC222 28 mc trans./receiver, £5 or offer ; 4-poster steel rack, 3 ft., 30/-. Commercial 'scope or Panadaptor wanted, must be perfect.—Box No. 818.

URGENTLY wanted. HRO Bandspread coils. Offers to G3GMZ, 12 Kingsmead Avenue, Tolworth, Surbiton, Surrey.

AR88D Fitted S-Meter, alignment tools, excellent condition, £45. Will exchange for complete HRO, 100 kc-30 mc with bandspread coils, plus £15.—Box No. 822.

EDDYSTONE S640. Stabilised Oscillator, good condition, £18. Buyer collects, all letters answered. —G3BPE, 35 Bladindon Drive, Bexley, Kent.

VALVES : 807, 4/6 ; 6J5, 2/6 ; DI, VU111, VR130' QP21, 2/- ; CV6, 1/6 ; 210LF, 1/-. Please add 6d. postage.—G3FXB, 26 Landseer Road, Hove, 4, Sussex.

6J6, 8/6 ; 6AK5, 832A, 7/6. Brand new, boxed, guaranteed. S640, perfect condition, as new, £20.—Box No. 819.

SCR522 VHF Tx/Rx, 110-150 mc. BC733, VHF Superhet Crystal Rx, 108-110 mc. ARN5, VHF Superhet Crystal RX, 332-335 mc. All complete, unmodified, as new, manuals included, £5 each.—Box No. 820.

SMALL ADVERTISEMENTS

TRADE—*continued*

EDDYSTONE S640 Receiver for sale, £17/10/-. This receiver is in immaculate condition and has been used for a few hours only ; it will be carefully packed and sent carriage paid on receipt of cash. Guaranteed.—Davey, Zwicky, Avenue Road, Freshwater, I.O.W.

FOR sale. Eddystone 640, as new, with speaker and phones, £16 or offer ? TU6B, good condition, 10/-. TU6B, converted into VFO, 20/-.—W. English, 578 Glasgow Road, Clydebank, nr. Glasgow, Scotland.

WANTED. HRO or any other good receiver, full particulars.—Box No. 821.

WANTED. Instruction book for the AR88LF. Loan or purchase, G3DFS, 20 Oakwood Road, Sutton Coldfield, Warwickshire.

FOR Sale. Telefunken Rx, 14 valves, AC or 12v DC, Panoramic tuning twin crystal filter, etc. Working 1·5-25 mc, spare tubes, cheap, £9. HRO coils and bandspread, 10, 20, 40, 80, one general 100, £10. Full set coils for Eddystone 358, £6. Wanted Panoramic viewer, 455 kc, if good order. SX28A Rx, good order, wooden cabinet and sep. speaker, cheap, £22/10/-. Carriage paid, write only.—S. Gabriel, 10 Abbotsford Place, Glasgow, C.5.

AMATEUR going QRT. Power unit Type 285, 400v/250 mA, 2,000v/20 mA, 6·3v/5A, 6·3v/3A. C. 230/200v input, 50/-. Power unit Type 3, rack mountung, 250/300v 100 mA, 6·3v 4A, 35/-. Tuning unit CAY 47155, 1500-3000 kc, 7/6. 700v 200 mA power pack, on aluminium chassis, 15/-. Signal generator Type 505, 430 kc to 15 mc, with artificial aerial and RF/AF output meter contained in one unit, practiacly new, £5. N-H 3 range frequency meter and wave meter/phone monitor, 3000-19000 kc, in carrying case with diode and probe, £2/10/-. Also Oscilliscope, valve-voltmeter, valves, etc. Send reasonable carriage. —21 Milner Road, Morden, Surrey.

FOR Sale.—Hallicrafters SX28A, with manual, £65. AR88LF, late model, manual, nearest £45. Both receivers unmarked, in original mint condition inside and out.—G3DAM, Offenham Road, Evesham.

3BZ Transmitter for sale, £4/10/-. Also Voigt 2 ft. Tractrix Horn, 35/-, or offers. Both very good condition.—Knight, 132 Elgar Avenue, Tolworth, Surrey. (*Elmbridge* 6931.)

WELDED steel tower 32 ft. high, 5 ft. square base, 1-ft. square top, dismantles into two 16 ft. lengths. Offers, G3COI, 59 Darlington Street, Wolverhampton, (*Phone* 35332.)

AR88LF unused, maker's case, buyer collects, £39/10/-.—10 Wake Green Road, Birmingham. (*South* 0958.)

PROP-PITCH motor 24v. AC, £2/10/-. C.P. BC453, new, £2/10/-. TU5B with case, new, £1/10/-. Shaftsbury Extal Mic and stand, £3.—GM3BHY, Moulin, Balmoral Road, Blairgowrie.

G3EGS selling Marconi CNY2 transmitter/receiver. Complete Phone/CW.7 Station for 40/80/160 from AC mains, with microphone and key, £20. R103A, £7.—47 Lindsworth Road, Birmingham, 30. (*KIN* 3268.)

HALLICRAFTERS Super Skyrider SX17, 13 valves, mains, continuous 5 to 550 metres, crystal, S-meter, BFO. Excellent appearance, working well. Delivery arranged. £30 or near offer.—2 Wolverhampton Road, Codsall, Staffs.

EDDYSTONE 640. Immaculate condition, unscratched, just over one year old. Stabilised frequency changer. Little used. Phones. £21.—Box No. 824.

Printed in Great Britain by Lochend Printing Co., Ltd., London, S.W.9, for the Proprietors and Publishers The Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following : Continental Publishers & Distributors, Ltd. ; William Dawson & Son, Ltd. ; CANADA—Imperial News Co., of Canada ; AUSTRALIA AND NEW ZEALAND—Gordon & Gotch, Ltd. ; AMERICA—International News Company, 131 Varick Street, New York. Registered for transmission to Canada and Newfoundland by Magazine Post. *October*, 1950.