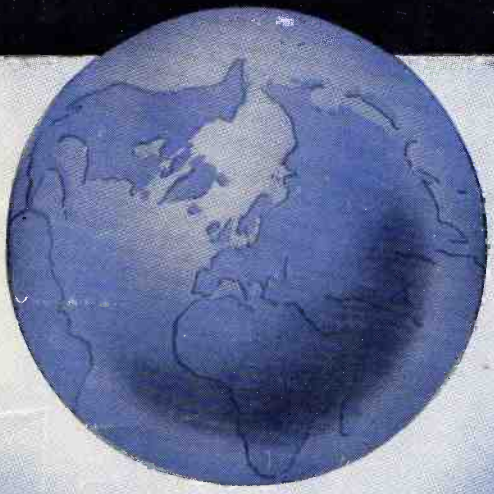
The SHORT WAVE Magazine

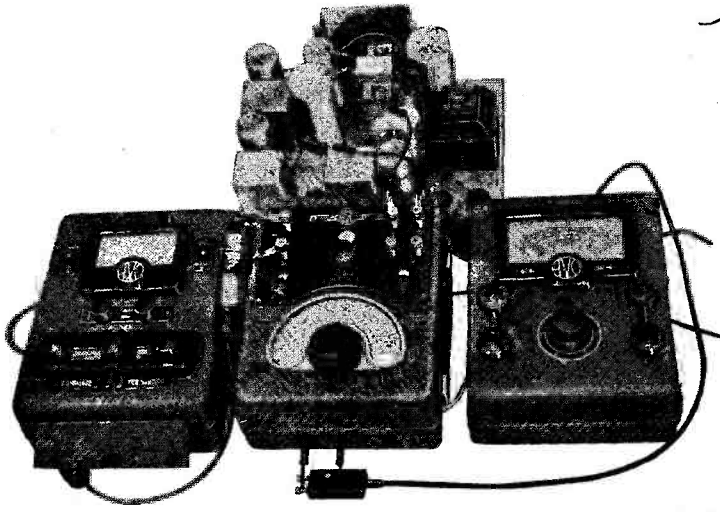
2/-



Audio Osc
for Rc 221 Page 113

EXCLUSIVELY FOR THE RADIO EXPERIMENTER & TRANSMITTING AMATEUR

VOL IX. No. 2 APRIL 1951



The PERFECT TEST TEAM

The illustration depicts a set of modern "AVO" testgear being used to measure the "Q" of the secondary winding of the second I.F. transformer on a chassis of unknown characteristics—just one of many tests which can be performed by this combination of instruments.

A signal of predetermined frequency from the "AVO" Wide Range Signal Generator is being fed into the Electronic Test Unit, where it is amplified and fed to the secondary winding of the transformer. The Electronic Testmeter is connected across the tuned circuit under test and, from the readings obtained and the controls of the Electronic Test Unit, the "Q" of the circuit can be determined. The three instruments, shown as a team, cover a very wide field in measurement and form between them a complete set of laboratory testgear, ruggedly constructed to withstand hard usage.

ELECTRONIC TESTMETER

A 56-range instrument combining the sensitivity of a delicate galvanometer with the robustness and ease of handling of an ordinary multirange meter. Consists basically of a highly stable D.C. Valve Millivoltmeter, free from mains variations and presenting negligible load on circuit under test.
Switched to measure :—

D.C. Volts: 2.5mV to 10,000V.
D.C. Current: 25μA to 1 Amp.
A.C. Volts: .1V to 2,500V R.M.S. up to 2 Mc/s.
.1V to 250V R.M.S. up to 200 Mc/s.
A.C. Power Output: 5mW to 5 Watts.
Decibels:—10db to + 20db.
Capacitance: .0001μF to 50μF.
Resistance: .2ohm to 10 Megohms

ELECTRONIC TEST UNIT

For measuring small values of A.C. voltage, inductance, capacity, and "Q" at radio frequences. Although designed primarily for use with "AVO" instruments, it can be used with any suitable Signal Generator/Valve Voltmeter combination.

As a Wide Range Amplifier, it is capable of an amplification factor of 40 ± 2—3db between 30c/s and 20Mc/s.

As a Capacity Meter, it covers measurements at radio frequency from .5pF. to 1000pF. in two distinctly calibrated ranges.

As an Inductance Meter, it gives direct measurements from .5μH. to 50mH. in six ranges.

As a "Q" Meter, it indicates R.F. coil and condenser losses at frequencies up to 20 Mc/s.

WIDE RANGE SIGNAL GENERATOR

An instrument of wide range and accuracy for use with modern radio and television circuits. Turret coil switching provides six frequency ranges covering 50Kc/s. to 80Mc/s.

Range 1. 50 Kc/s.—150 Kc/s.
" 2. 150 Kc/s.—500 Kc/s.
" 3. 500 Kc/s.—1.5 Mc/s.
" 4. 1.5 Mc/s.—5.5 Mc/s.
" 5. 5.5 Mc/s.—20 Mc/s.
" 6. 20 Mc/s.—80 Mc/s.

Accuracy to within 1% of scale marking. Gives sensibly constant signal of good wave-form, modulated or unmodulated, over entire range. Minimum signal less than 1μV at 20 Mc/s. and less than 3μV between 20 and 80 Mc/s. Gives calibrated output from 1μV to 50mV.

Fully descriptive leaflets available from the Sole Proprietors and Manufacturers

The AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.
WINDER HOUSE • DOUGLAS STREET • LONDON • S.W.1 Telephone: VICTORIA 3404/9

TT.1

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

Vol. IX **APRIL 1951** **No. 93**

CONTENTS

Editor: AUSTIN FORSYTH, O.B.E. (G6FO)

Advertisement Manager: P. H. FALKNER

Assistant Editor: L. H. THOMAS, M.B.E. (G6QB)

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.

73

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.

The SHORT WAVE Magazine
FOR THE RADIO AMATEUR AND AMATEUR RADIO

EDITORIAL

Portability

With the coming of spring and the prospect of the fine summer we have every right to expect after the atrocious weather of these last few months, the thoughts of many keen amateurs will be turning once again to the possibility of portable operation, away from the home station.

This side of Amateur Radio activity does not get quite the support or attention it deserves. To some, "going portable" means loading up an AR88, a 150-watt transmitter and a petrol-electric generating set on a lorry, together with several telescopic masts, and going forth accompanied by a band of willing helpers in a fleet of cars. To others, it suggests the business of getting specialised gear built up to take part in the various summer VHF contests.

But, to all too few, what portable work really means is the design and construction of miniaturised and simplified equipment, which is self-contained for power and, incorporating a universal output coupler enabling any available length of wire to be energised, can be operated on the regular communication bands with QRP CW and perhaps phone—the whole outfit being sufficiently compact (and portable!) for use from a car, in a boat or a caravan, or even in a hotel bedroom. The design of apparatus of this kind calls for much ingenuity and a fairly high degree of constructional skill. But unquestionably it will demonstrate that a watt or two of RF, when properly used, can be made to give the most surprising results. And going portable in the fullest sense will be found an undertaking of quite unusual fascination and interest.

Austin Forbes G6FO.

Aerial Coupling Systems

SURVEY OF THE ACCEPTED METHODS IN AMATEUR PRATICE

It is easy enough to generate the RF but getting the signal out successfully usually calls for some knowledge, a little practical experience and almost always a certain amount of careful experiment. Results as already being obtained can often be improved by giving a little more time and thought to the aerial and its feeder system. This useful article discusses the various ways in which the aerial can be energised and makes recommendations which will be of particular interest to the newcomer.—Editor.

IN all radio transmitting installations, whether amateur or commercial, the object is almost always to produce the strongest possible signal at the receiving end. In amateur circles the power input to the final stage is limited either by the licensing authority, by the depth of the owner's pocket, or by some other equally definite fact. In order to make the most of the power available, the transmitter itself must be efficient, the best possible aerial system for the work in hand must be employed and, lastly, the RF power generated by the transmitter must be passed on to the aerial with the least possible loss. In previous articles in *Short Wave Magazine* a good deal of practical information on the design, installation and tuning of aerials and aerial feeder systems has been presented, and this one deals with the process of coupling the transmitter to the aerial or the feeder line.

Transmitter aerial coupling arrangements are provided to match the output impedance of the transmitter to the input impedance of the aerial feeder, thus ensuring the best possible transfer of power. They also give discrimination against spurious frequencies, *e.g.* harmonics; and the various types of coupler, whilst all satisfying the impedance matching requirement, vary very widely indeed in their capacity for rejecting all frequencies but the fundamental. Harmonic rejection is vitally important in these days of TVI. and a well-designed and constructed aerial coupler can do a great deal towards relieving the TVI (and BCI) situation.

Directly Excited Aerials

In special circumstances it is sometimes desirable to excite the aerial directly from the transmitter without the use of a transmission line system at all. Direct excitation means that the aerial proper is brought into the station and coupled directly to the transmitter by some means. Wherever possible, the method should be avoided, since radiation takes place all along the wire from the point of attachment to the transmitter to its furthest extremity, with consequent losses in neighbouring house wiring, plumbling, and so on, and this. in turn, can cause BCI and TVI troubles in abundance. Sometimes, however, the method is justified—for example, for portable or emergency working when it is not possible to erect properly designed and fed aerial systems.

Fig. 1 shows three methods of direct aerial excitation. *(a)* indicates direct voltage feed and may be used when the radiator length is approximately one-half wavelength. Coupling is increased merely by tapping up the transmitter tank coil from the earthy end (with respect to RF) until the desired input is achieved. Harmonics are accepted equally with the fundamental, and such a system is also liable to give key clicks and other interference in nearby broadcast receivers. Some discrimination against spurious radiation is given by the system shown at *(b)*, which consists of a separate resonant circuit tuned to the transmitting frequency and loosely coupled to the PA tank. The aerial is voltage-fed by attaching it to one end of the auxiliary circuit, and the coupling is adjusted by alteration of the physical distance between the transmitter tank coil and the aerial coupling coil.

The system shown in *(c)* is a current-feed arrangement and is applicable to aerials near one-quarter wave long. The variable condenser is adjusted until the system is in resonance, and the loading is varied by alteration of the relative

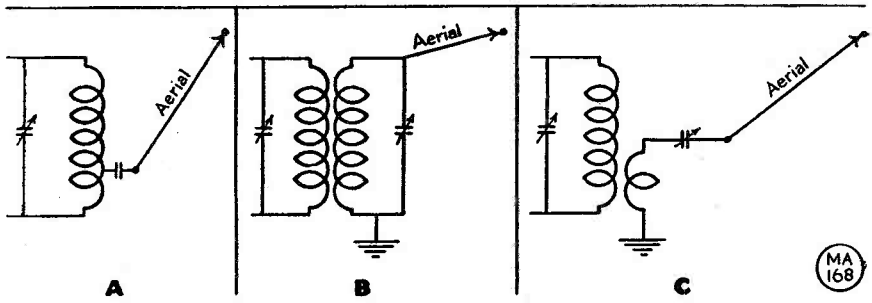


Fig. 1. Methods of exciting the aerial directly, discussed in detail in the text.

positions of the transmitter tank coil and the coupling coil.

An interesting method of direct aerial excitation is shown in Fig. 2. It is known as a Pi-Coupler, and by its use almost any length of wire may be made to accept power from the transmitter. C is merely a blocking condenser and LC1,C2 form the normal tuned tank circuit. In effect, adjustment of C1 and C2 in series moves the electrical position of the earth tap on the circuit, and, in operation, adjustment of C2 gives a variation of loading, whilst C1 is used to resonate the circuit after every adjustment of C2. In practice, C1 and C2 may be .00025 μF for the 3.5 to 14 mc bands inclusive, and L may have 30, 20 and 10 turns 1½in. diameter for the 3.5, 7 and 14 mc bands respectively.

Aerials Excited Through Transmission Lines

In general, the most efficient type of aerial system is that fed *via* a transmission line constructed either from coaxial cable or twin spaced wires. This type of installation ensures the lowest possible power loss in surrounding metal objects; it allows the attainment of aerial polar diagrams nearer to the theoretical ones; and it ensures that all points of high RF voltage on the system are kept well out in clear space, with consequent reduction of RF feedback troubles in the station and BCI and TVI noises in the neighbours' houses.

Fig. 3 shows a selection of methods for coupling a transmitter to an aerial fed with twin open-wire feeder. In all cases, a strictly balanced transmitter tank coil tuned by means of split stator condenser is shown, and this may be used with any normal single-ended plate-neutralised circuit or any usual push-pull tank. In the cases of *(b)*, *(c)*, *(d)* and *(f)*, in Fig. 3, there is, however, no necessity for the balanced arrangement (although it may be preferable for other reasons), and if a non-centre-tapped tank circuit is employed, the aerial coupling coil would be mounted near the earthy end of the tank coil in order to keep the stray capacity as low as possible.

In all cases where a separate tuned circuit is used for aerial coupling, both the PA tank side and the aerial coupling circuit must be tuned to resonance accurately and the amplifier loading adjusted by *variation of the coupling* between the coils, *not* by de-tuning of either circuit—a common failing. Where inductive coupling with a centre-tapped tank circuit is used, it will be observed that the main tank coil is split and the aerial tuning coil mounted at its centre; this is to reduce capacity coupling between the valve anode circuits and the

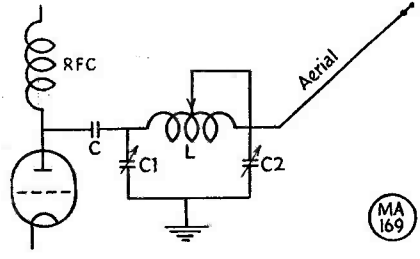


Fig. 2. The pi-section coupler, allowing almost any length of direct-on wire to be resonated at any frequency, within wide limits. This arrangement is specially useful for HF aerials when operated off their true mode on the LF bands.

aerial circuit, thus keeping harmonic radiation to a minimum.

Fig. 3*(a)* is a method of direct capacity coupling, the two condensers being there merely for HT blocking purposes. The degree of coupling is adjusted by varying the positions of the taps, the two always being symmetrically disposed about the centre of the coil. If the end of the feeder line is reactive, it will be found necessary to readjust the setting of the plate tank condenser every time the taps are changed; thus, the system is not suitable except with non-resonant feeders. In any case, it is not recommended, since it provides no isolation between the aerial and the transmitter, and is inherently unsound for that reason.

Fig. 3*(b)* is similar to Fig. 3*(a)* except that inductive coupling is used; again, the method is only satisfactory when used with non-resonant feeders. Adjustment of the transmitter loading is made by varying the coupling between the coils and, if desired, the centre of the coupling coil may be earthed. The arrangements given in Figs. 3*(c)* and 3*(d)* may be used with tuned feeders, and they give current feed and voltage feed respectively. The secondary circuits are loosely coupled to the transmitter, adjusted to resonance, and then the coupling between the circuits is increased until the correct transmitter loading is achieved. A final adjustment of the tank circuit is necessary after variation of the circuit coupling.

Fig. 3*(e)* shows a method very similar to that of Fig. 3*(d)*, except that the feeder connections are tapped down the coil in order to improve the matching and the Q of the system when non-resonant feeders are employed. Fig. 3*(f)* shows a pi-section filter. CC are HT blocking condensers, whilst C1 and C2 serve respectively to match the filter to the feeder and tune it to resonance. In using this system, which was very popular many years ago, a trial position

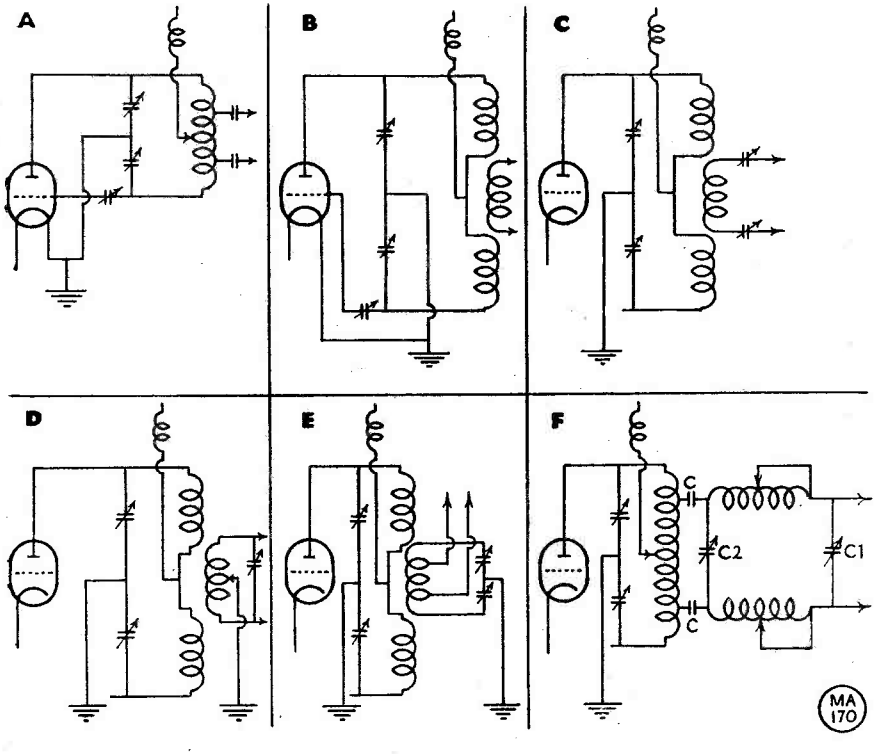


Fig. 3. A variety of coupling methods when using twin open-wire feeder to energise the aerial.

of the coil shorting clips is used, and C1 is then set to about half capacity and C2 adjusted to give resonance of the circuit. If the transmitter loading is too heavy, C1 is increased in capacity and C2 re-adjusted to give circuit resonance again. If the transmitter loading is too light, C1 is decreased in capacity. During all adjustments of the filter, the main transmitter tuning must not be touched; this must be set to resonance *before* the filter is tapped on to the tank coil. If C2 cannot be adjusted to give resonance, an alteration in the amount of the coil in circuit should be tried; similarly, if C1 cannot be set to give satisfactory transmitter loading, the position of the taps on the main tank coil should be altered in the appropriate directions, their positions always being kept symmetrical with respect to the centre tap of the tank coil.

Link Coupling

Whilst all the coupling methods so far described can be relied upon to operate admirably, it is the writer's opinion that the only type of aerial coupling unit which should be used in these days of TVI is one which is entirely separate from the transmitter and coupled only by means of a low impedance link line. In this way, maximum isolation is achieved between the transmitter and the aerial except on the fundamental frequency, where efficiency is high.

Fig. 4 shows a typical aerial coupling unit employing link coupling. The auxiliary aerial circuit, in this case, is tapped quarter-way up from each end of the coil to allow coupling to non-resonant feeders. If, however, resonant feeders are used, arrangements similar to those given in Figs. 3*(c)* and 3*(d)* may be used. A split stator condenser is indicated, but, if it is preferred, this could be a normal single-type condenser and the coil could be centre-tapped and earthed. If this is done, rather poorer symmetry to earth must be expected. In the link-coupled circuit, as previously, both the transmitter tank circuit and the aerial tuning circuit must be tuned to resonance accurately and the actual transmitter loading adjusted by alteration of the position of the *coupling links*. After setting up the aerial coupler, a final trim of the transmitter plate tank circuit is always advisable.

Discrimination Against Harmonics

The reader is referred back to an article on feeder design which appeared in the October 1950 issue of *Short Wave Magazine*; in this, some information on optimum feeder lengths was given. It is recommended that low impedance link lines should be made from coaxial cable and the use of "Faraday Screen" technique in the construction of the link coils is very desirable; again, details of a screened coupling loop were given in the October issue of the *Magazine* and they will not be repeated here. The aerial coupling circuit itself may be constructed conveniently on a metal chassis and housed in a neat metal cabinet, which should be earthed by as direct a route as possible. Care should be taken that the coil does not come too near to the metal case of the cabinet (especially if this is steel) in order to reduce possible eddy current losses; in one commercially available coupling unit the steel cabinet is lined with silver-plated copper in the vicinity of the aerial tuning coil, which is rather an elaborate and expensive way of doing it.

It will be gathered from the foregoing remarks that a very large number of permutations of final amplifier circuit, aerial coupling circuit and aerial feeder design are possible. Fig. 5 shows one interesting circuit which is part of a 500-watt commercial transmitter designed by a well-known British manufacturer. Part of the final amplifier circuit and that of the separate aerial coupling unit are shown, and it will be seen that the transmitter itself delivers its power *via* a pi-coupler and the nominal output

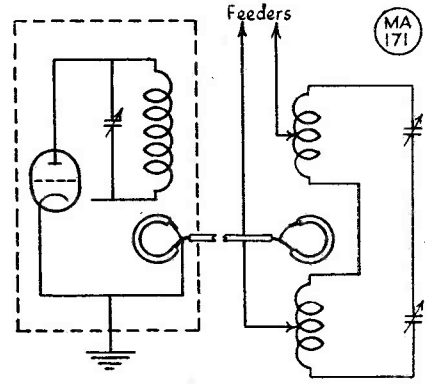


Fig. 4. Link coupled aerial tuning system, typical of many well designed amateur installations. Its advantages are discussed in the text.

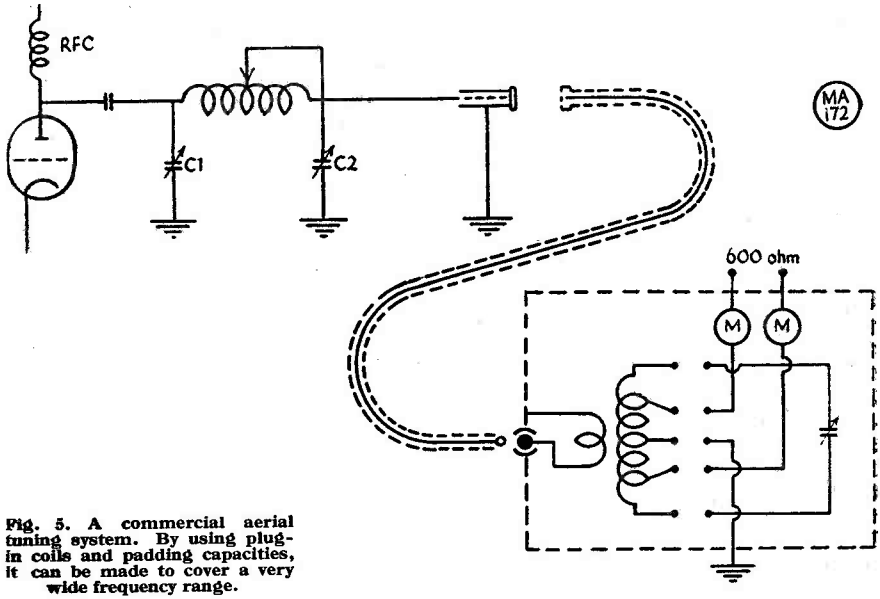


Fig. 5. A commercial aerial tuning system. By using plug-in coils and padding capacities, it can be made to cover a very wide frequency range.

impedance is 45 ohms. The aerial coupling unit on the right-hand side of the figure is mounted at any convenient place in the station, and is fed through a length of 45-ohm coaxial cable; it matches this to a 600-ohm open-wire feeder. Currents in the latter are measured by two 0-1.5 amp RF meters. In a unit of this sort, the feeder currents should be as nearly balanced as possible, and the actual value of the current in each wire of a perfectly-matched non-resonant feeder should be $\sqrt{\frac{W}{Z_0}}$. W is the power output of the transmitter in watts, and Z_0 is the surge impedance of the open feeder. In this coupling unit three alternative plug-in coils are available, and they cover the bands 1.9 to 4.1 mc, 3.9 to 10.5 mc, and 10 to 20 mc; they are wound on ceramic formers approximately 2½in. in diameter, and have 32, 12 and 4 turns respectively. The tuning condenser has a maximum capacity of 250 $\mu\mu$F, and the range of the unit can be extended down to 1.5 mc by connecting an additional 250 $\mu\mu$F fixed condenser in parallel with the variable on the lowest frequency range. It must be noted that any variable condenser used in a parallel-tuned aerial coupler must have a plate spacing at least equal to that in the final amplifier tank circuit, but, in the case of series tuning, a good-quality receiving-type condenser is usually adequate to handle the power normally found in amateur installations.

Receiver Inter-Connection

Link coupling of the aerial tuning unit to the transmitter through a length of coaxial cable has the very considerable advantage of allowing the properties of the tuning unit to be used on the receiver also, it being merely necessary to insert the "Transmit/Receive" aerial change-over relay in the length of coaxial cable between the aerial coupler and the transmitter and to add an extra length of coax. from the relay to the receiver aerial terminals. Thus, in the "Receive" position the aerial coupler is connected through to the receiver *via* the link line.

There is nothing more desirable in amateur installations than stable "handling" of the transmitter controls without that all-too-well-known feeling that something is on the verge of instability. Careful attention to aerial coupling arrangements and feeder design are important factors in achieving this, and it is hoped that the foregoing comments and information will guide newcomers and old hands alike along the right track to clean, stable transmitter operation.

An HF GDO

IMPROVED GRID DIP OSCILLATOR WITH DC AMPLIFIER

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

It can fairly be said that a calibrated grid dip oscillator is almost essential if any experimental work at all is being done. It is easy to make, simple to use and has many unsuspected practical applications. This article describes an improved version, giving a wider and more sensitive meter deflection with looser coupling—a twin triode being used with the second half of the valve functioning as an amplifier.—Editor.

ONE of the most versatile pieces of equipment an amateur can possess is a Grid Dip Oscillator. Where much experimental work is carried out, it becomes almost indispensable.

Resonance of a grid dip oscillator with the circuit under test is often indicated by noting the change of grid current as read on a meter inserted in series with the grid leak. As the current is low, a very sensitive meter is necessary, and even then the movement of the needle is only small unless tight coupling is used between the two circuits —and tight coupling should be avoided because it is liable to cause an appreciable change in the GDO frequency.

It is not the actual grid current flowing which is of interest so much as the *change* of grid current, and it is obviously desirable to amplify this effect if it can be done without undue complication. In this case, DC amplification is called for and can easily be arranged with a bridge circuit in which a valve acts as one arm of the bridge. The negative grid potential developed across the oscillator grid leak is applied to the grid of the amplifying valve. When an external circuit interacts with the GDO, the grid current falls, the grid potential becomes less negative, and the resistance of the anode/cathode path of the amplifier valve drops. The balance of the bridge (in the anode circuit) is upset and a good positive upward reading is given on a suitably connected meter. This is altogether more satisfactory than trying to observe a slight dip of the needle. A further benefit is that a more robust type of meter can be used as an indicator.

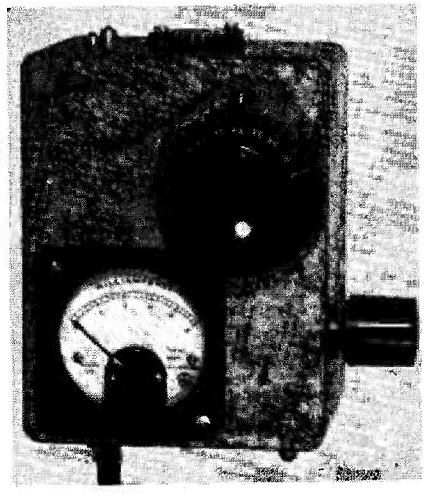
Circuit

The circuit of an instrument using this principle is shown in Fig. 1. For convenience, oscillator and amplifier triodes are contained in a single envelope and, to permit compact construction, a miniature valve on a B7G base is employed—the Mullard ECC91 and the 6J6 are equally suitable.

The first half of the valve is arranged as a normal oscillator. The second half is the DC amplifier, the bridge being formed by R5, R6, R7 and R8 in series, and the valve itself. The meter is connected with the polarity indicated and the needle adjusted to zero with R7. The actuating voltage is taken from the junction of the two grid resistors R1 and R2, *via* a decoupling network which filters out RF voltage.

The magnitude of the reading obtained will vary according to the sensitivity of the meter, and this in turn depends on the full scale deflection. Ideally, a miniature meter reading to one milliampere would be excellent.

[*over*



General appearance of the finished GDO.

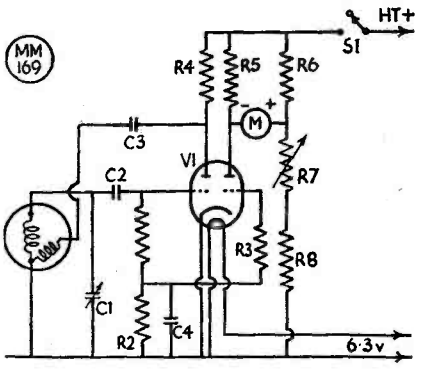


Fig. 1. Circuit diagram of the grid dip oscillator, using miniature plug-in coils and covering a range of about 32 mc to 820 kc. Coil details and coverage are given in the accompanying table.

Such an instrument, with a diameter of 1½in., is made by Howard Butler (Hobut) and probably by other instrument manufacturers, but unfortunately it is difficult to obtain. Alternatively, an external meter of any diameter can be used, a jack being fitted to the instrument and the meter plugged in when required. This, however, is not so convenient as having the dial and meter observable simultaneously, and it also means an additional loose lead to get into one's way. Therefore, in the instrument illustrated, an 0-5 mA meter, 2in. diameter, is employed, as it is readily obtainable. The range is on the high side, but the sensitivity is still much better than would be the case when measuring grid current directly.

Another point is that the value of the resistors in the bridge arms depends on the meter full scale deflection. Obviously if high value resistors are used with a high reading meter, sufficient current to give a large deflection could not flow even with a bridge completely out of balance. The values given in the list are correct for an 0-5 mA meter, but R4, R5 and R6 should be increased to 47,000 or 51,000 ohms if an 0-1 mA meter is used (½ watt ratings are then permissible). R7 should be 25,000 ohms in the first case, 50,000 ohms in the second. A wire-wound component is desirable but not essential. The potentiometer as indicated is a miniature type, but there is ample room for a full-size component.

Reverting to the oscillator, it will be appreciated that any standard circuit can be used, provided the design is such as permits operation at high frequencies. The present version is for what might be called "normal," high and medium frequencies, the range covered being from 30 mc (actually somewhat higher) to 820 kc. Commercial plug-in coils are used so that an intending constructor can rely on securing a close approximation to the calibration frequencies listed in the panel.

Construction

The construction is straightforward, except perhaps for fitting the valveholder in a position to give room for the small components attached to it, and which also allows for easy valve insertion. Photographs illustrate the placement of the various parts in the containing metal box—it is suggested that the valveholder could well be mounted a little further away from the side of the box, to allow more room for R4 and C3. The fixing bolts are ⅝in. distant from the side, and this should be increased to ¾in. or ⅞in.

The valveholder is spaced away with

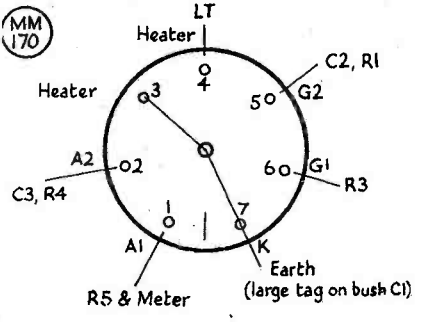


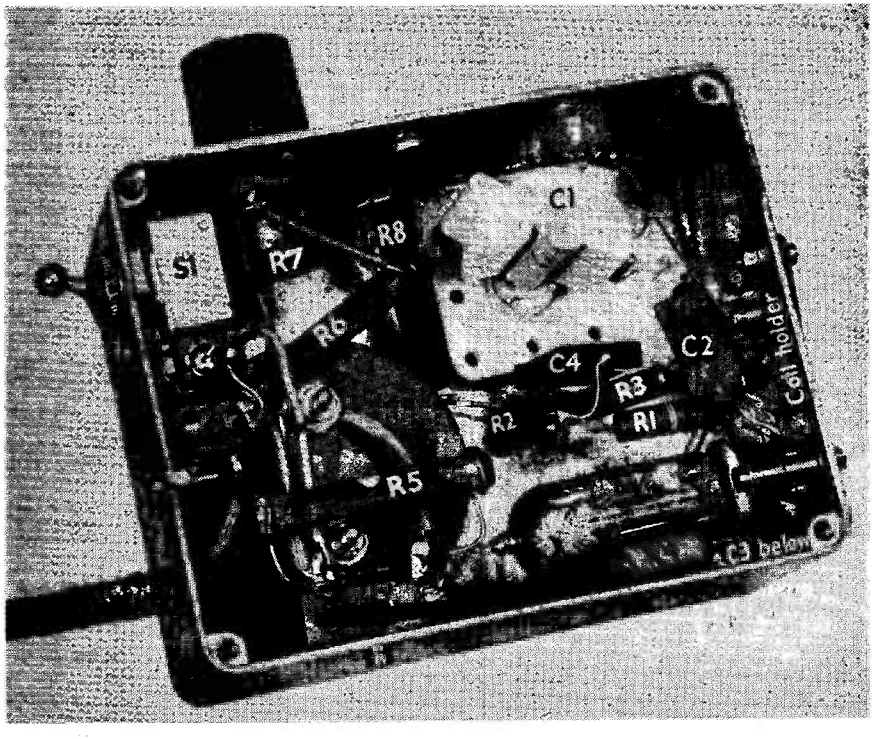
Fig. 2. Underside connections to be made to the valveholder before fitting it in position in the box.

half-inch pillars; all connections to it should be made before bolting in position, and Fig. 2 is provided to simplify this part of the construction.

When the lid is screwed in place, the box becomes almost airtight. To prevent the temperature rising to an undesirable degree, it is necessary to drill a few ventilation holes in the lid and in the box, particularly in those parts adjoining the valve.

Power Supplies

The power requirements are, of



Showing the construction inside the Grid Dip Oscillator unit described by G5JU, with major components identified.

course, quite small—6.3 volts 0.45 amps and 150 volts, 4-6 mA—and it would be a good idea to build a small power unit into a second die-cast box, bolted to the first, or better, fitted with a socket to match up with a suitable plug on the GDO box. Such a unit was envisaged (especially as further instruments on the same pattern are being constructed for higher frequencies) and a single plug-in power unit would serve throughout. Rectification and smoothing would present no problem, since metal rectifiers are available and resistance smoothing would suffice. The difficulty lies in the mains transformer, which can and must be of small dimensions. A suitable component is not available as far as the writer is aware, and for the time being, at least, power is drawn from a separate small pack.

The HT supply should have good regulation and, if possible, it should be stabilised at 150 volts or less by means of a small gaseous stabiliser valve. It is permissible to use 200 volts HT if the resistors R5 and R6 are of high value, but no advantage is gained by so doing and, in general, it is wise to keep the voltage between 100 and 150.

Testing

For the first test, a coil should be inserted in the holder, and, after allowing time for the valve to warm up, the switch S1 closed. All being well, adjustment of R7 will bring the needle of the meter to zero. Touching the coil should cause the needle to rise rapidly, and this is a sign that the circuit is oscillating properly. The zero adjustment will vary from coil to coil, and it is likely that the needle will move slightly from one end of the range to another, but this effect can be disregarded, as it is a smooth, slow movement, very different to the sharp rise brought about when the GDO is

operated in the usual way.

Calibration

The stray capacities on the oscillator circuit are on the low side, which factor affects the frequency range of each coil —it will be seen that the coverage differs slightly from the makers' figures. As a matter of interest, because of the low strays it was found almost possible to obtain complete coverage with a 100 $\mu\mu$F condenser, but the amateur bands fell at the high frequency end of the dial, which is undesirable. The tuning condenser was therefore changed to 140 $\mu\mu$F, thus making certain of complete coverage and bringing the amateur bands well up the dial.

If the constructor has access to a calibrated communications receiver, the signal emitted by the GDO can be picked up and a record made of dial setting against frequency on each range, followed by the preparation of a set of graphs for future reference. Failing this, the figures given in the accompanying panel will be found sufficiently accurate for practical purposes. In the case of the "W" and "P" coils, the coverage is affected by the setting of the dust-iron core, but as both coils include medium-wave broadcast frequencies, a direct check, using a domestic broadcast receiver, should present no difficulty. The dust-core should be adjusted to make the readings actually obtained correspond with those in the panel.

Inverse and Direct Dial Readings

There are two ways of fixing the dial —one with the reading increasing as the condenser vanes mesh; the other (180° diametrically opposite) with the reading increasing as the capacity becomes less. In the first case, frequency decreases as the dial reading increases, and it is often more convenient to have frequency and dial reading increasing simultaneously. Two sets of figures, A and B in the panel, are therefore provided, and a constructor can choose whichever method he prefers. The change of capacity over the ten degrees each side of minimum capacity is small, and it is well to ignore the last few degrees. For this reason, the figures in the panel omit readings at zero (inverse reading) and 100 degrees (direct reading).

It was found that "squegging" occurred with the LB coil at frequencies above 24 mc. Probably this trouble would disappear if a lower HT voltage was used, but it was thought desirable to eradicate it by modifying the coil. Two reaction turns were removed from the winding nearest the base, an operation easily carried out.

Uses

For the benefit of those not familiar with the uses to which a grid dip oscillator can be put, a brief recapitulation may be of assistance. The chief application is to determine the resonant frequency of a tuned circuit, as found in receivers, transmitters and many other equipments. It it not necessary that the circuit under test be made to oscillate; therefore no power need be applied to associated valves. Also the tuned circuit can be in its proper place, with other components connected, so that the reading obtained takes into account stray capacities. It is only necessary that the

Frequency Calibrations

A

DIAL Reading	LB mc	Y mc	R mc	W kc	P kc
100	16·20	7·00	3·05	1450	820
90	17·00	7·40	3·20	1520	860
80	18·20	7·90	3·43	1610	910
70	19·60	8·50	3·70	1730	970
60	21·40	9·30	4·00	1870	1045
50	23·50	10·25	4·40	2050	1130
40	26·40	11·50	5·00	2250	1240
30	30·0	13·20	5·70	2520	1365
20	(26°= 32 mc)	15·50	6·70	2860	1520
10	—	18·50	7·90	3300	1675

B

DIAL Reading	LB mc	Y mc	R mc	W kc	P kc
0	16·20	7·00	3·05	1450	820
10	16·45	7·15	3·10	1470	830
20	17·00	7·42	3·23	1510	855
30	17·90	7·83	3·39	1580	890
40	18·90	8·30	3·60	1670	938
50	20·40	8·90	3·85	1785	995
60	22·25	9·75	4·20	1925	1070
70	24·90	11·00	4·73	2125	1175
80	29·20	12·90	5·53	2450	1325
90	—	16·20	6·86	2910	1530

Calibration figures obtained for the GDO built as illustrated; these are given for guidance only, as readings obtained on individual instruments may vary somewhat if not constructed exactly as specified. The coils used are Eddystone miniature plug-in, and can be selected for the ranges required. Table A refers when the dial reading increases with capacity, and B when the dial is fixed to give readings increasing with frequency.

coil on the GDO can be brought into fairly close proximity to the coil under test. When this is done and the dial on the GDO is rotated, resonance will be indicated by a sharp upward kick on the needle of the milliammeter (unless the assumption regarding frequency is a long way out). The coupling between the GDO coil and the test circuit can then often be reduced whilst still maintaining a definite meter reading—such loose coupling permits a greater degree of accuracy. Reference to the curve on the graph then gives the actual frequency.

Aerial Resonance

Another application is to determine the resonant frequency of an aerial system. Considerable information can be obtained in this way—in fact, for anyone with a definite interest in aerials, the GDO is well worth constructing for this purpose alone. The subject is one which merits fuller treatment than can be given here and will be dealt with in a later article.

Grid Dip Osillator (HF)

LIST OF COMPONENTS

1 Diecast Metal Box *Cat. No.* 650 *Eddystone*
1 Microdenser 140 $\mu\mu$F (C1) *Cat. No.* 586 *Eddystone*
1 Coil Base (4-pin) *Cat. No.* 707 *Eddystone*
Miniature Coils (*as required*) *Cat. No.* 706 *Eddystone*
1 Direct Drive Dial *Cat. No.* 595 *Eddystone*
1 Knob *Cat. No.* 785 *Eddystone*
1 Valve type ECC91 *Mullard*
1 Valveholder B7G type XM7/U *McMurdo*
1 M/C Meter - see text.
1 Switch SP on/off
1 Potentiometer 25,000 or 50,000 ohms (R7) —*see text.*
2 3-way Tag Strips.

Fixed Condensers

C2 = 100 $\mu\mu$F Silvered Mica.
C3 = 200 $\mu\mu$F Silvered Mica.
C4 = .001 μF Moulded Mica.

Resistors

R1, R2, R8 = 10,000 ohms ½ watt.
R.3 100,000 ohms ½ watt.
R.5 R6 = 27,000 or 47,000 ohms (*see text*) 1 watt.
R4 47,000 ohms ½ watt.

Coils

Eddystone plug-in, as required (*see* Calibration Panel).

SWL REPORT SERVICE

Those operators who may require SWL reports on their transmissions, either for experimental or coverage-survey purposes, are at liberty to make use of the "Pse QSL" space in our *Short Wave Listener & Television Review*. This is an established monthly feature of several years' standing and report-requests have now been published from something like 3,000 different stations all over the world. The object of "Pse QSL" is simply to assist transmitters who need reports by keeping our vast army of SWL's informed as to those who really want them. The details we require for "Pse QSL" are: Call-sign, address for QSL's, operating frequencies (and times, if possible), mode of operation, and any particular transmission characteristic on which information is wanted—all on a separate slip addressed to "Pse QSL," *Short Wave Listener,* 53 Victoria Street, London, S.W.1.

The only obligation incurred by transmitters using this service is the obvious one of undertaking to QSL promptly by card all useful SWL reports that they may receive. Entry in "Pse QSL" is on this understanding.

Proofing Beams Against Corrosion

TREATMENT OF METALS IN AMATEUR PRACTICE

By **E. J. PEARCEY (G2JU)**

Many a carefully-designed and built beam array has come to pieces after exposure to the weather, for no other reason than failure to proof the metal properly. Our contributor shows that sealing and proofing are quite as important as sound mechanical construction if long service in corrosive atmospheres is expected of the array.—Editor.

THE protection of metals used in the construction of beam aerials of the all-metal variety, *i.e.*, the so-called "plumbers' delight" and similar types, is of great importance to all users of this category of aerial.

Because authoritative technical advice is not readily available, in the majority of cases the matter of protection against weather and erosion effects is relegated to the levels just below consciousness—until such time as an element collapses, when the pieces are picked up to the accompaniment of much blasphemy.

The writer knows of one well-known amateur whose 3-element ten-metre rotary beam just fell to pieces in a very short time after its construction, and this due to no fault in the mechanical design or selection of materials. Cases are also common where television aerials are minus half an element, and the cause has apparently been that the manufacturer has not given sufficient attention to detail and the protection of the materials used.

To the amateur who goes to the trouble and expense of building and erecting a television or rotary beam transmitting aerial, it is essential that proper attention be paid to its protection against weather, so as to have the assurance that the whole thing will not collapse within a month or two of its installation.

It is obvious that the choice of material thicknesses is the first consideration, but there are so many excellent articles on that aspect of the matter that failures are not often due to mechanical weakness. Cases, however, have been noted and television aerial manufacturers are not always blameless in this respect. The remedy here is very obvious, and the old adage concerning the non-spoliation of the vessel because of too sparing an application of tar is equally applicable.

Corrosion

The failing at which this article is aimed is not one of insufficient mechanical strength *initially*, but that of guarding against it *later*, due to the effects of corrosion. This trouble is particularly prevalent in sea-side locations, but it can also be encountered in town and industrial areas due to fume-laden atmospheres.

That protection against such conditions is fully catered for in the industrial world may come as a surprise to most amateurs, because of the almost complete absence of any guidance on it in the Amateur Radio press.

Metal aerial systems are usually constructed of aluminium or its alloys, and before embarking on the construction of a beam aerial to be used within a few yards of the sea the writer got in touch with a firm manufacturing aluminium and magnesium alloys, and was pleased and surprised at the excellence of the advice given. It is from the information thus obtained, and the adoption of the suggestions they made, that this article has been written.

Design

First, it has been noticed that some television aerials are designed in such a way that liquid, *e.g.*, rain or salt-spray, can collect in, and be retained at, points where the element is attached to the support. This is the point of highest stress, and unless measures are taken to counteract it, corrosion soon weakens the joint with eventual falling apart of the element.

Where it is difficult to design in such a way as to avoid these "cups," jointing compound should be forced into the space between element and support, and formed up into a shape which will not retain liquid.

Suitable compounds are given in the notes at the end of this article. The

material recommended is very plastic and can be forced in easily by hand. It retains its characteristics up to a temperature of about 300 degrees F., is a good insulator and has no corrosive effect on aluminium and its alloys; it remains elastic and effectively prevents the ingress of liquid; any moisture which does collect on its surface will soon dry off.

The material should be forced into gaps which cannot be avoided in the design and should be built up to present a smooth rounded surface—almost as a continuation of the element and its support, and on which moisture cannot be collected and retained as a liquid.

As an example, a certain manufactured television aerial has an excellently-designed retaining clamp, which has obviously had a great deal of thought expended on it. There is, however, a gap in the clamped surfaces of about one-eighth of an inch which could conceivably retain liquid. It would benefit by application of the compound, and the design is such that this could easily be formed up to present a continuous non-cupped surface.

It is obviously impracticable, in England at least, to prevent an outside aerial getting wet, but it *is* possible, by careful attention to design, to avoid the formation of cups. Where, for some reason, this cannot be achieved, then the jointing compound should be applied as described.

Element Materials

The treatment to be described below is suitable for aluminium and all its alloys and can be confidently applied to any material which is ex-Government surplus, or otherwise obtained as an "unknown aluminium alloy."

However, in this life there is almost invariably a best way to do anything, and the choice of suitable material for beam aerials is no exception. Aluminium or one of its alloys is commonly used because of its light weight, and the best grade of material for the purpose is Duralumin H. This alloy is considered to possess the best corrosion resistance combined with adequate mechanical strength.

Pre-Treatment

After the material has been cut to length and any other workshop operation on it completed—and not before—the tubing should be thoroughly degreased. Any conventional method can be used, but one suitable solution is mentioned in the concluding notes. It is essential that all traces of oil or grease be removed before the next operation, and this is the only pre-treatment necessary. Immediately after de-greasing and before the surface can be spoilt by handling, an etch primer paint should be applied.

This paint consists of a zinc chromate pigmented paint which also contains a small quantity of phosphoric acid, and, as the paint dries, this bites into the surface and ensures excellent adhesion. The acid, in fact, etches the surface and provides a key-way for the special paint. The chromate-rich paint deposits a special corrosion-resistant film which adheres very tenaciously to the metal and which will still adhere even when a finishing coat of paint is damaged or broken.

It has been found that the primer film is extremely water-resistant, and does not curl or lift with the application of normal cellulose or synthetic resin-based finishes. Extensive weathering tests have been carried out, and these indicate its complete protective value over very long periods and under exposed conditions.

The greatest feature of the etch primer is the exceptional adhesion which it affords, and this is due to the microscopic pickling action which it produces and which is not given at all by ordinary paints.

In the concluding notes, three manufacturers of etch primer paint are named; these firms supply excellent leaflets of technical details and application methods for their particular products. They make paints for both brushing and spraying, the former being suitable for the amateur and as easily applied as ordinary paint.

The paint is usually supplied in two solutions, *i.e.*, primer base and hardener, or reducer, and these two solutions must only be mixed in the quantity required for immediate use. Any paint remaining mixed after a few hours is useless, because certain chemical reactions take place. The solutions can, however, be stored unmixed for much longer periods.

It is of interest to add that these etch primers are not only suitable for protecting aluminium and its alloys, but in general can also be used on iron, steel, zinc, galvanized iron, tin-plate, copper and brass, as well as cadmium plating.

This is important, because it is not

always possible to use aluminium or its alloys for every part of a beam, and it is recommended that all metallic components be treated in the individual state before assembly. The film formed on each of the dissimilar metals, being a non-conductor, will affectively prevent electrolytic action and consequent weakening of the material.

Finishing Paint

The film produced by the etch primer, whilst thoroughly weather resistant, is only very thin, and must itself be protected with a suitable finishing paint. Ordinary aluminium paint is a satisfactory finisher, but the manufacturers of the etch primers also make very satisfactory cellulose and enamel finishes.

The etch primer will, however, take any good quality air-drying cellulose, synthetic or oil base finishing paint, and the primer itself will air-dry very quickly.

It is safe to say that an aerial treated as outlined in this article should give satisfactory service for a number of years, and premature collapse due to corrosion and weathering will also be prevented.

Acknowledgments

The writer's thanks are gratefully accorded ot Mr. C. Smith, chief metallurgist of James Booth & Co., Ltd., Argyle Street Works, Nechells, Birmingham, 7, who provided technical details of the method and materials. His firm manufacture, amongst other things, aluminium and magnesium alloys, and the Duralumin H, which is specially recommended.

Thanks are also accorded to the following firms for supplying technical literature and helpful advice: Cellon Ltd., Richmond Park, Kingston, Surrey; Drynamels Ltd., Shaftmoor Lane, Hall Green, Birmingham, 28; and Docker Bros., 17 Berners Street, London, W.1. These three firms manufacture etch primers, finishing paints and de-greasing solutions.

Jointing compounds are manufactured by W. T. Henley, Holborn Viaduct, London ("Henley's Green Plastic Compound"); Berry Wiggins & Co., Ltd., Bream's Buildings, Fetter Lane, London, E.C.4 ("Compound No. 998"); and Messrs. Drynamels make a special compound for this purpose called "Dielectric Zinc Chrome Compound," particularly recommended for aluminium and its alloys. A suitable de-greaser is Cellon De-greasing Liquid.

CARDS IN THE BOX

Here is this month's list of operators for whom, being without any postal address for them, we are holding cards at our QSL Bureau. They can be claimed by sending a large S.A.E., with name and callsign, to BCM/QSL, London, W.C.1 If publication of the address in "New QTH's," and subsequently in the *Radio Amateur Call Book*, is also desired this should be mentioned when sending for the cards.

G2BCK, 3AEO, 3AGS, 3CHJ, 3DRZ, 3GLW, 3GZH, 3HAB, 3HFS, 5GB, 5MT, GM2MW, 3CSO, GW3ZB.

★

STILL WITH US!

We have been greatly touched by the many kind enquiries after the health and well-being of our poor friend G1BF—in particular, we would like to thank the anonymous reader in Lancashire who sent him a wreath cunningly contrived of obsolete and burnt-out valves, and the other who went to the trouble of making him a real water-cooled PM2A.

Busy rebuilding again (this time the PA is to be a pair of 813's in horizontally opposed flat twin) it has fortunately not been possible recently to find space for the technical advice G1BF is now in a position to give on valves operated in push-pull, push-push or parallel—as well as in a new mode entirely his own, to be known as bash-bash, which he says is "No trouble at all if you have bags of drive."

Visiting him the other evening with another batch of enthusiastic QSL's from Box 88, we found the 813's glowing like lighthouses and departed with the threat of "Another FB exclusive technical feature article which will make the Editor think." Everything happens to us!

★

ADVERTISEMENT CORRECTION

In the announcement on p.63 of our March issue respecting H.A.C. Products, the address was given incorrectly; it should be 11 Old Bond Street. Unfortunately, any correspondence directed to the address as advertised in March will come back marked "Unknown." Our deepest apologies to readers affected and to Messrs. H.A.C. Products, who have been with us since pre-war days.

Tribute to Amateur Radio

THE STORY OF LOUIS NEL, ZS6XQ

THE story of ZS6XQ is one which illustrates in the very highest degree the value of Amateur Radio as a hobby. In 1947, Louis Nel was a brilliant 15-year-old schoolboy athlete, winning South African championships and training for the Olympics, but in October of that year he met with an accident while diving into a pool. This fractured his neck and displaced several vertebræ, leaving him completely paralysed. Doctors gave him two days to live.

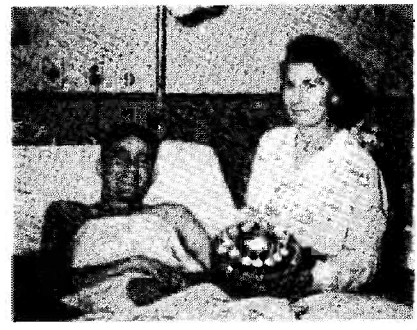
He was flown to Johannesburg and operated on, regaining, as a result, the control of his face muscles and partial use of his arms, but none of his fingers, back, hips or legs. He was sent home in the hope that, with rest, care and time, he would improve. During this period his brother, ZS6JL, and a friend, ZS6KJ, built him an amateur station. Using his wrists, Louis learned to send Morse and also to receive it at a speed sufficient to obtain his own licence—ZS6XQ.

Operating from his wheel-chair, ZS6XQ worked 75 countries with 50 watts input to a 3-element beam, mostly on 14 mc. His interest in Amateur Radio brought him a fresh outlook on life, giving him new courage, hope, and countless friends.

After two years of waiting, it became obvious that no further improvement would come naturally, so his many friends offered to raise money and send Louis to a famous neuro-surgeon, Dr. Donald Munroe, at the City Hospital in Boston, Mass. Dr. Munroe required him to go to America for at least a year.

Committee of Welcome

This is where Amateur Radio really comes into the picture. ZS6MD notified ARRL Headquarters, and W1BB was asked to form a welcoming committee. The local association sent a message of greeting for delivery to the ship when one week out, and several W1's went aboard at the dock to meet ZS6XQ and his mother.



ZS6XQ in hospital at Boston, Mass., where he is undergoing special treatment in the circumstances described in the accompanying article.

Louis is now settled at the Boston City Hospital, where he has had one major eight-hour operation and another shorter one. He is making slow but steady progress towards recovery, but it is going to be a long time before he can begin to think about returning home.

Naturally, one of his chief joys is to hear from fellow-amateurs, whether in the shape of QSL cards, letters, station photographs, or reading material of any kind connected with Amateur Radio. We suggest that if everyone reading this story would send him a message of greeting on their QSL card, he would be aware of the intense sympathy and admiration that all amateurs must feel for him.

Personal visits by U.S. amateurs are, of course, numerous; and W1BB has arranged a weekly schedule with ZS6XQ's brother, ZS6JL. Louis makes recordings which are transmitted to his family at home; the family's signals are also recorded and played back to him in the hospital.

There is a hope of great improvement and possibly a complete cure, and the family are deeply appreciative of the courtesies and help they have had from the amateur fraternity and all their other friends in America.

So remember that you can help, too, if only by writing a few words of cheer on a QSL card or photograph. The address is: Louis Nel, ZS6XQ, c/o 7th Floor Medical, Boston City Hospital, Boston, Mass., U.S.A.

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

WHO would be a DX Commentator these days? Having talked down the 14 mc band in last month's issue with the heading, "Poor Old Twenty," it started disgorging DX of all kinds. Then, just as we were about to sit down and apologise, it suddenly switched itself off again, and for some days has been a dead loss to the DX hunter, even if it's lovely for working Russians! The ups and downs of the bands this year may be fascinating, but they're pretty exasperating to anyone trying to write about them.

We seem to have had another very patchy month. From mid-February onwards there was quite an interesting stretch of conditions on all bands, but by the time March came in we rather lost interest again.

However, here is one News Flash to make everyone sit up and take notice: ZL1AH logged W1BB and "W9CUQ" on the Top Band during the tests of March 11! The former was RST 549, the latter 329 (and was probably W9CVQ anyway, because he *was* active). ZL1AH also thinks he may have heard G6GM at RST 219. This news was received by radio *via* G5WR (Manchester), to whom many thanks for the QSP, and full confirmation has since been received from ZL.

Incidentally, ZL1AH was formerly G3AH of Flixton, Manchester, and our old friend ZL1MP was witness to this reception. Fine work indeed, and let's hope it leads to something even better next winter.

Top Band Doings

The results of the last few Trans-Atlantic Tests on 160 metres have been disappointing, and we are satisfied that the peak week-ends were January 28 and February 11. We don't propose to review these Tests in detail now, since we shall be writing up the whole thing in next month's issue. It has not, after all, been possible to do it this month, as W1BB has a lot more news to collate on his side. But we *shall* have the story complete for May. One more item worthy of comment, though, is that KV4AA did succeed in working GW3ZV on Sunday, March 4, at 0445. This is almost certainly the first Virgin Islands-U.K. contact, and we don't think KV4AA has yet worked a G at all. (We had this from KV4AA—'ZV has maintained a modest silence).

Next one—a reliable SWL has reported that he heard ZD4AB working a G on the band; that he logged YI3ECU and some G's calling him; and that UB5BP was working G8NF. Again, we have no confirmation from the G's concerned; we should like to know who made these first-ever contacts with YI and ZD4. Don't forget, we are still talking about 1.7 mc!

Other Top-Band news in brief: G6GM (Holsworthy) has had some 38 contacts with W and VE since the beginning of the year, and has also worked EK1AO, UA3AW and UA4FC. G6LB (Chelmsford) says the extra 250 miles across England makes Trans-Atlantic work twice as difficult—he's probably right, at that. He's putting a reflector behind his dipole to make up for it, next season.

G5JU (Birmingham) logged KV4AA working W's; incidentally, we hear a rumour that he has worked nearly all districts by now. G2PL (Wallington) says it's a pity that KV4AA arrived on the scene so late in the season, and hopes we shall be able to bring in other Central and South Americans, not to mention West Indies stations, next time. (VP6CDI and VP7NM, please note!)

GW3FSP (Neath), who did so well in the Tests, had up a temporary aerial consisting of two half-waves in phase! He has now had to take it down. (The

Calls Heard, Worked & QSL'd

gale took ours down for us.) G3DKZ (Leafield) sent in a Top-Band card from Leningrad showing, as he says, "not a paltry 349 but a nice full-blooded 589 report." Very nice, too.

So that's about the size of the Top-Band news until the full write-up on the Tests next month. Incidentally, we shall certainly repeat something on similar lines next winter—probably starting a little earlier and ending by mid-February. The results obtained and the DX support given this series have exceeded all expectations.

DX on Eighty

The specialists who work DX, morning after morning, on the 3.5 mc band, never write and tell us anything, and we take a poor view of having to get up early to hear other people working DX that we can't raise ourselves! But the situation has been partly saved by G6GM, who admits to working loads of ZL's and sends a list of *seventeen* of them whose cards have been received for 80-metre QSO's. Rumour has it that others doing well in the same line are G6ZO and G8JR.

G2AJ (Biggin Hill) has worked KP4KF, KZ5DE, VP4TB, VP6CDI, ZC4TF and ZL4BO on Eighty; G3ATU (Roker) raised MP4KW and ZC4TF; GW3FSP collected VP4TB, ZC4TF and ZS1BK—the latter at 1930 GMT. G6QX (Hornchurch) bagged FA8CR, KP4HU and 4X4CM, and G3DKZ managed several VE's and W's, CT3AB, FA9RW and KV4AA. Heard, but not worked, by G3FXB (Hove) were KP4, KV4, PY7 and 4X4; his 66-ft. top restricts DX on the band!

From all of this it seems that Eighty is still alive and kicking—and probably likely to remain so while HF conditions are so poor.

Forty Metres

The much-maligned forty-metre band may also be said to be quite well, thank you, even if it breaks a few hearts now and then. (We took five minutes off from this Commentary just now and worked HE9LAA—a new one, if not DX). G2AJ's impressive list includes PY, VK, VP4TB, VP7NM, VP8AI, VP8AP, VU2JP, ZD4AB and a W7—none of which are to be sneezed at.

G5FA (London, N.11) says "plenty of the usual stuff," plus FY7YC, MP4KW, TI2PZ, VS7NG, ZB1's and 2's and YV6AO. G2YS (Chester) was pleased to hear VK7JB come straight back to a CQ call.

G3ABG (Cannock) says Forty has been "vy FB again" and turns in ST2TC, VQ3CF, KV4AI, 4X4BX, UG6WD, VP6CDI, I1SN/M1, as well as VK, ZB1 and 2, TF and MP4. G3ATU offers VP8AI, CR5AF (2015), ZE4JA (0045), EA9AM (2345), ZD4BC (0020), AR8AB (1930), UI8KAA (0230), TI2TG (0030) and W7LEE, Arizona (0300). Referring to "the FC1WP thing" mentioned by G3ABG last month, 'ATU says he heard something similar—FT8CR, giving QTH as Sawah and name as Geron. A Martian, no doubt.

G8IP (Hampton) made a 7 mc WAC in the early hours of March 4, with ZL's, VK, VU, ZD4's, VE, VP1AA and VP7NM, VP8AI and an SM. He says the band was stiff with ZL's at 0630 that morning. Other useful 40-metre ones were VS7NX, VS9AA, VP6CDI and ZC4TF. G3EDA (Loughborough) raised FF8JC, HZ1HZ, PY7WS and W6DFY.

G5BZ (Croydon) weighs in with HE9LAA and I1SN/M1, and adds that he heard F3NB working FB8ZZ at 1600 hrs., and, at the same time, a YU was calling CE6AB. 'BZ also noted KP4CU round about that time. G5MR (Hythe) worked VP8AI for a new one, also VP6, VU, ZC4, ZD4 and ZL. GW3FSP's bag included VP8AI, 8AO and 8AP, as well as VP4TB, VP7NM, VS7NG and 7NX, VU2JP, VQ3CF, ZD4AB and 4AE.

[over

DL3FM (Mulheim-Ruhr) is not only a keen VHF operator, but is also on 3.5, 7, 14 and 28 mc with a band-switched transmitter running 180 watts in the PA. Receivers are HRO and S-27, and much time is spent looking for DX on Ten.

FOUR BAND MARATHON

(STARTING JANUARY 1, 1951)

Station	Total Points	3.5 mc	7 mc	14 mc	28 mc	Countries
G3ATU	181	18	77	83	3	117
G6QB	164	15	46	90	13	103
G5BZ	153	20	40	91	2	103
G5FA	152	13	63	72	4	88
G6QX	128	32	55	39	2	71
G3ABG	120	18	63	36	3	73
G5JU	118	20	41	53	4	69
G8IP	109	12	47	42	8	71
G2AJ	101	13	34	38	16	57
G3FXB	99	13	40	45	1	66
G2AVP	82	8	63	9	2	70
G3EDA	79	12	32	34	1	51
G6TC	76	12	27	35	2	47
W2WC	74	16	25	28	5	43
G3GUM	68	14	19	34	1	46
GM2DBX	66	1	8	15	42	59
G8KU	66	13	22	28	3	48
G2BW	64	14	21	27	2	43
G6AT	39	7	20	10	2	27
G3COI	35	10	5	19	1	28
G2YS	33	7	16	4	6	25
G3IAR	18	4	10	3	1	18

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

Nice ones for G6TC (Wolverhampton) were KP4EG and 4MD, VE7VC, VP8AP, YV6AO, as well as W6 and ZL. G6QX fetched in CT3AB, FY7YC, HP1BR, VP8AK and 8AP, VS7NG and others like ZC4, F9QV/FC and TA2RF. Finally, G3FXB singles out CO2AJ, HK5CR, SVØWH, VP6CDI, VP8AI, VS9AA, VU2JP, and ZB's and ZC's as well as his first ZL's on the band.

From all this you will gather that there are sundry good pieces of DX to be gleaned on Forty that you just can't find anywhere else. On the debit side, there is our old friend General Cacophony, who is let loose at most of the civilised hours, and even some of the barbaric ones, such as 0300. And when the Russians decide to run a contest . . .

Good Old Twenty!

If we give this band a nicer heading this month, it's not because we like it, but in the hope of better things to come.

Running through the pile of letters yet again, we start with G2AJ, who worked VP1AA, VP5AY, VP7NM, VS6AC, 6AE, 6BJ and 6BP, VS2CC and VS9AA —also VE8OV on phone.

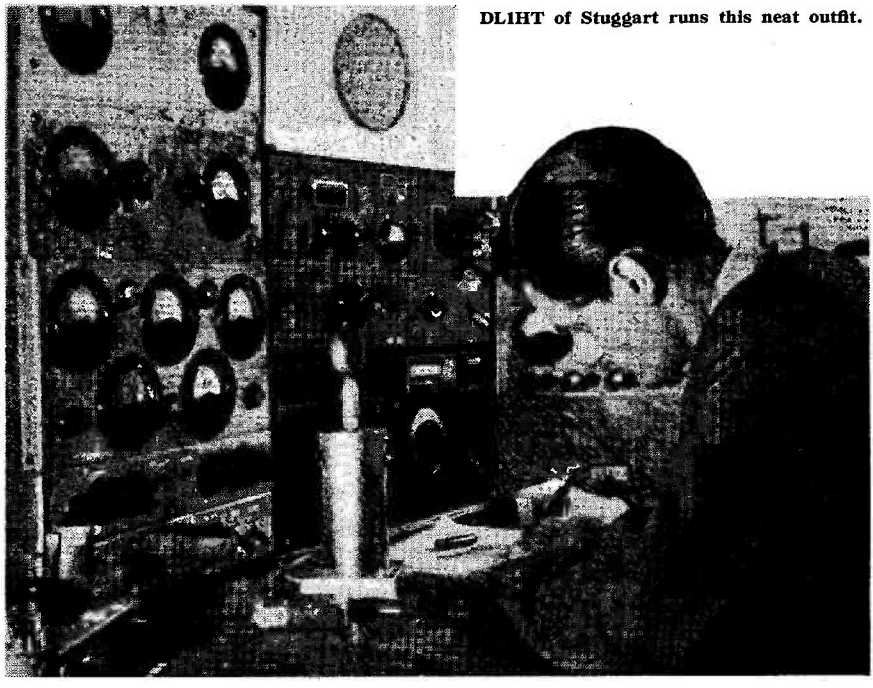
G5FA did well with VS1 and VS2, AP2Z, VU2JP, VS7NG, VP7NM, KZ5KO—all on CW—as well as UD6AH, VQ4RF, VS1 and 6, ZB1 and ZC4, all on phone. In addition to these, he snagged three new ones in the shapes of KC6WC, PK5AA and both the VT1's, of whom you will hear more later.

G3GUM (Formby) has now backed out from the Marathon, as he doesn't like dashing from band to band. He is going to settle down on 14 mc for nice cosy chats with DX like CR5AC, ZS3Q, CE3DZ, VP7NM, VS6BZ, ZD2TBS and 3V8AJ. He also asks to be registered as being against So Many Contests. At this time of year, as he says, every week-end seems to be "Number-Happy," and it gets a bit too much.

G3ABG turns in VP6, VQ, VS6, VU, ZE, KV4 and Utah! G3ATU then comes along with JA2KW (0900), PK5AA (1500), ZS2MI (1830), VP7NM (1945), VT1AF (1430), VP5BL (1930), VS9AA (1930), HS1VR (1400), VQ8CB (1600) and XE1AC "long way round" at 1330. He also heard the DU's 1DO, 1NL and 6IV at lunch time. (We worked one of these chaps and had a nice QSO, the DU saying "sorry, not allowed to work you but very glad to QSO"!)

G8IP comments on the lift in twenty-metre conditions in the early afternoon (which doesn't *always* work!) and quotes the VS1's and VS6's plus VK, ZL and YI. On several days we have noticed terrific signals from the VS's, but on other days there's not a smell of them.

GM2DBX (Methilhill) suggests that 14 mc phone devotees should look for VT1AF, whom he worked on March 12. G5BZ asks whether anyone managed to raise FG8OA (Guadeloupe), who only seemed interested in the W gang; he



DL1HT of Stuggart runs this neat outfit.

also asks who AC3SQ is. Well, we *think* he is OK, and he was recently worked by G3AAM (Birmingham). He was on a year or so back and is not suspect, so far as we know.

G5MR suggests that Twenty is "not so black as it's painted" (just how black would that be?) and says he has heard much of interest, although he has not worked the band much. G3BID (London, N.W.3) wielded phone to some purpose, emerging with EL9A (1800), XZ2EM (1650), VT1AB (1620), HZ1TA (1600), MI3NA (1500), VP9VV (2230) and YV5AB (1130). He also heard—on phone—UP2KBC, UA4HI, JA3AH and HZ1AB.

GW3FSP offers VP1AA, 7NM and 9AI, VK9QK, VQ8AF and VT1AC and 1AF. G3BNE (London, N.W.3) raised CR5AC on CW and several new ones on phone, including AR8BC, VP6FO, OQ5CF and VQ5BC. He also says that the VS1's and 7's were pouring in on phone on March 11, but his 25 watts of supermod couldn't quite make it through the Sunday opposition.

G6TC worked VQ2GW, VQ5AU, ZD4BD, KL7 and VK7, and didn't think conditions too good on the whole. G6QX reports "nothing unusual"—he has been making hay on the other bands and is wisely leaving Twenty until later in the year.

Ten-metre Results

Just take a look at the Marathon table, and you will see a startling ten-metre figure against the call-sign of GM2DBX. This just shows what devotion to one band will do! During the last two months 'DBX has worked such stuff as CE, CX, HC, HH, HK, KS4, KV4, KZ5, LU, TI, VP3, VQ2 and 4, VS7, ZE and all sorts of others, making his total up to 42 countries. The answer? All on phone! 'DBX says he has only had five blank days this year on the band.

All the others together have hardly worked as many countries as this—but we will take them in rotation once again! G2AJ mentions VP6CDI, VP9HH, VQ2GW, ZC4HV, ZD2DYM and ZS9F. G2YS managed to catch KP4KA, TI2TG, VP6CDI and ZE2JV—all on CW. G8IP has found them few and far between, but has worked MP4BAF, MP4KW, ZC4HV, ZE3JJ and ZS6A. G3BID, on phone, has managed

to snag CE6AB, CR6AJ, LU9DBF, PY3SI and ZE2JK. He heard PK3WH several times but didn't work him.

G6QX says "just checked the band on my receiver and left it cold!" We must admit to doing very nearly this ourselves, but we did manage to build the score up a bit (by using the modulator!)

General Patter

Now we've summed up the bands once more, all sorts of loose ends remain. First, thanks to the many readers who have been good enough to say encouraging things about the "Ethics" offering last month. That's the funny thing about it—practically *everybody* agrees with it and yet the same old things go on. G3ATU makes a suggestion when he says "Translate it into practically all European languages and send it out in quantity *via* the QSL Bureaux, with a special bumper edition for Box 88."

G2YS contributes a new thought. Is it quite fair for the "regulars" on a band to go on working the same DX over and over again, when there are others with weaker signals who would very much like to have a look in? As an example—the way the 80-metre ZL's seem to work the same G's every day, or, at least, every week. Also, of course, the fortunate G's and GW's with big aerials and big signals on the Top Band; they do call attention to themselves—they can't help it—but it tends to make the W's overlook some of the weaker ones.

The DX Award

Comment on the *Magazine* DX Award from G3ABG—"I'm only 27, so am hoping to qualify before I pass on!"

One criticism of the conditions for the Award is that it is just about impossible for "a ZL4, KL7, CE7 or VP8, to quote a few," to qualify, since they could never work 15 countries on the Top Band. Candidly, we were being selfish and thinking of the Award in terms of U.K. stations only. After all, there aren't many achievement certificates exclusive to them—and they certainly deserve this one if they can get it.

G2BW (Walton-on-Thames) deplores the inclusion of 1.7 mc in the scheme because it necessitates the use of a separate transmitter and might debar the DX hounds from qualifying. Our reply is that plenty of people are actively after DX on the four main bands, but it takes a little extra time and trouble to become a Top Band Wizard as well; and the last thing we wanted to do was to make the Award *easy*, anyway.

Several 'chasers ask if pre-war cards will be allowed to count for this award. The answer is Yes. We are not among those who assume that Amateur Radio only started in 1946 (except for the purposes of our Zones Worked list). So let us have some claims—the parchments are beautiful, and all ready to be issued!

Last month's story of G3AQZ's trip home from Hong Kong has prompted the father of G3GUF (Belvedere) to write and say that his son is a navigator flying Hastings aircraft on the U.K.-Singapore route. He asks that fellow-amateurs travelling in either direction should try to make their presence known. Having made some long trips himself, he knows the value of "a friendly handshake in unexpected places."

G6TC would like to know "the exact number of hours wasted per week by G stations calling CQ DX on 14 mc . . . . just tune round the band at any time of day and listen to them churning it out, and all to no avail." We quite agree that the band would be cleaner if everyone did a bit more listening; but then perhaps we might not work that DX that the CQ-ers didn't hear!

Another omnibus letter from Darlington tells us that the DX-chasers up there are G2CKN, G3BQJ and G6YC. All are doing well. G3GUP (Chatham) suggests that the mysterious FC1WP might be a genuine Corsican—but we doubt it. He says he keeps hearing a lot about ground-plane aerials but can't find a description anywhere. May we refer him to "Long Way Round on Forty," by W6SAI? It was published in our issue of May 1950.

One Satisfied Customer

We were delighted to have a letter from G3HBZ (London, N.W.2) after his first three months on the air, expressing (*a*) A most favourable opinion of Amater Radio, and (*b*) A great appreciation of the efforts of the old-stagers. 'HBZ admits that some of the usual moans are justified, but adds, candidly, "I'm having a *smashing* time." He runs 22 watts and says he doesn't qualify for any of the tables, but is perfectly happy just the same.

Then he proceeds to shame us by correcting our correction of last month: *all* Printed Matter overseas pays the 1½d. rate, whether to Colonies and

Dominions or not. He should know—he's in the Post Office. We humble ourselves once more!

G3ATU has been very active and has fairly leapt ahead in the Four-Band Marathon. He finds it amusing to reflect that during January and February of this year he worked more than 100 countries, while it took him from January 1947 until March 1949 to acquire his DXCC Certificate. (And then he flings "Poor Old Twenty" in our teeth again!)

Ethics Once More

G5FA remarks that so many G's were replying to VP6CDI's recent calls of "CQ VE" that he came up and said very slowly: "If you boys don't behave yourselves I won't work any of you"—and then on his next "CQ VE" along came another bunch of G's calling him! This isn't ethics—it's just a question of being able to read. 'FA had a personal visit from KL7AAD and gave the 40-metre phone boys their first KL7 contact! He also passes on an interesting

ZONES WORKED LISTING

POST WAR

Station	Z	C	Station	Z	C
Phone and CW			**Phone and CW**		
G6ZO	WAZ	227	G3ABG	37	131
G6RH	WAZ	224			
G6QB	WAZ	215	G2FYT	36	133
G5YV	WAZ	205	G2YS	36	130
G3ATU	WAZ	204	G6QX	36	130
G2FSR	WAZ	196	G3CIZ	36	127
G4CP	WAZ	195			
G3DO	WAZ	191	G3GUM	35	111
G8IG	WAZ	181	G6TC	35	110
G2VD	WAZ	171	G2DHV	35	106
G3BI	WAZ	162			
G3TK	WAZ	157	G3FGT	34	129
G3AAM	WAZ	154	GM3CVZ	34	107
G2IO	WAZ	152	G6AT	34	100
G3YF	WAZ	152			
G8IP	WAZ	142	G2BBI	30	100
G3AZ	WAZ	133			
G5BJ	WAZ	126			
G5VU	WAZ	124	**Phone only**		
G2AJ	40	197	G2AJ	38	156
G2WW	40	183			
G3FNJ	40	150	G3DO	37	154
G6BB	40	136	G6WX	37	128
G3BNE	40	134			
G5MR	40	129	G8QX	36	139
			G3COJ	36	134
G3DCU	39	159	G2WW	36	134
G8KU	39	156			
G5FA	39	155	G2VJ	34	116
G3BDQ	39	140			
			GM2DBX	32	95
G3COJ	38	157			
G2BJY	38	152	G2BBI	30	97
GM3EST	38	131			

one. He worked KO2Y, said to be "With the British Army in Korea." He is not counting it until a confirmation arrives; it was on 7 mc at 2330, and KO2Y said, "Pleased to work Blighty this afternoon"—which sounds awful funny!

G2AJ reports that he has now completed a major rebuild, and has separate PA's for all bands, with band-switching from the control position. He has entered for all recent contests in a big way, but says he only worked 450 stations in the ARRL CW contest, as against 1060 last year; he has also received his certificate from New Zealand as the leading G in the 1950 VK/ZL Contest. Finally, G2AJ has A Moan, and a new one for airing in these columns: It concerns the chap (particularly on 7 mc, where the QRM is bad) who comes back at 20 or 25 w.p.m., natters for about ten minutes, and then says "Hw?" and comes over for his report. Sometimes the latter is a pretty poor one and you've heard nothing! (This confirms our theory that even a good operator can be a Lid by doing the wrong thing at the wrong time.)

G3COJ (Hull) is now "residing" in Honiton with the REME. He was delighted to get his card from FM8AD and would now like to know how to get a companion from FN8AD. He also quotes some unusual results from his forty-metre ground-plane on purely local (inter-G) contacts—mostly due to the use of a vertical receiving aerial at the other end.

G3IAR (Wokingham) is our old friend ZB1AR, working from "a caravan in the middle of a pine wood"! He runs 40 watts to a 20-ft. vertical wire and finds it pretty hard going. He says he has QSL'd all ZB1 contacts, but if anyone should be short of a card he can still fix them up.

G8PP (Harold Wood, Essex) asks all G stations who have worked VE2NU to mail him off another QSL as an act of kindness. He recently had a fire and lost all his cards, though he managed to save most of the station and so is not off the air.

Finally, G3GWO (Worthing) wants to know the actual *town* QTH of UN1AE, if anyone should have it.

The Overseas Mail

Here, in brief, is the story from Kuwait, as told by VT1AC and 1AF. First, VT1DF *was* genuine but didn't QSL and is now off the air. Secondly,

VT1AB, 1AC and 1AF are all active now, 1AB being on 20-metre phone only. They have not been licensed in the strictly official sense of the word, but they are "regularised," so to speak, and the call-signs were issued by a responsible person. But they have recently heard that their official licences are coming through from Bahrein, although they don't know what the prefix will be—VT was more or less brilliant guesswork!

Sidelight on the trials of being a DX station—VT1AF remarked that he was awaiting his QSL's, at 30*s. a hundred*! (We have since received one, which occupies an honoured place on the wall).

THE SHORT WAVE MAGAZINE DX AWARD

For the first time, we offer a Certificate for outstanding DX work. This will be known as the SHORT WAVE MAGAZINE DX AWARD and will, by the very difficulty of achieving it, be regarded as one of the highest distinctions that an all-round DX worker can attain.

To qualify for the Award it will be necessary to supply proof of having worked the following :

1—***Three continents and 15 countries on 1.7 mc.***

2—***Five continents and 40 countries on 3.5 mc.***

3—***All continents and 80 countries on 7 mc.***

4—***All continents and 180 countries on 14 mc.***

5—***All continents and 90 countries on 28 mc.***

Since this involves a total of 405 QSL cards, we are not going to demand that they should all be produced. In claiming the Award, a list of all the necessary contacts must be sent in, giving Date, Time, RST and Frequency.

The judges will then make a "percentage check" on verifications, by scrutinising the lists and asking for the production, at their discretion, of certain specific QSL's for each frequency-band. Failure to produce any of those requested will naturally invalidate the claim.

Claims, and any correspondence relating to this Award, should be addressed "DX Award," *Short Wave Magazine* 53 Victoria Street, London, S.W.1.

Send yours to Box 54, Kuwait, Persian Gulf.

DL3FM (Mulheim) encloses a nice picture of his rig, running 180 watts on all bands, but mostly 14 mc CW. He says "73 to all the boys over there."

G3GKT (ex-ZB1AM and XACP) is now QRT in this country, but hopes to break out as a ZE within the next month or two, and renew old acquaintances. VS9AA is ex-VU7JU, LT3JU and G3JU, and will be in Aden all this year. VS9AH will be QRT in May.

What we believe to be a situation unique for Singapore—the arrival on the air of a YL—is reported by VS1BQ. His wife has made the grade and is now licensed as VS1YL. (This proves that some Government Departments are still human). They have also formed a club for the VS1's, some of whom met in person for the first time. One of them was hoping to get across to VS4 and put it on the map, but it hasn't come off yet.

Finally, welcome to W2WC (Brooklyn), who not only joins in our Four-Band Marathon table, but was also one of the stalwarts getting across nicely on the Top Band. He is a worthy competitor among the G's, as he runs 125 watts to a 132-ft. end-fed aerial (sorry, Frank—antenna!). We hope to see him climbing that ladder.

And with that we come to the end of another month's survey. Please note that next month's deadline is shockingly early—**first post on April 11**—due to the fact that you must have your May issue as early as the 4th of that month. Don't miss the date, and overseas readers please note that the one after that will be May 16, for June.

Address everything to DX Commentary, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1. 73, BCNU and Good Hunting.

SPLENDID ACHIEVEMENT

In our issue for March (p.47), we mentioned that blind operator G3IOW, Isle of Wight, had just been licensed. What we did not say was that he is one of those who has had to start literally from scratch, having to learn not only radio theory and construction and the operation of a receiver by touch, but also Morse code—and we might have added that he was greatly assisted in all this, over the air with code practice and with the technical side by long correspondence conducted in Braille, by another blind amateur, G6KJ, of Buckingham.

FIRST CLASS OPERATORS' CLUB

President:
GERALD MARCUSE, G2NM
Hon. Secretary:
Capt. A. M. H. FERGUS, G2ZC
Asst. Hon. Secretary:
J. E. CATT, G5PS

While the club maintains its weekly session on the 3.5 mc band, it would be a mistake to imagine that it confines its attention to Eighty alone. All-round activity is at a high level, as a glance through February *Short Wave Magazine* shows. In the recent Top Band Trans-Atlantic Tests, four members are known to have been successful, with GW3ZV getting the honours on this side of the Pond. In the Four-Band Marathon, eleven stations are listed, of which eight are FOC operated, and the first four places go to the Club. QRP is becoming increasingly popular, and the experiences of G6ZN on the DX bands will certainly encourage more members to experiment with low power. And, at the other end of the spectrum, the European record for 2300 mc is still shared by G81H.

An interesting article in the same issue of the *Magazine* discussing the distribution of the amateur population comes from the pen of FOC member G3BDQ —who, incidentally, was the winner of the last Club marathon contest.

So it is clear that the activities of members of the FOC are as diverse as the membership itself—for the March issue of *Short Wave Magazine* also reports the Top Band appearances of KV4AA and W4KFC.

Never Too Old

G2NM, President of the First Class Operators' Club, has been repeating in 1951 on the Top Band what he first accomplished in the Trans-Atlantic tests of 1923. This makes one think a bit, for when Gerry Marcuse—still as keen and as active as ever today—was breaking new ground all those years ago, quite a number of operators well known on the bands today had not been born. On the same theme, the combined ages of the President and the two Joint Hon. Secretaries of the FOC are getting almost too near the 200-mark to be comfortable! But all this also shows that one is never too old for Amateur Radio.

Other Interests

A question was asked in a recent FOC Circular Letter as to what hobbies, other than radio, were of interest to members. The philatelists have already got together, and it is hoped that those with the same non-radio hobbies can also be put in touch with one another. Replies are still coming in, and show the wide range of members' interests. Some will easily be paired off, but others of the hobbies admitted are, to say the least of it, unusual — amongst them are astronomy, bee-keeping and the study of statistics.

Morse Practice

Two Dutch members of the Club, PAØIF and PAØLR, are running practice transmissions at 1000 GMT on 3505 kc every Sunday morning. The speeds rise from 6 to 18 w.p.m. by stages, and it is thought that some of the younger brethren in this country might like to avail themselves of the service. As the text is in Dutch, there can be no guessing! The operators concerned would be glad to have reports on readability and the value of the transmissions from G listeners using the service.

In the list of elected members this month appears the callsign of VE3BWY, who, as G6WY, was a founder-member of the FOC in 1938. He left this country early in 1947 to settle in Canada, and before that was a regular contributor to *Short Wave Magazine.*

Election Notice

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

H. J. Chater, G2LU (Coventry) : G. Denby, G3FCW (Leeds) ; I. Persson, SM5HD (Solna) ; H. Andersson, SM5LL (Stockholm) J. A. Bratby, G3GVA/A (Calne) ; G. W. Spray, G3FXA (Bexhill) ; and H. A. M. Whyte, VE3BWY (Toronto).

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).

Decibels

WHAT THEY ARE AND HOW TO USE THEM

By **G. F. WILSON (GW3BZH)**

While a signal capable of pushing the S-meter to "20 dB over S9" is universally regarded as being good and strong, it is also generally realised that by itself it does not mean very much—there must be some standard to which it can be referred. This article is by way of being a simplified explanation of the method of thinking and calculating in terms of decibels.—Editor.

MANY beginners in radio find difficulty in grasping what is meant by "Decibels"—and it is the writer's experience that not a few Old Timers, whose theory is otherwise solid, will reply rather vaguely if asked outright: "What is a Decibel?"

The object of these notes is to attempt to clear up the subject for the beginner and, at the same time, to make manipulation in Decibels easier for the man whose mathematics are rusty.

The first, and most important, fact to get hold of is that the Decibel is not an absolute unit in the same way as is a volt, an ohm, or an ampere. It does not specify any definite values of power, voltage, or current. It is a relative expression of the *ratio* of one value to another. The Decibel is commonly used for such purposes as the expression of gain in an amplifier, gain of one aerial system as compared with another, loss in an attenuator or transmission line, and so forth.

The Decibel was first introduced as a convenient measuring unit in landline telephony, where it was desired to have an expression suitable for comparing the intensities of sound levels. It is obvious that the important thing in telephony is the effect of the sound intensity on the human ear. Now, the response of the ear to sound is not linear, *e.g.* whilst the effect produced by a 10 watt noise is 10 times that produced by 1 watt, 100 watts appears only 20 times as loud, and 1,000 watts only shakes the eardrum 30 times as much as the 1 watt noise. Quite clearly, this non-linear effect is not going to be expressed by a set of units that "increase in regular steps." At this stage, the reader who is familiar with logarithms will have recognised from the relationship 10, 100, 1,000 and 10, 20, 30, that a logarithmic progression has entered the picture.

The Mathematics

But for the sake of those whose maths. are a hateful memory, we recall that the Common Logarithm of a number is the power to which 10 must be raised to equal the given number. Thus, the common log of 10 is 1, of 100 is 2, and so on. Remembering this, we can tabulate the statements above to make the relationship quite clear, as in the table.

Comparison Watts		Watts	Ratio	Log of Ratio	Effective Increase (Times)
10	to	1	10	1	10
100	to	1	100	2	20
1000	to	1	1000	3	30

Hence the gain *in effect* of one power as compared with another depends on their ratio and is numerically equal to 10 times the logarithm of that ratio. The unit of comparison is the Decibel (dB)—actually, the Decibel is by definition one tenth of a Bel, but for all practical purposes the Decibel is used. The relationship, *as far as Power is concerned*, may be written:—

$$\text{dBs (Power)} = 10 \log_{10} \frac{P1}{P2}$$

***i.e.* Rule 1:** To find the dBs of gain or loss, when comparing power levels, the logarithm of the power ratio is multiplied by 10.

Example: 25 watts are fed to a transmission line, which is terminated in its characteristic impedance. The measured power dissipated in the terminating load is 20 watts. What is the line loss in dBs?

Power Ratio = 25/20 = 1.25
Log Ratio = 0.097
dBs. = 0.097 x 10 = 0.97 dB (Ans)

dBs of gain may be referred to as + dBs, and dBs of loss as − dBs. Decibels may be added algebraically. Thus, if a two stage amplifier consists of a conventional amplifier whose gain is + 9 dBs, and a cathode follower stage whose gain is − 1 db, then the overall gain is + 8 dBs.

The dBs of gain or loss will be the same for any values of P1 and P2 that give the same ratio. Thus, 50 watts is a gain of 40 dBs on 5 milliwatts, and an output of 10 watts for an input of 1 milliwatt also shows a gain of 40 dBs.

If voltages or currents are measured with regard to the same (or an identical) impedance, comparison may also be made in dBs. It must be remembered that:

$$\text{Power} = I^2R \text{ - or } I^2Z$$

and

$$\text{Power} = E^2/R \text{ - or } E^2/Z$$

That is to say, power varies directly as the square of the current or voltage, and this fact must be taken into account when arriving at the expression for Decibels. Now, to square a number, its logarithm is multiplied by 2. The formula for dBs must also multiplied by 2. Thus, we arrive at

$$\text{dBs (E or I)} = 20 \log_{10} E1/E2 \text{ (for Volts)}$$
$$\text{or} = 20 \log_{10} I1/I2 \text{ (for Current)}$$

Rule 2. To find dBs of gain or loss when comparing voltage or current (associated with the same, or identical impedance) the logarithm of the voltage or current ratio is multiplied by 20.

Example. The input and output impedances of a certain amplifier are equal. The input is 50 millivolts and the output voltage 15 volts. What is the gain of the amplifier?

$$\text{Voltage Ratio} = \frac{15 \times 1000}{50} = 300$$

$$\text{Log } 300 = 2.48$$

$$\text{dBs} = 2.48 \times 20 = 49.6 \text{ (Ans)}$$

Even if the impedances with which E1 and E2 (or I1 and I2) are associated are unequal, it is possible to make a comparison in Decibels. In this case, the expression will be a little more complex because of these considerations:

(a) The squares of the voltages (or currents) which are being compared.

(b) The impedances with which they are associated.

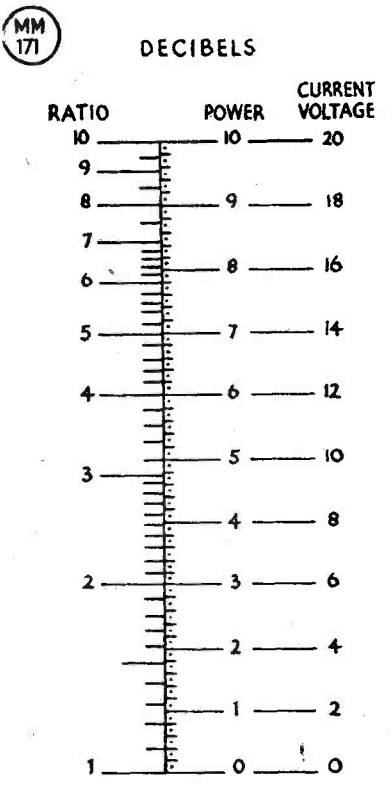
(c) The power factors of these impedances.

There are, therefore, three separate ratios affecting the answer. However, as has been pointed out previously, dBs may be added algebraically; so the dBs of gain or loss will be obtained by a simple additive process, and the formula is:

$$\text{dBs (E or I, unequal Z)} = 20 \log_{10} \text{Voltage (or Current) Ratio} + 10 \log_{10} \text{Impedance Ratio} + 10 \log_{10} \text{Power Factor Ratio.}$$

The Reference Level

Although, as has been pointed out previously, no definite values of power, current, or voltage are associated with the Decibel, in some applications (particularly in dealing with audio circuits) it is very *convenient* to have a fixed reference level. In this case, 6 milliwatts is taken as Zero dBs.



Values of dB corresponding to power ratios from 1-10 can be obtained from this scale.

It is important to remember that dBs just "don't mean a thing" unless the reference level is known. An example which is of practical interest to all amateurs is in S-meter calibration. The value for an S-point may be fixed arbitrarily by the designer as 6, 5, 4, or even 3 dBs. The reference level for S1 is also arbitrary, being a value of input voltage which will sufficiently over-ride inherent receiver noise to give a just audible signal. A good receiver might do this with an input of 2 microvolts. For 6 dB steps, S2 is then 6 dB above 2 microvolts, *i.e.* 4 microvolts; S3 is 6 dB above 4 microvolts, *i.e.* 8 microvolts; and so on, with S9 working out at 572 microvolts. Had the sensitivity of the receiver been such that the

reference level for S1 was 5 microvolts, then S9 would be given by a signal of 1300 microvolts, approximately—and a very different matter.

Ready Reckoner

Unless extreme accuracy is required, the scale given in Fig. 1 may be used for all dB calculations. First find the power, voltage, or current ratio. Then, if it lies between 1 and 10, locate its value on the left-hand side of the Scale. The dBs value lies at the corresponding point on the right-hand side of the Scale. The Decibels scale is numbered to accommodate either Power or Pressure (Voltage and Current) ratios. Should the ratio be greater than 10, the decimal point should be moved to make it less than 10. Thereafter proceed as above, and to the answer found add 10 dBs in the case of power, and 20 dBs in the case of voltage, for each place by which the decimal point was moved.

Example :

What is the stage again of an amplifier where the output voltage is 81 volts for an input of 0.6 volts ? The input and output impedances are equal.

Ratio = 81/0.6 = 135

Move the decimal point two places left, then Ratio = 1.35

From the Scale, dBs for ratio 1.35 = 2.6

But the decimal point was moved 2 places, therefore add 40 dBs

Hence, dBs of gain = 2.6 + 40 = 42.6 (Ans)

Check by Calculation.

dBs (Voltage) = $20 \log_{10} E1/E2$

= $20 \log_{10} 135$

= 20×2.1303

= 42.606 dBs (Ans)

Finally, the beginner can only become really familiar with decibel manipulation by usage. In the early stages, it is worth while to work out as many as possible of the dB references encountered, in terms of suitable power, voltage or current units. By doing so, he will quickly find that he has acquired familiarity with a most useful, even essential, radio "yardstick."

160-metre Super Modulated Transmitter

NOTES ON OPERATION AND RESULTS

By **F. C. JUDD (G2BCX)**

This article expands the information given in our November 1950 issue on the subject of Super Modulation, and deals in particular with the adjustment of an SM transmitter used experimentally on the Top Band. Our contributor explains how to get the PM/PA conditions right for the proper functioning of the system, and shows that the PA is particularly sensitive to aerial loading for SM operation.—Editor.

THESE notes are the results of further experiments with Super Modulation applied to a transmitter running 10 watts input on 160 metres and using 6V6G valves for the PA (power amplifier) and the PM (positive modulator) respectively.

The following may be of use to those who contemplate trying the system and those already operating it. Numerous modifications and many experiments were carried out using the original circuit (see *Short Wave Magazine*, November, 1950 : "Super-Modulation"), but a standard drive arrangement was employed, comprising a 6F6 ECO/VFO and a 6V6G tuned buffer amplifier which, with 300v HT, gave ample RF drive for the PA and PM stages. The modified circuit is shown in Fig. 1. Basically, this differs little from the original, but certain differences were found in actual operation, and the circuit in Fig. 1 is as modified for optimum results under the conditions laid down by R. E. Taylor, the originator of the system.

Some Practical Leads

One of the first difficulties was a badly spreading carrier, and immediate steps were taken to correct this. The fault was due to an over-coupled aerial, resulting in a mis-match between the aerial circuit and the PA/PM. However, coupling between the aerial tuning circuit and the PA/PM tank must not be too loose, because the PM valve will only operate at maximum efficiency when the aerial loading is somewhat heavier than normal. So it remains that the aerial loading and tuning are critical.

A widely spread signal will result from too little RF drive and too much audio to the PA grid. The aerial current

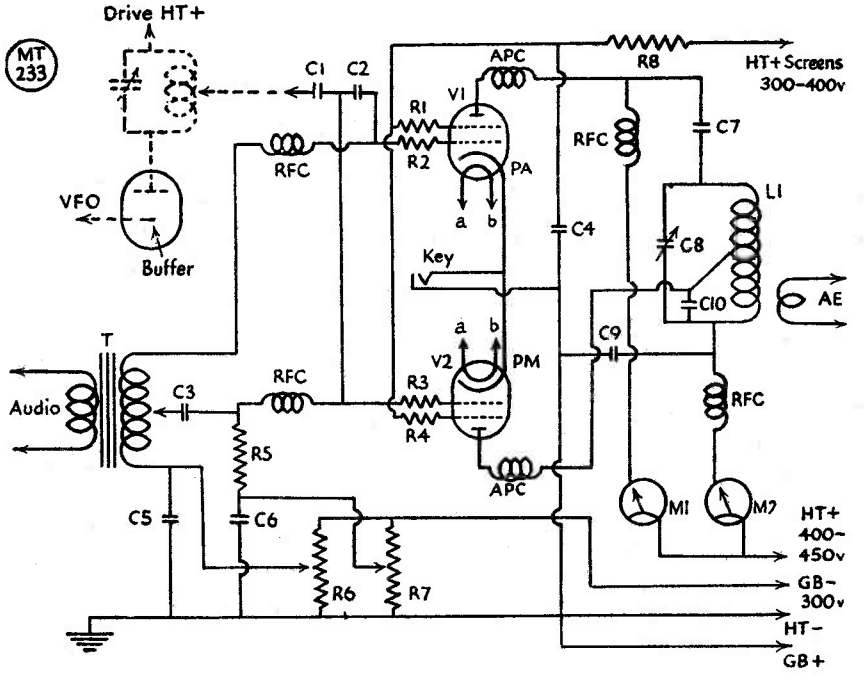


Fig. 1. Circuit of the PA/PM section of the 160-metre super modulated transmitter discussed by G2BCX.

should increase by not more than 50%, and bad splatter off the sidebands may be due to insufficient RF drive to the PA which, on negative peaks of audio voltage, will allow the RF output to be reduced to zero before the positive modulator has reached maximum peak current. Not only splatter, but carrier breaking, will be evident under these conditions. A summary of proper operating conditions will be given later. A peculiar form of splatter at frequencies greatly removed from the fundamental, of very low signal strength and noticeable only to very local stations, was finally traced to parasitics in the PM stage when the valve was operating at maximum positive peaks. Both the PM and PA valves were fitted with anti-parasitic chokes and resistors which removed all trace of spurious radiation.

Some notes from another transmitter operating on 10 metres with Super Modulation may be helpful to others using that band, and are as follows:

(*a*) A small variable condenser of 50 $\mu\mu$F capacity is fitted in series with one lead of the outgoing feeder line (assuming a line-fed aerial) and tuned for maximum feeder current whatever the impedance of the feeder. The link coil must not be too tightly coupled to

Table of Values

Fig. 1. Circuit of the 160-metre Transmitter

C1	=	340 $\mu\mu$F
C2	=	150-200 $\mu\mu$F
C3	=	2 μF paper.
C4	=	0.1 μF
C5, C6	=	2 μF paper
C7	=	.005 μF mica
C8	=	Tank tuning, .0004 μF
C9	=	.005 μF mica
C10	=	100 $\mu\mu$F, air-spaced fixed or variable.
RFC	=	Transmitting type RF chokes
APC	=	Anti parsitic chokes, 5-6 turns 18 SWG enamelled wire $\frac{3}{8}$in. dia. spaced out to $\frac{3}{4}$in. long
L1	=	Tank tuning coil for 160 metres
J1	=	CW keying jack (if required)
T	=	Modulation transformer, ratio 1 : 1
V1, V2	=	6V6G valves
M1, M2	=	0-50 mA meters
R1, R2, R3, R4	=	47 ohms $\frac{1}{2}$-watt
R5	=	5,000 ohm 1-watt
R6, R7	=	100,000 ohm variable 1-watt
R8	=	20-30,000 ohm 2-watt

the PA tank, but it may be necessary to increase the number of turns. This arrangement provides for better operation of the PM.

(*b*) The anode current of the PA (no-modulation condition) should not fall by more than 5% when the stage is loaded (aerial on) and then tuned out of resonance, and not exceed 10% under the same condition as above.

Notes by other users and Taylor himself reveal that the operating condition of PA is critical, but once attained will remain constant over a wide band of frequencies. The drive should be sufficient to maintain the anode current at about half as much again as the normal current for the valve when (*a*) It is biassed to cut-off at no-drive condition, (*b*) The PA tank circuit is off resonance, and (*c*) The PM is biassed to two to three times cut-off with drive on the grid. The PA should then be tuned to minimum dip, which will be a little higher than for a normal PA stage using the same valve. Aerial loading is increased until the valve takes maximum current. The bias and drive are adjusted so that the valve runs at approximately half to three-quarters CW rating.

Setting Up

The PA tuning is quite sharp, and a change of frequency of more than a few kc will mean retuning the buffer and PA stages. Since the aerial loading will remain constant for the band, it is only necessary to peak the buffer and PA tuning so that the aerial takes its original current. Correct procedure for setting up under Super Modulation conditions is as below:

(1) The PA stage should operate at full Class-C rating and the input set to half to three-quarters CW loading by adjusting the *bias and drive only;* but if the drive is correct in the first instance, then adjustment must be made to bias only. Slacking off the aerial loading only results in a mis-match to the PM, and should not be attempted once set.

(2) Apply audio, and advance the gain control until the PM anode current starts to kick upwards. The maximum current must not exceed the valve rating. At the same time, the PA anode current will kick downwards, but it should not be allowed to go below one-quarter of the total current being taken under the no-modulation condition. If the current falls below this value, then a reduction in audio or an increase in RF drive may be necessary. The aerial current should kick upward by approximately 50% of its standing current.

Fig. 2 shows the full waveform of a super-modulated carrier, together with the waveform at the second detector of a normal superhet, *e.g.*, a diode. This diagram shows how the audio reference level is raised by the action of the positive modulator valve, and the cushioning effect of the RF developed by the PA during its return from compression under the negative-going modulation peak.

Finally, some tests were made by comparing the super-modulated signal with others using normal anode modulation. On one test the signal from a transmitter using Volume Compression (G3FEW) was used for comparison, and at the receiving end both signals (G2BCX and G3FEW) were adjusted to produce an S6 carrier level. The audio gain from the Volume Compression system was approximately 6-7 dB over a normal amplitude modulated signal of the same carrier strength (100% modulation), whereas Super Modulation gave something like 12 dB gain in speech power.

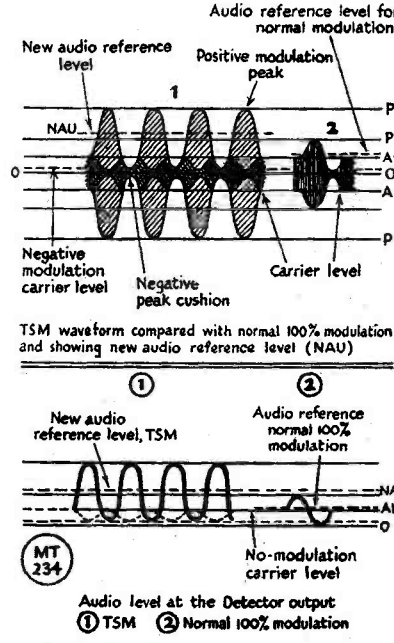


Fig. 2. Waveform diagrams to illustrate the discussion in the text.

VHF BANDS

DX On The Continent—

Activity in DL2, DL4, F, LX, ON, OZ, PA, SM, ZB1—

March Conditions and Results—

Station News and Activity Reports

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

EARLY March brought the first real signs of a DX opening on two metres. Unfortunately, the improvement was short lived. It did, however, extend over a wide area and, in addition to providing 300-mile paths in this country—from Cumberland to the South Coast—it enabled some excellent new circuits to be opened on the Continent.

On March 4, the first DL/OZ contact was made, the stations concerned being DL6SW in Hamburg and OZ2FR in Brekke, which is 100 km. north of the DL/OZ border. The following day DL2DV (whom many will remember as G8DV of Farnham) also made contact with the OZ, the distance being 212 miles. Further QSO's followed between DL2DV and OZ2FR on March 9 and 10. On the 10th DL2DV also worked SM7BE, 20 km. north of Malmo, over a distance of 247 miles, for the first DL/SM two-metre contact. As DL2DV says, these results are quite encouraging, as they were made under conditions which were not remarkable. It now seems reasonable to hope that the first G/OZ and even G/SM contacts may not be long delayed when summer conditions arrive. For the information of all who are interested, OZ2FR is on 145.0 mc and SM7BE on 144.7 mc.

The Dutch stations are also endeavouring to work into OZ and are calling in that direction nightly at 2100 GMT, while the Danish stations reply at 2100. Results so far are that PAØZU possibly heard an OZ on February 27, while PAØLDG found an OZ calling him on March 5, but the signal was too weak to read in full.

There has been quite an influx of mail from the Continent this month, and it seems very certain that the scarcity of 144 mc signals from Europe has not been due to any lack of activity or enthusiasm. DL2DV (Fassberg) is midway between Hanover and Hamburg in a stretch of country about 200 feet a.s.l. and covered with pine woods; his beam at 45 feet up just peeps over the tree-tops. Until recently, DL2DV had been using a modified SCR-522 and a 6-element stack, and, with only one other stabilised transmitter (DL3MH) within a 100 miles of him, contacts were rare. There were a dozen or so SEO's, but these were mostly unreadable on DL2DV's converter (6J4-EF54-EF54-6J5). A big rebuild in recent months now finds DL2DV with 70 watts to an 829 in the PA, a standard 6J6 type converter and a 4-over-4 beam at 45 feet. Others now active with stabilised equipment include DL2MW (Hanover), DL3MH (Celle), DL6SW (Hamburg) and DL3RY—the last-named is 2,000 feet up, but we gather his receiving equipment is not too good. DL3MH, with 100 watts, has worked DL3JI (Gierson) at 270 km.

DL3HG (Haar-Munchen) has three receivers in use, including a Wallman type converter, and two stabilised transmitters; he is hoping to work G stations this year. DL4XS (Rhein-Main) writes again and reports nightly activity on Two in the Frankfurt area. DL4XS himself will be operating from Radio-Hill again this year, although it will mean a 32-mile journey each way every time he thinks conditions will be good enough. DL3KE will once again be with him, and DL4XS asks that, in listing the various records standing in '4XS's name, equal credit be given to DL3KE, including the existing European two-metre record held with G2BMZ, of Torquay. Much of the equipment at Radio-Hill has been constructed by

DL3KE. From DL4XS comes news that OH2OK will be performing again this year with a pair of 4-65's.

ON4BZ (Brussels) is active nightly on 144.95 mc, from 2000 to midnight GMT. He has a 6-element wide-spaced rotary Yagi, but is replacing this soon with a 15-element Yagi, consisting of 9 directors, 1 radiator and 5 reflectors in corner form; this will be up at 240-ft. above ground level. The ON4BZ receiver, using two EC80 grounded grid stages, has coaxial line tuned circuits all silver-plated. The PA in the transmitter runs two 24G/3C24's in push-pull. According to ON4BZ, LX1JW is on two metres and other Luxemburg stations should also be on soon. The following Belgian stations are regularly active: ON4HC, ON4HN, ON4IW, ON4PH, ON4UV, ON4VL, ON4VN, ON4XB and ON4ZR.

PAØFB (The Hague) reports about a dozen two-metre stations on the air in West Holland every night. Good conditions were experienced during the end of February and beginning of March, and numerous contacts made with the ON's. PAØFB is using NFM with some success, and says the Danish stations are also using it. By having two separate beams, one for Tx and one for Rx, PAØFB is operating duplex on Two and can work that way with any station more than about 200 kc off his own frequency. He asks us particularly to mention that he would welcome a visit from any VHF G who is coming to Holland during the vacation season.

Lastly, a welcome letter from Malta, where ZB1BZ and ZB1FK are active on Two. They are each using about 15 watts to 16-element stacks, but hope to

TWO-METRE ACTIVITY BY ZONES AND COUNTIES

(Based on reports for current issue only)

Zone A (144.0 to 144.2 mc)

Dumfries : GM3OL
Fife : GM3EGW, GM3ENJ, GM3FYB
Lanark : GM3BDA
Stirling : GM4QV

Zone C (144.2 to 144.4 mc)

Cumberland : G3BW
Lancashire : G2ALN, G2DCI, G2OI, G2HGR, G3AOO, G3BPJ, G3DA, G3ELT, G6QT, G8UF
Yorkshire : G2IQ

Zone D (145.8 to 146 mc)

Co. Down : GI2FHN

Zone E (144.4 to 144.65 mc)

Cheshire : G3ABM, G3ATZ, G3AYT, G3DH, G3FMI, G5CP, G8SB
Derby : G3EMJ, G5RW
Leicestershire : G2FNW
Nottinghamshire : G2XS, G6CW
Staffordshire : G3CXD, G8KL
Warwickshire : G2ATK, G3ABA, G4NB, G4RK, G6CI, G6XY, G6YU, G8QY

Zone F (145.65 to 145.8 mc)

Flintshire : GW2FVQ, GW3DNN, GW5MQ
Glamorgan : GW3EJM
Montgomeryshire : GW2ADZ
Shropshire : G3AHX

Zone G (144.65 to 144.85 mc)

Bedfordshire : G2DUS, G3CGQ
Buckinghamshire : G2MQ, G3GBO, G3MI, G4MR, G6JK, G6NB, G8WV
Cambridgeshire : G2AIQ, G2UQ, G2XV, G3BK, G3GGJ, G3WW, G4MW
Hertfordshire : G3DJX, G3FD, G4RO, G5UM, G6LL
Huntingdonshire : G2FQP, G3AKU
Norfolk : G3VM, G5UD
Northamptonshire : G2HCG, G3BA, G3DUP, G3EHQ
Suffolk : G2CPL, G4PV

Zone H (145.25 to 145.5 mc)

Berkshire : G3AVO/A, G3CCP, G4SA, G5HB, G6OH, G8LG
Dorset : G3ABH, G5UF
Gloucestershire : G3YH, G5BM, G8ML
Hampshire : G2DSW, G2DZT, G2VH, G2XC, G3ARL, G3BHS, G3BNC, G3EUQ, G3GAV, G3GOP, G6XM, G8LY
Oxfordshire : G6KB
Wiltshire : G2BUJ, G2MM, G3GYQ, G4AP, G8IL

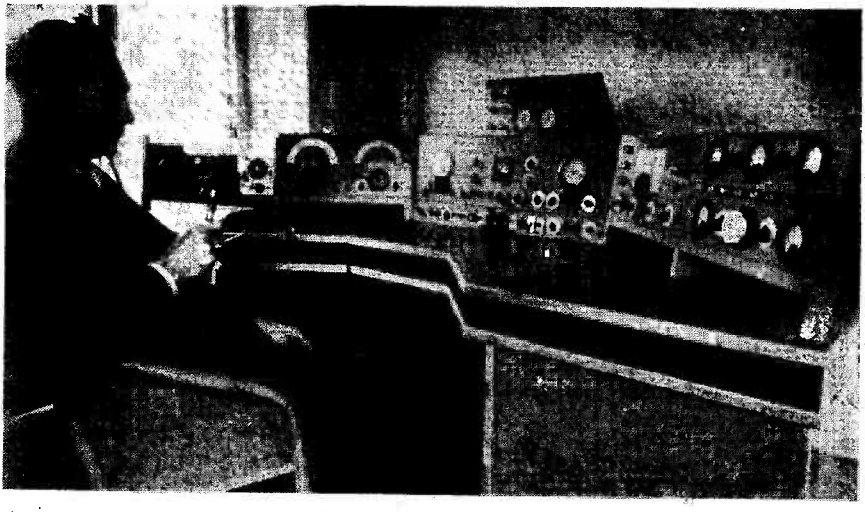
Zone I (145.5 to 145.65 mc)

Devonshire : G2BMZ, G3GAO
Somerset : G3EHY

Zone J (144.85 to 145.25 mc)

Essex : G2CIW, G2WJ, G3ECA
Kent : G2KF, G2UJ, G3BVA, G5MR, G6AG, G6VX
London : G2BZ, G2DTO, G2LW, G3BCY, G3EIW, G3ENI, G3EYV, G3FSD, G3GTH, G3GX, G4DC, G5DT, G5LN, G6LR, G6QN, G6WU, G8KZ, G8LN
Middlesex : G2AHP, G2BMI, G2DD, G2FMF, G2HDZ, G2YC, G3GSE, G3GXO, G3SM, G4HT, G5LQ, G6JP, G6UH, G8IP
Surrey : G2BN, G2MV, G3BLP, G3DVQ, G3ENY, G3GHI, G3HCU, G3HEA, G4CG, G5DS, G5LK, G5LC, G5MA, G5NF, G6CB, G6LK
Sussex : G2AON, G2AVR, G2FTS, G2JU, G2MC, G2NM, G3BEX/A, G3DIV/A, G3HCK, G5RO, G8OS

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



The operating position at G5BY, Bolt Tail, S. Devon, who for many years has been an outstanding performer on the VHF bands. This console was designed and built by himself, and incorporates all the necessary receiving equipment and control gear for the transmitters and aerial systems. The various units were also constructed or modified entirely by G5BY. Fully equipped for serious VHF work, it can confidently be expected that he will be there to make the most of DX conditions during this coming season.

have 100 watts available shortly. Their frequencies are: ZB1BZ, 145.0 mc, and ZB1FK, 145.35 mc. They would be glad of any fixed schedules and are on most afternoons and evenings.

The Activity Week-End

The first of the Activity Week-Ends, March 10 and 11, brought a strange mixture of conditions. The experience at G2XC on the Saturday evening was typical of that at many other locations. For the first two hours (1830 to 2030) a number of contacts were made with stations up to 60 miles or so, the general impression being that signal strengths were somewhat below normal. The low-frequency end of the band was searched a number of times, but no DX at all was heard. Yet soon after 2030 a call came in from G3VM (Norwich) at nearly 170 miles. He reported G2XC as the only signal audible with him. G3VM continued to be heard at G2XC throughout the evening, yet, with the exception of G2IQ at 2230, *no* other signals from beyond 70 miles were received. The conclusion might have been that activity was poor and that stations had just not responded to the idea of the week-end. Yet reports since received show that there was ample activity and that other instances of isolated DX paths being open in different directions on that evening were experienced by several operators.

Different impressions of the level of activity were formed by different operators. One correspondent made the usual crack about an "inactivity week-end," but another complained of the congestion! G2AHP counted 51 stations on the air, and none of them were more than 100 miles from him. Personal experience of your conductor was that the Sunday afternoon activity on the band was decidedly above normal, while on the Saturday evening it was disappointing. Conditions may, however, have had much to do with this. Incidentally, three readers complain that there was insufficient notice of the week-end. As two other well-known VHF operators were heard saying the same over the air, your blameless commentator would like just to mention, in self-defence, that notice of this March Activity period was given on page 822 of the *February* issue! That box in March was only meant as a reminder! The May Activity Week-End, which will *not* be a contest, will be May 5 and 6, the times being as for previous week-ends—namely, Saturday 1830 to mid-

night and Sunday 1000 to 1600, clock time. Two correspondents sent in entries for a March contest. The March week-end was not a contest with points, but the April week-end *is* a contest, details of which were given in last month's "VHF Bands."

Station News from The North

GM3EGW (Dunfermline) reports some good activity in his locality. GM3ENJ and GM3FYB are on the band in addition to himself. GM3ENJ is situated about 500 feet a.s.l. with a good outlook in all directions. He is using a 522, with a push-pull 6J6 added to the receiver input, and a 3-element beam. GM3FYB is poorly situated near the bottom of a valley. GM3EGW has 60 watts to an 829, and a G2IQ converter;

TWO-METRE ACTIVITY REPORT

G3EYV, London, S.W.4.

WORKED: G2DTO, 2FAB, 2HDZ, 2MV, 3BVA, 6CB, 6LR.
HEARD: G2AHP, 2BMZ, 2MV, 2XC, 2YC, 2YC, 3BLP, 3BCY, 3GHI, 3GSE, 3HEA, 4DC, 4HT, 4IG, 4MR, 4RO, 5PY, 6LO/A, 6QN, 6XM, 8IP, 8KZ.
(*March Activity Periods*).

G2OI, Eccles, Lancs.

WORKED: G2ALN, 2HGR, 2JT, 2XC, 3BA, 3BLP, 3BW, 3DH, 3ELT, 3GHI, 5BM, 6CW, 6NB, 6XM, 8SB, GW5MQ.
HEARD: G2CDB, 3ABA, 3ABM, 3AHX, 3AOO, 3ATZ, 3AUB, 3AVT, 3BFJ, 3BJ, 3BPJ, 3BVJ, 3CGQ, 3DA, 3DUP, 3FJW, 3FMI, 4RO, 6QT.

G2DCI, Speke, Lancs.

WORKED: G2ALN, 2HGR, 3ATZ, 3DA, 3DH, 3EHY, 8SB.
HEARD: G3FMI, 5BM, 5CP, GW2ADZ, 5MQ.
(*March* 10 *and* 11).

G3DVQ, Purley, Surrey.

WORKED: G2AHP, 2BZ, 2HDZ, 2UJ, 3CGQ, 3GBO, 3GHI, 3GSE, 4KD, 4MR, 4RO, 5YM, 6CB.
HEARD: G2AVR, 2BMI, 2KF, 2MV, 3BLP, 3ENY, 3GHS, 3GTH, 3HEA, 4CG, 4HT, 6NB, 8KZ.
(*Activity Week-End*).

G6CW, Nottingham. NGR 43/460345.

WORKED: G2CPL, 2HQ, 2OI, 2XC, 3ABA, 3BA, 3CGQ, 3ELT, 3EHY, 3VM, 3WW, 4HT, 4RO, 5MA, 6CI, 6NB, 6XM, GW5MQ.
HEARD: G2BUJ, 2CXD, 3BLP, 5BM, 6LI, 6LK, 6VX, 6YO, 6YU, GM3OL.
(*February* 20 *to March* 11).

G4MR, Slough, Bucks.

WORKED: G2AHP, 2BMI, 2XC, 3BLP, 3BVA, 3DUQ, 3EYV, 3FAN, 3GBO, 3GSE, 5DS, 5LK, 5LC, 6CB, 6KB, 6NB, 6OH, 6QN, 6XM.
HEARD: G2BYY, 2CIW, 2FAB, 2MA, 2UJ, 2YC, 3BCY, 3CKX, 3GHI, 3HCU, 4CG, 4HT, 4RO, 5LQ, 5RD, 5UM, 6LO/A, 6UH, 8KZ.
(*March* 10 *to* 11).

G3BW, Whitehaven, Cumberland.

WORKED: G2OI, 3ABA, 3BA, 3BY, 3CXD, 3DA, 3DH, 3DUP, 3GMX, 3GPT, 5BM, 5CP, 5VN/A, 6CW, 6NB, 8GL, 8KL, 8ML, 8SB, GI2FHN, GM3BDA, 3EGW, 3ENJ, 3FOW, 3OL, GW5MQ.
HEARD: G2HCG, 3BLP, 3EHY, 3ELT, 4HT, 5TH, 6MI, 6QT, 6XM.
(*February* 26 *to March* 11).

G3BEX/A, Hove, Sussex.

WORKED: G2AON, 2DSW, 2FTS, 2JU, 2MC, 2MV, 2VH, 2XC, 3ARL, 3DIV/A, 3FAN, 3GAV, 3GHI, 3HCK, 4HT, 5LK, 5RO, 5UF, 6NB, 6XM.
HEARD: G2AVR, 2DTO, 2NM, 2XV, 3BCY, 6AG, 6UH, 8IL.
(*March* 4 *to* 11).

G3CCP, Shrivenham, Berks.

WORKED: G2HIF, 2UJ, 2XC, 3AVO/A, 3EUP, 3BCY, 3GHI, 4AP, 4HT, 4SA, 5TP, 6KB, 6NB, 6VX.
HEARD: G2BUJ, 3BLP.
(*February* 13 *to March* 12).

G3WW, Wimblington, Cambs.

WORKED: G2AIQ, 2ATK, 2DUS, 2FQP, 2FTS, 2HCG, 2UQ, 2XC, 2XV, 3ABA, 3AKU, 3BCY, 3BK, 3CGQ, 3CXD, 3DIV/A, 3DUP, 3GGJ, 3EHQ, 3EHY, 3EMJ, 3ENS, 3FMI, 3FNW, 4MW, 5DS, 5RW, 5UD, GW2ADZ, 5MQ.
HEARD: G2RI, 3GHS, 4HT, 4NB, 5UF.
(*February* 12 *to March* 13).

G4RO, St. Albans, Herts.

WORKED: G2HCG, 3BA, 3BVA, 3CGQ, 3DVQ, 3GSE, 5YM, 6JK, 8WV.
HEARD: G2DTO, 2MV, 3BLP, 3EYV, 4HT, 5UM, 6LR.
(*March* 11, 0930 *to* 1630).

G5DS, Surbiton, Surrey.

WORKED: G2AIQ, 2HCG, 2IQ, 2XC, 2XS, 3ABA, 3BA, 3FAN, 3WW, 5UD.
HEARD: G2AVR, 2OI, 2UQ, 2XV, 3AKU, 3DJX, 3DUP, 3EHY, 4MW, 6CW, 6LL, 6YU, GW2ADZ.
(*February* 13 *to March* 12).

G3HCK, Hurst Green, Sussex.

WORKED: G2AON, 2DSW, 2FTS, 2MC, 2MV, 3BEX/A, 3BLP, 3DIV/A, 4HT, 6UF, 5RO, 5LK, 6XM, 8IL.
HEARD: G2KF, 2XC, 3GBO, 3GHI, 3GSE, 5MA, 5TP, 6NB, GW5MQ.
(*February* 14 *to March* 11).

G3EHY, Banwell, Somerset.

WORKED: G2DCI, 2OI, 3AHX, 3ATZ, 3BKW, 3DUP, 3GHI, 3WW, 3YH, 4DC, 5MA, 6AG, 6CW, 6JK, 6NB, 6UH, 8ML, 8SB, GW2ADZ, 3HCH.
HEARD: G3ABA, 3BW, 8UF.
(*February* 12 *to March* 12).
WORKED: G2DCI, 3ATZ, 3FMI, 8SB, GW2ADZ.
HEARD: G3BW.
(*Activity Week-End only*).

G8ML, Cheltenham, Glos.

HEARD: G2BUJ, 2XS, 3AHX, 3ATZ, 3BA, 3BLP, 3BW, 3CCP, 3EHY, 4HT, 6NB, 6XM, 8KL, 8SB, GW2ADZ, 5MQ.
(*February* 28 *to March* 4).

G8LY, Lee-on-Solent, Hants.

WORKED: G2VH, 3FAN, 3GAV.
HEARD: G2DSW, 3BEX/A.
(*March* 11, 1450 *to* 1630).

G6CB, Wimbledon, Surrey.

WORKED: G3BVA, 3EYV, 3GBO, 3GHS, 3GSE, 4MR, 5YM, 6QN.
HEARD: G2AHP, 2BZ, 2DTO, 2MV, 2UJ, 2XC, 3BCY, 3BLP, 3DVQ, 3GHI, 3HEA, 4CG, 4HT, 4KD, 4RO, 5DS, 5LC, 5PY, 5UM, 6JP, 6LR, 6XM, 8IP, 8KZ.
(*March* 10 *and* 11).

G2XC, Portsmouth, Hants.

WORKED: G2AHP, 2ANT, 2CPL, 2HCG, 2JU, 2MC, 2MV, 2OI, 2UJ, 2VH, 2XS, 2XV, 2YC, 3AHX, 3ARL, 3BEX, 3BEX/A, 3BK, 3BLP, 3BNC, 3CCP, 3ENY, 3GAV, 3GHI, 3GHS, 3GTH, 3HCK, 3SM, 3VM, 3WW, 4MR, 4MW, 5DS, 5LC, 5LQ, 5NF, 5RO, 5UD, 5UF, 6AG, 6CW, 6KB, 6LK, 6NB, 6UH, 6WU, 8IL, 8IP, 8KZ, 8OS.
HEARD: G2AIQ, 2IQ, 2NM, 2WJ, 3BA, 3BCY, 3BW, 3DUP, 3EYV, 3EMJ, 3HCU, 4HT, 4RK, 5LK, 5UM, 6CB, 6XY, 8KL, GW2ADZ, 5MQ.
(*February* 18 *to March* 14).

at present the beam, a 4-ele. Yagi, is indoors. GM3ENJ has heard GW5MQ at S8. GM3EGW can usually receive G3BW off the *back* of the latter's beam, and is somewhat envious of the Southern DX he hears the latter working.

G3BW (Whitehaven) has rebuilt his 2-metre gear. The transmitter now runs a 3E29 PA with Lecher line tuning. A G2IQ converter looks after the reception side, while a 16-element stack on a 32-foot tower (which, with the steel tube carrying the beam, puts the top of the array at 47 feet) has proved its worth already. Regular schedules are maintained with G3BA (Daventry) at 1900 or 2300 hours. G3BW asks us to mention that if at times he seems brief during QSO's, it is due to his desire to give as many stations as possible a chance to work Cumberland.

G2DCI (Speke) thought conditions poor during Activity Week-End, although G3EHY was heard on phone. Other Southern signals were weak. G2OI (Eccles) found conditions good from February 27 to March 5.

GW5MQ (Mold) has an idea that the range of hills to his south prevent him receiving stations who are, however, hearing him. No DX was logged during the activity periods.

G6CW (Nottingham), another who reported February 28 to March 5 as a very good period, has been on every night from 1800 to 2330, with occasional gaps to look at TV if activity was low. G3BW and GM3OL are all that he has heard from the North. The Activity Period was a complete flop with him, with only the usual local stations on the band. G2XS (Mansfield) has recently shifted all his gear, except the aerial, to a more comfortable operating position in the lounge. A 5-element Yagi is in use, and at the time G2XS wrote it was being used *in* the lounge. G3ABA (Coventry) managed to work G3BW during the good spell, but, due to pressure of business, time available for radio has been limited. It is nice to hear from G3ABA again. G4NB (Coventry) has been experiencing difficulty working North and feels this will make it impossible for him ever to achieve a high counties score. G3HAZ (Birmingham), 144.457 mc, is now working on two metres, but so far contacts have been few. The transmitter runs an 832 PA, which was found to require neutralising for satisfactory results. The beam is a 6-element close-spaced Yagi, which appears to load the PA well and to show signs of radiating a signal. However, it seems that much of the radiation is being re-absorbed in the roof space in which the beam is housed, as distant stations do not appear to be receiving G3HAZ so far. The receiver is a CV66-6AKS-9001-9002 line-up.

Down South

G3WW (Wimblington) sends news of the Cambridge stations. G2FQP (Ramsey) has a G2IQ converter working satisfactorily now; G2HCG has completed a rebuild and is once again on Two; G2UQ (Whittlesey) has a new beam; but G3AEP lost his in a recent gale. G4MW (Cambridge) is building a new transmitter with an 829B final. G3WW found the band open on "Activity Sunday," when he received G2XC, G3EHY and GW2ADZ.

In Norfolk, G3VM (Norwich), in common with the rest of us, found conditions good from February 28 to March 4, but, with little activity during the early evening hours, he did not succeed in working much new DX. He says the Activity Week-End proved what he has believed for a long time—that conditions are rarely so bad that a QSO of 100 miles or more is impossible. He contends that he worked two DX stations, namely, G2XC and GW2ADZ, because on this occasion they were *transmitting* and *not* using 150 watts with 200% modulation to work their local chums. (In case anyone should feel that this implies that G2XC normally does not transmit, or, if he does, uses 150 watts of over-modulated phone, may we plead Not Guilty! In fact, the locals complain that G2XC only works DX and does not reply to anything under 50 miles! And we use an 832 in the final!)

G8DM, chairman of the Club that operates G3CCP, considers we are making two inconsistent demands in asking for more active stations and, at the same time, suggesting that it is not mainly a matter of more activity by those already on the band. He insists that there can be no improvement until established stations come on regularly at stated times. (Your conductor, as a matter of principle, never asks others to do what he is unable to do himself. G2XC finds it impossible to promise regular schedules; he comes on as often as this life's other commitments will permit). G8DM gives some news of stations active in and around Swindon. G4SA (Steventon) is on 144.108 mc at present with a 4-ele. Yagi and an SCR-522 transmitter. G4AP

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH only

Worked	Station
49	G2OI (183)
46	G3BLP (363)
45	G3EHY (213)
43	G2AJ (304), G3COJ (133), G5WP, G6NB
41	G2NH (283), G3ABA (182), G5MA
39	G3WW, G4HT (329), G6XM (208)
38	G2IQ, G3APY, G5BY
36	G2XC, G3CGQ, G3CXD
35	G4LU, G6LK
34	G3VM (143), G4AU (201), G4DC, G5BM, G8SB
33	G2XS (147), G3DMU (115), G5JU
32	G2CPL (200), G3BK, G6CW, G8WV
31	G2CIW (231), G5RP, G8IP (216)
30	G3BOB, G4CI (181), G8IL, G8SM (172)
29	G5DS (169), G5NF
28	G3BW, G6VC
27	G3DAH, G6UH (223), G8QY
26	G2ADR, G2FNW, G3BHS, G3FIJ, G4NB, G8QC (126)
25	G3FAN (123), G6WT
24	G2AIQ, G3FXG, G3AKU, G8KL
23	G2NM, G3AVO/A, G3GSE, G4RO, G5PY, G6CI
22	G3GBO (174), G4RK, G5SK
21	G2FMF
20	G2ANT, G3AEP, G3EYV (134), G8KZ
19	G6CB
18	G3CAZ, G8VR, GM3OL
17	G3ANB, G3HBW, G4MR, GM3BDA
16	G2AOL, G4LX, G5LI (121), G5LQ, G5MR, GW5SA
15	G2AHP (135), G2AVR, G2HDZ, G4RX, GW5MQ.

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

(Swindon) is also up again and looking for contacts. G3CCP, by the way, is in Berkshire, and not Wiltshire, as shown in last month's Activity List.

G3EHY (Banwell) found February 11 the only good day in February, but the opening days of March were much better, though things have deteriorated since. He considers that conditions must obviously be held to blame for much of the quietness on the band during recent weeks. G8ML (Cheltenham), on 145.134 mc, has a 6-element wide-spaced beam 50 feet high; his best DX so far is a report of RST-579 from Bolton.

Activity continues at a high level along the Hampshire and Sussex coasts. G3BEX/A (Hove) is using 90 watts or so on CW and 25 watts on phone; the receiver has two 6J6 RF stages and 6J6 mixer and oscillator. The beam is a 4-element close-spaced rotary. G2VH (Southsea) has made a welcome reappearance on the band after 18 months of inactivity due to ill-health. G2JU (West Wittering) is operating on Saturdays from 1830 to 2000, and is considering the possibilities of putting the South Downs on rollers and then remote controlling them so that the one small gap can be placed in line with the DX! G3FAN (Ryde) has achieved the VHF Century Club, on which he is to be congratulated.

G3ENI (Kew Gardens) hopes to be active very soon using an omnidirectional circularly-polarised array; his frequencies will be 144.025 and 145.296 mc. He would like to hear from anyone else who has tried such an array, and he is also interested in controlled carriers and turnstile aerials. G4HT (Ealing) was one of the lucky ones to catch GW5MQ in Flintshire in the early March opening. G8LN (Plumstead) has been designing a beam, and, after much experimenting, has come to the conclusion that a lot of the published data on matching is erroneous and does not work out in practice. (We must admit that the one and only time that G2XC constructed a beam from data given in a well-known handbook, its gain worked out in practice to be *minus* 8 dB compared with a dipole!)

G3AVO/A (Wallingford) has made a retrogressive change of QTH from the VHF aspect. He is now in a hollow close to the Chilterns, in a house which is not his own, but after some initial feelings of discouragement, is now hard at work scheming how to put up a

decent aerial; he is on 145.422 mc. G3DVQ (Purley) has a G2IQ converter, and the next move is to get an outdoor aerial up. He wants more Activity periods. G3EYV (S.W. London) found conditions none too good during the March 10/11 period, with G2XC as his best DX! However, he quite enjoyed the stir-up of the usual week-end activity and is looking forward to the next.

In the extreme south-east, G5MR (Hythe) is back on two metres with an input of 18 watts. An increase to 70 watts is scheduled before April 7; he is on 145.152 mc. G3HCK (Hurst Green) is on 144.936 mc with an SCR-522 and a 4-element beam 16 feet high. Listeners' reports would be welcomed by G3HCK.

Seventycems

G5BY (Bolt Tail) has been busy rebuilding for the coming season. He has an entirely new 435 mc converter with an ASB8 lighthouse RF stage and ASB8 mixer cavity, but using a 1N23A as mixer and the usual 6J6 141-143 mc oscillator, followed by a 9002 tripler stage. The original 435 mc converter has had an ASB8 RF stage added to it. Both these RF stages are as described in the November *Short Wave Magazine*, but with an additional modification on the cathode-to-grid line, which is given longer travel and now resonates at 435 mc. A 30-element 435 mc beam (consisting of six 5-element Yagis spaced one wavelength apart) has been completed. This seems, on local tests in the garden, to have an unusually low angle of radiation in the vertical plane.

G2QY (Pinner) reports some interesting conditions on March 4 between 2245 and 2305 GMT. At 2245 G2QY, with his beam aiming West, heard G5CD, 8 miles to his East, working G2CIW 21 miles East of G2QY at S7, for about 15 seconds. The signal then went down and was only just detectable. Swinging the beam East brought G5CD up to S6, and G2CIW, who is normally inaudible, was S6-7; contact was made with G2CIW at 2300, but he faded out within 30 seconds. (Conditions were excellent on two metres that night). G2CIW is, unfortunately, going overseas, but will be active on the DX bands with an EK1 call as soon as he gets there. He rather feels that the remoteness of any chance of working G on the VHF bands does not warrant taking his equipment out. But what about ZB1, F, HB and the Continent generally?

G3EHY (Banwell) has been putting out a regular signal on 70 cm, beamed on London, every day since March 1st. He will continue to radiate a signal that way from 1840 to 1850 GMT and 2000 to 2010 on 435.75 mc. G3EHY gets an output of 4 watts from an 832 into a 16-element stacked array. G3HHY (Coventry) hopes to be active at week-ends from the beginning of April with a CV6 driving an Eimac twin 30. A simple corner reflector will be used as aerial, and both CW and phone will be available.

GW5MQ (Mold) has continued to work the usual 70 cm stations in his area; two new ones have been G3AOO and G3AYT, both in Manchester. G2OI (Eccles) has two 446A's working as RF stages, giving an improvement of 13 dB in signal-to-noise level; he receives GW5MQ (42 miles away) at 20 dB over S9. G2OI agrees with the remarks of DL4XS last month regarding the width of the band and the desirability of using only a megacycle of it for DX working. As an alternative, he suggests Northern stations work between 423 and 433 mc, and Southerners between 435 and 436 mc. However, we gather he is willing to try out any scheme. The only other comment received on this topic comes from G5RP, who gives the following bands in order of preference:

(1) 438 to 440 mc
(2) 430 to 432 mc
(3) 432 to 434 mc

He feels it desirable, to avoid mutual interference between stations operating on 2 metres and 70 cm, that the frequencies in exact harmonic relationship should *not* be used. On the other hand, in the interests of economy, many must use the two-metre transmitter as the driver for the 70 cm rig. Therefore, a band just outside harmonic relationship is suggested.

G2CPL (Lowestoft) is preparing for activity, and GM3EGW reports some interest and activity in Fife.

G2OI and G3ELT both have worked over 100 contacts on 70 cm (an excellent piece of work, we would say), and it is hoped to produce the promised list of members of the SCCC next month.

Sayings of the Month

"One fine warm day and everything is OK, but the trouble is we only average one fine warm day per month" (G3EHY . . . "Surely even *you* ought to be convinced that it is high time the Band Plan was amended to line up with

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1950
Starting Figure, 14

Worked	Station
33	G3WW, G5MA
32	G3EHY, G4HT
31	G3ABA
28	G5DS, G6CW
25	G2OI
24	G2AIQ, G2AJ, G3VM, G5RP
23	G8IL
22	G2CPL, G3FAN
21	G2XC, G3AKU, G3BOB, G3COJ
20	G3AEP, G3FD, G3GBO
18	G2CIW, G3EYV, G5PV, G6CW
17	G2ANT, G3GSE, G3HBW
15	G8IP, GW5MQ

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

the distribution of activity" (G6CB) . . . "I really disapprove of Contests, but I always enjoy them so much. Let's have more of them" (G5MR) . . , "After bleating like all the others about QSL's, I found a bunch of about ten or so all ready to go to the Bureau that I had forgotten to post two months ago" (G3AVO/A) . . . "One cannot say these boys have not got receivers, because they work DX, but they just do miss calls" (G8LN) . . . "I shall build a 70 cm Tx, but not bother about the receiver, as my 2-metre converter appears perfectly satisfactory for receiving all the London 70 cm stations!" (G4HT) . . . "All the English Channel is mine for the asking, but cannot find any two-metre boys who are afloat" (G2JU) . . . "The 144 mc beam on a caravan is G3EHB" (G8DM) . . . "One smells in the air the usual seasonal migration to Two by the purely phone DX stations, who are now discussing super multi-element beams which the very first autumn breeze will blow away for the winter duration" (G3VM) . . . "When Two sounds like 40 on a Sunday morning, I will be satisfied" (G6CI) . . . "I *am* going to work G's this year or bust" (DL4CK) . . . "The 'VHF Bands' section of the *Magazine* is not only my favourite, but a monthly shot in the arm. Just what the doctor ordered. Keep 'er going" (DL4XS).

In Conclusion

If you have not booked for the Fiveband Club Dinner on April 14 in London, there may just be time to do so. Reservations should be made with G3BLP and **not** to *Short Wave Magazine* —full details were given in these columns last month. New members of the VHF Century Club are G3FAN and G3VM, while more newcomers have enrolled in the Fiveband Club. VHF CC parchments issued now total 81, and there are 148 members of the FBC, all of whom have had their certificates.

Reports for next month's "VHF Bands" should reach E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1, **by April 11 latest** — it is the calendar again. In order that the Contest results can be published in the May issue of the *Magazine*, these should also reach us by April 11. With you once more on May 4.

"TV SOUND AND VISION WITH THE R.3084"

This is the title of a practical article, in two parts, now appearing in our *Short Wave Listener & Television Review*. The modification of the R.3084 is discussed in detail, with a full circuit diagram and the necessary layout sketches. It is shown that the unit can be converted into a sensitive sound-vision TV receiver with the minimum of complication, particularly as the existing oscillator and frequency-changer stages in the R.3084 can be retained. Ask for copies dated April and May, price 1s. 7d. each post free.

SPRING CALL BOOK

Delivery of the Spring 1951 edition of the *Radio Amateur Call Book* will shortly be due. The cost is 20s. post free, and orders can be placed with Gage & Pollard, 49 Victoria Street, London, S.W.1, sole agents for the United Kingdom. Remittances in any currency can also be accepted at this rate from countries within the sterling area.

HERE & THERE

American Mails

DURING the latter part of February, despatch of all second-class mail from the States was considerably delayed by the impact of strikes over there. This has affected delivery to this country of American periodicals and, in fact, everything not stamped at airmail or full letter rate. By the time this note appears, the arrears should have been caught up and normal delivery resumed.

The Festival Station

It is now understood that the callsign of the Festival of Britain amateur station is to be GB3FB—and with reference to the note on p.21 of our March issue, we are informed that responsibility for the Birmingham appearance (August 4-25) has been undertaken by V. M. Desmond, G5VM, a well-known amateur of many years' standing. He is calling a meeting of all interested Class-B licence holders in that area on May 8 next, 7.30 p.m., at the Sydenham Hotel, Pershore Street, Birmingham. In the meantime, G5VM will be glad to have offers of assistance to his office address at 90 Worcester Street.

Back Again

In 1912, C. C. Redshaw, of Bodmin, Cornwall, was licensed "to carry out wireless experiments" under the callsign XZT. He is just now starting up again as G4VZ. As all Old Timers know, the bug bites so deep that you can never give up altogether, the passage of time notwithstanding.

Radio Components Exhibition

The Radio and Electronic Component Manufacturers' Federation will once again hold their annual show at Grosvenor House, London. This, the eighth of a series of private exhibitions started during the war years, will take place over the period April 10-12. More than 100 firms have taken stands, and the important contribution being made by this branch of our great radio industry to the defence programme will be proven by the display of parts and equipment designed in conformity with Service requirements. Many new items of particular interest in the television, radar and radio communication fields will also be shown for the first time at this Exhibition.

Army Amateur Reserve

Arising from the Editorial comment in March *Short Wave Magazine*, and the notes appearing in this space from time to time, there have been many enquiries as to what the Army is doing, or is likely to do, about forming an Amateur Radio Reserve. Our present information is that the position remains as stated in the March Editorial, and that this is largely due to the reorganisation of the system of Army reserves. The efforts of G3ADZ (Southsea) and many others also interested have therefore been temporarily frustrated, but it is still hoped that "something may be done in the future." What this is likely to be, or when, we have no knowledge.

The Grenada Riots

Early in March, the newspapers were reporting the labour riots in Grenada, British West Indies. When things began to take a serious turn, the local amateurs formed an emergency communications system. Those who played notable parts were VP2GB, VP2GF, VP2GG, VP2GH, VP2GQ and VP2GX, with KV4AAT (G3AAT) of the cruiser *Devonshire* as organiser and in control. Some operators were on duty for 48 hours continuously, and all of them gave the authorities valuable assistance in what must have been very difficult circumstances.

ARRL Handbook — 1951 Edition

The first 25 editions of the American Radio Relay League's *Radio Amateur's Handbook* sold in all nearly two million copies. The present 28th Edition, just published, fully justifies its sub-title of being "The Standard Manual of Amateur Radio Communication." Indeed, it is difficult to see how any amateur can be without his copy of the *Handbook*. The 1951 issue costs 22s. (post 1s. extra) and is available on order from Gage & Pollard, Publishers' Agents, 49 Victoria Street, London, S.W.1.

NEW QTH's

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

G2BHA T. W. Hudson, 27 Park Road, Southend, Essex. (*Tel.: Southend* 49149).

G2BVW R. F. Weston, 1 Church Lane, Rearsby, Leics. (*Tel.: Rearsby* 278).

G2CGR G. Crossley, 75 Bywell Road, Dewsbury, Yorkshire.

G2FMH W. E. Cooper, 82 Thistley Hough, Penkhull, Stoke-on-Trent, Staffs.

G3AWS A. W. Summers (*VS6AW*), 20 Collingham Place, Earls Court, London, S.W.5.

G3CFQ J. Howat, 211 St. Sepulchre Gate, Doncaster, Yorkshire.

GM3DZG J. A. Keating, Bridge Cottage, Drochduil, Dunragit, Wigtownshire.

GM3DZG/A J. A. Keating, Dunragit House, Dunragit, Wigtownshire.

G3FDT Air Service Training Amateur Radio Society, School of Marine Radio, Hamble, Hants.

GI3FEF C. H. Moorhouse (*ex-GI3BWV*), 20 Hillsborough Parade, Belfast.

GM3FQF G. Grieve, 60 Randolph Road, Glasgow, W.1.

G3GJV H. Brooke, 105 Upper Batley Lane, Batley, Yorkshire.

G3GPT B. Barstow, 85 New Lane Pace, Banks, nr. Southport, Lancs.

G3GVK C. A. Penniston, 15 Westfield Lane, Rothley, Leics.

G3GVY M. G. James, Buxton Road, Tideswell, Buxton, Derbyshire.

G3GWY E. W. Hancock, 112 High Street, Epping, Essex.

G3GXH C. Hassall, 44 Beresford Road, Southall Middlesex.

G3GYU J. Wild, 2 Fir Street, Ramsbottom, Manchester.

G3GYW S. E. Stevenson, 239 Westbourne Grove, Westcliffe-on-Sea, Essex.

G3HAP 83 Reserve Centre Amateur Radio Club. (R.A.F.V.R.), Old Church Lane, Stanmore Park, Middlesex. (*Tel.: GRImsdyke* 1700, *Ex.* 75).

G3HAV A. E. Gee (*ex-DL2PL*), 10 Grove Hill Road, Wheatley Hills, Doncaster, Yorkshire.

G3HBH A. W. J. Fussell, 6 Clare Crescent, Baldock, Herts.

G3HBI R. J. Brooker, 77 The Cottages, Rosendale Road, Herne Hill, London, S.E.24.

GW3HDH E. C. Taylor, 8 Conduit Street, Port Talbot, Glam.

G3HEA J. U. Burke, 116 Bedford Court Mansions, London, W.C.1. (*Tel.: LAN* 1552).

G3HEI E. G. Braywood, 55 Hollinwell Avenue, Nottingham.

G3HFP T. Worton (*ex-VS1DG/VS1BJ*), 16 Hall Street, St. Helens, Lancs.

G3HFW E. F. Brooks (*ex-VS1BF*), 29 Falsgrave Road, Scarborough, Yorkshire.

GW3HGL B. Clark, 49a Penrhyn Avenue, Rhos-on-Sea, Colwyn Bay, N. Wales.

G3HGT Cpl. McFadyen, A., Central Radio Workshops, R.A.F. Station Binbrook, Lincs.

GM3HHB W. Brown, 90 Lorne Terrace, Muirhall Road, Larbert, Stirlingshire.

G3HHD T. J. Hayward, 41 Shortheath Road, Erdington, Birmingham, 23.

GW3HHF S. Jones, 13 Kings Mills Road, Wrexham, N. Wales.

G3HHH J. D. Tomlinson, 153 Tulse Hill, London, S.W.2. (*Tel.: Tulse Hill* 1391).

GW3HHO S. Y. Howard, The Croft, Godre'rgraig, Swansea Valley.

G3HHR A. L. Thwaites, 15 Windham Place, Lancaster, Lancs.

G3HHS B. J. Kite, 97a Basingstoke Road, Reading, Berks. (*Tel.: Reading* 82026).

GI3HHT Sgt. B. A. Bassford, 41 New Married Quarters, Cross Hill, Crumlin, Co. Antrim.

G3HHW H. Burns, 8 Harcourt Street, Workington, Cumberland.

G3HHY J. C. Watson, 158 Leamington Road, Coventry, Warks.

G3HHZ W. S. Smith, 12 Kemble, Cirencester, Glos. (*Tel.: Kemble* 269).

G3HIA H. C. Young, 28 Baxter Gardens, Royal Oak, Wythenshawe, Manchester.

G4BP Scarborough Amateur Radio Society, c/o 31 St. John's Avenue, Scarborough, Yorkshire.

G4VZ C. C. Redshaw, M.I.E.E. Assoc.I. Mech.E., Peninnis, Lanivet, Bodmin, Cornwall.

G5HU/A R. S. Holden, c/o 30 Sholebroke View, Leeds, 7., Yorkshire.

G6DB F. C. Rand, 5 Melbourne Grove, East Dulwich, London, S.E.22.

CHANGE OF ADDRESS

G2AWA Maj. A. W. Allan, High Acre, Stonehouse Lane, Combe Down, Bath, Somerset.

G2AWA/A Maj. A. W. Allan, Haydn, Thorney Lane, Iver, Bucks.

G2NX H. C. Woodhead, 77 Norton Road, Letchworth, Herts.

G2ZA L. Davis, Flat 4, 45 Selborne Road, Hove, Sussex.

G3ADZ D. W. J. Haylock, 230 Devonshire Avenue, Southsea, Hants. (*Tel.: Portsmouth* 33288).

G3AGP F. J. Barns, 73 Torrington Way, Morden, Surrey.

G3AHP I. C. Humphreys, Oaklands, Uxbridge Road, Harrow Weald, Middlesex.

G3AKV F. Holding, 54 Higher Darcy Street, Darcy Lever, Bolton, Lancs.

GM3AOD L. G. Petch, 57 Graham Street, Johnstone, Renfrewshire.

G3BJD J. Colebrook, 33 Hollins Close, Mirehouse, Whitehaven, Cumberland.

G3CXJ R. Davies, 17 Lowcay Road, Southsea, Portsmouth, Hants.

GM3EQC D. Hendry, Killiechassie, Aberfeldy, Perthshire.

G3GHO J. B. McCall, 18 Hyde Close, Roade, Northants.

GM3GYD G. Robertson, 4 Baronscourt Drive, Paisley, Renfrewshire.

G3JU S. G. Abbott (*VS9AA*), 139 Melbourne Avenue, Newington, Ramsgate, Kent.

G4CM C. G. Middle, 54 Brampton Road, East Ham, London, E.6.

G4QU F. C. Mason, Flat 2, 20 Grimston Gardens, Folkestone, Kent.

G5AO A. E. Lambourne, 170 Old Shoreham Road, Hove, 4., Sussex.

G6ZP J. G. Ross, Flat 2, Larch Hill, Hanley Terrace, Malvern Wells, Worcs.

G8PP L. A. Parnell, 41 David Drive, Harold Wood, Essex.

CORRECTION

G3HEV/P c/o 63 Lewisham Hill, London, S.E.13.

G6MN E. R. Martin, Castlemount, Worksop, Notts.

Audio Oscillator for the BC-221

SIMPLE MODIFICATIONS TO EXTEND SCOPE

By **R. F. STEVENS (G2BVN)**

WHEN using the BC-221 frequency meter for aligning receivers or measuring frequencies, the writer came to the conclusion that modulation of the RF output of the instrument would greatly increase its utility. Suggestions in this sense have also been made in American papers.

It was not desired to go to the trouble or expense of constructing a separate audio oscillator, and when discussing the question with W's, it emerged that the modifications shown in Fig. 1 would give the required modulation with the minimum of alteration and cost.

Only four additional components are required, *viz.*: one .002 μF and two .01 μF mica fixed condensers, and an SPST toggle switch. The model on which the alterations were carried out is a BC-221(T), as made by Zenith, but they are apparently equally applicable to all other marks of the BC-221. The circuit identification numbers of the various components will, however, show differences from the numbers appearing in the BC-221(T) diagram, though the *values* will be similar.

In order to maintain the accuracy of the meter when measuring frequencies, a modulation on-off switch was incorporated, and this may be fitted in the top left-hand corner of the front panel. If the centre of the required mounting hole is aligned with the existing controls, both vertically and horizontally, the appearance of the instrument will not be impaired. The three additional fixed condensers should be securely mounted and connections made with heavy-gauge wire to avoid vibration, and the various leads may be run along with the existing cabling. Although the VFO screen-grid by-pass condenser, as already fitted, is not now used, it is recommended that this be left in place, as an attempt to remove it might damage the nearby oscillator coil.

[over

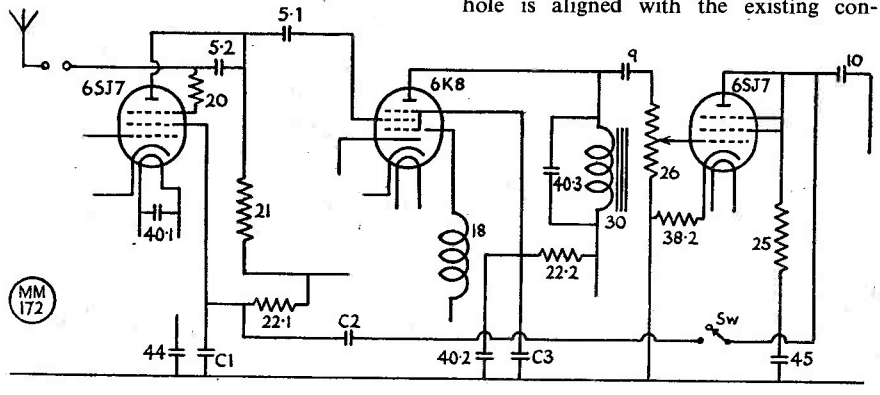


Fig. 1. Modifying the BC-221 as suggested by G2BVN. The numbers refer to components marked on the original BC-221 (T) circuit diagram. To carry out the modification the additional items required are: C1, .002 μF, mica ; C2, C3, .01 μF mica ; SPST toggle switch.

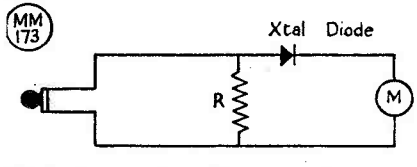


Fig. 2. The plug-in null indicator, discussed in the text. The crystal diode can be a 1N21 or 1N34, the meter 0-1 mA or 0-500 μA, and the value of R is a matter of experiment, 8000 ohms being about right for an 0-1 mA meter.

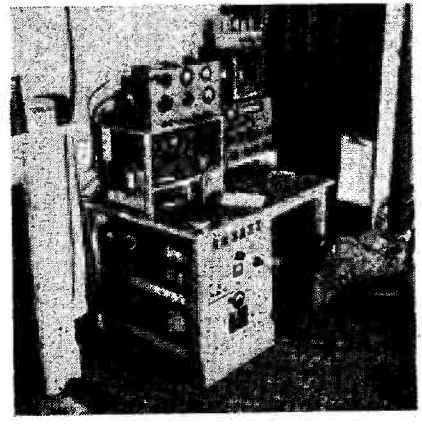
Application

With the values specified, the BC-221 produced a note of about 400 cycles, but this can be varied by alteration in the value of C3. Additionally, the gain control will provide some control of the frequency, and will also control the depth of modulation.

It may be found that the note from the headphones is confusing when using the instrument for alignment, or that the anode of the amplifier valve is so heavily loaded that the output is greatly reduced. To obviate these disadvantages, the headphones may be withdrawn and a dummy plug inserted to complete the filament circuit.

A further useful addition to the BC-221 is a plug-in null indicator, the circuit of which is shown in Fig. 2. With the plug inserted in the headphone socket, the meter will show the null point by a slow beat, and with practice this point can be quickly found. A high frequency beat note will be shown by a steady indication, but the null point will be recognisable by a slow. regular vibration of the meter needle. Experiment with R will show the best value to use with any particular meter, but about 8000 ohms will be found to be suitable for an 0-1 mA meter.

The other man's station GM3AXX



GOING North of the Border this time, we find the station of GM3AXX—A. M. Fraser, 130 West Graham Street, Glasgow, C.4—the photograph herewith illustrating the layout.

A recent rebuild from the conventional rack-and-panel arrangement to the more modern table-top design has paid dividends in terms of accessibility, space-economy and elbow room generally, the result being the neat outfit shown in the picture. The 500/1000-volt power supplies and push-pull 807 modulator unit are built into the operating table, which is covered with linoleum and edged with ¾-in. angle aluminium strip, the units themselves being carried on slide runners for easy access. Auxiliary equipment comprises a 100/1000 kc crystal calibrator and a 10-watt CW/phone standby transmitter; operation on CW is with a slowed bug-key and on phone with a moving-coil microphone. A card index is also maintained for station record purposes.

The receiver is a modified CR-100, and to its left is the Wilcox-Gay VFO and the station control-box; this contains a 300-volt stabilised power pack for the VFO, the Variac, a relay power supply unit, a band-edge checker using a 3.5 mc crystal, and a modulation indicator from a recent *Magazine* design. Above is the transmitter, running 6L6-807-813 with about 140 watts input on 7, 14 and 28 mc.

Three separate aerials are available. switched through a coaxial relay: Half-wave dipoles for Forty and Twenty, and an attic 3-element beam for Ten. Operation is mainly 14 mc CW and 7 mc phone in the summer, and phone on Ten and Twenty in the winter. Time available on the air is restricted to a few hours a week, but DX as at the end of January, 1951, included 76 countries in 28 zones, and 42 American states.

GM3AXX is an interesting example of up-to-date station design, and its planning and layout do the operator great credit.

The Month with the Clubs

FROM REPORTS RECEIVED

This month we summarise reports received from 34 Clubs and, in addition, we should like to acknowledge receipt of many broadsheets and news letters, including the following: Wirral *Newsletter, Brighton Link,* Dorking Radio Society *Bulletin,* South Manchester *Monthly Magazine, CQ CF* (Cardiff), MARS *News Letter, The Radio Link* (West Cornwall), Sutton and Cheam *News Letter,* Cray Valley's *QRM* and the West Kent *QLF.* All these publications reflect the energy and enthusiasm of the hard-working members responsible for their production, and some contain valuable technical material worthy of a wider publicity.

But will Club Secretaries please note than we cannot write up a paragraph of club news simply on receipt of a duplicated News Letter? Many of them refer only to past events, or, if they mention future meetings, they are not far enough ahead for our next issue to serve any useful purpose by mentioning them. If you wish for a club "write-up," please send it in as a write-up, preferably as concise as possible, and we will do the rest. And don't forget that we are always glad of good photographs of club events of any kind.

Deadline for the May issue is **first post on April 11.** Please note this unusually early date and make sure of getting your reports in on time. Send them all to "Club Secretary," *Short Wave Magazine,* 53 Victoria Street, London, S.W.1.

Pye Short Wave Radio Society, Cambridge.—This Club reminds us that it has been in existence since 1933, except for a break during the war. Activity at present is not very high, but they hope to be on the air shortly, with call-signs G8PY and G8PY/P.

Torbay Amateur Radio Society.—Judging of the entries for various contests will be taking place at the March meeting, and the trophies will be presented at the AGM in April. The Club meets on the third Saturday of each month at the YMCA, Castle Road—7.30 p.m. Visitors will always be welcomed. The future programme includes technical films and demonstrations.

Wakefield & District Amateur Radio Society.—A very successful dinner was held last month. Morse classes are now on the air on Mondays, Tuesdays, Wednesdays and Fridays from 2100 to 2130—frequency 1850 kc. More new members are still needed, and all interested are invited to Service House, Providence Street, Wakefield—Wednesdays at 7.30 p.m.

Grafton Radio Society.—The Morse classes held at every Club meeting have brought forth fruit, the latest successful trainees having emerged as G3HMS and G3HGX. On April 13 at 8 p.m. there is to be a lecture on Radio Control of Model Aircraft, followed by a demonstration. This is by courtesy of Ilford Electrical Co. Ltd. and will be given by F. C. Judd (G2BCX) and W. Taylor. Visitors will be welcomed if they notify the Hon. Sec. beforehand —refreshments free of charge.

Cray Valley Radio Transmitting Club.—Meetings continue, on the fourth Tuesday of the month, 7.30 p.m. at Station Hotel, Sidcup. Arrangements for the 1951 programme are now complete, and details are available from the Hon. Sec.—QTH in panel.

Mid-Kent Amateur Radio Society.—This newcomer to our ranks has just been formed, and will be meeting on Friday evenings, 7.30 p.m. at the Union Flag Hotel, 79 Union Street, Maidstone. New members are cordially invited to make themselves known to the Hon. Sec.—see panel for details.

Taunton and West Somerset Radio Society.—At the March meeting, held at the Castle Hotel, Taunton, the speaker was Mr. F. Richardson, who gave a talk on the subject of The Williamson Amplifier.

Ravensbourne Amateur Radio Club.—An exhibition of home-made equipment was recently put on for the benefit of some overseas visitors. The gear included a transmitter, two receivers, an oscilloscope, and QSL's, magazines, photographs and so on. Membership is steadily increasing, and meetings are held Wednesday and Thursday evenings at Childeric Road School, New Cross.

R.E.M.E. Radio Club, Arborfield.—This club now has its own transmitter, call G3HIE, under construction. On the Saturday evening of the last "Corps Weekend" they had an interesting lecture on TV, and on the Sunday were on the air on the Top Band. During future Corps Weekends they hope to hold D—F field days, and a QRP transmitter is being built for the purpose.

CHEETHAM HILL DISTRICT MANCHESTER

It has been decided to form a Club in this district, and all interested readers should get into touch with Mr. B. H. Knowles, 36 Oak Road, Crumpsall, or Mr. J. C. Henderson, 7 Maple Street, Cheetham.

Bedfast Club.—Since the first publication of these notes many offers of help for bedridden amateurs have been received—together with much practical assistance. It is now felt desirable to try to compile a list of people all over the country who are willing to assist with offers of gear, assistance or local transport in such cases. Will all those who would like to be associated with this good work please get in touch with the Hon. Sec. ? At present a rig is being fixed up for G3AOC, in a sanatorium at Haslemere. Similarly, the Bedfast Club invites letters from bedridden amateurs who would like to communicate with others similarly placed.

Worthing & District Amateur Radio Club.—Meetings are held in the Adult Education Centre, Worthing on the second Monday of the month at 7.30 p.m. The

result of the Club's recent 40-metre Contest (Receiving) was that the Silver Cup was won by H. Groom, with a score of 45 points.

Portsmouth and District Radio Society.—The Club's funds are in a healthy state, to which a recent Junk Sale made a useful contribution. Recent lectures have been on Receiver Design, Hints and Kinks, and with a film, Electronics in Industry, and a Quiz programme should keep up the interest. On April 18 the Club will be operating as G3GHQ from a local Exhibition (Carnegie Library, Fratton Road). Membership is still increasing, but more would be welcomed at the weekly meetings.

North Manchester Radio Club.—This newly-formed Club holds fortnightly meetings on Fridays, 7.30 p.m., at The Municipal High School, Dommett Street, off Market Street, Blackley. The first half-hour is given up to a Morse class, the second by introduction of new members and Club business, and from 8.30 p.m. onwards the evening's main event takes place, after which "refreshments and rag-chew" are the order of the proceedings. Lectures and demonstrations are planned for the future, together with a field day. New members will be heartily welcomed.

Yeovil Amateur Radio Club.—Activity has been at a high level during the past few months, with regular Wednesday meetings and many get-togethers on other evenings. A new 60-watt transmitter for G3CMH has just been completed and is on the air. Recently a lecture was given by members of the staff of Standard Telephones on Valves and their Manufacture. The Club has been selected by the Mid-Island Radio Club of Freeport, New York, to receive one of four gift subscriptions to *QST*—in memory of the U.S. Club's first President, the late W2UBW.

Gillingham Telecommunications Society.—This Club's transmitter, G3GTS, is now licensed for full power and 'phone. At the recent AGM it was revealed that finances are in an excellent state, and the officers for the new season were elected. Meetings continue on alternate Tuesdays, 7.30 p.m. at the Medway Technical College, Gardiner Street, Gillingham. Note new Secretary's QTH in panel.

Thames Valley Amateur Radio Transmitters' Society.—At the March meeting, which was well attended, Mr. W. Webber gave a talk on Tape Recording, and played back a full-length recording of the Thames Valley Top Band Net, made the previous Monday. Members are busy preparing for the Hobbies Exhibition to be staged by the Rotary Club of Teddington. Two stations will be in action, and demonstrations of TV and microwaves will be given. At the May meeting there will be a talk on Operating Procedure by by G8IP.

FESTIVAL OF BRITAIN EXHIBITIONS

The Newbury and District Amateur Radio Society, who will be operating G3CJU/A from a local Festival of Britain Exhibition during the period June 12 to June 16, suggest that if any other societies are participating in similar events at the same time, a network of Top Band inter-town QSO's might be arranged. If all Clubs who are taking part in such Exhibitions would notify us of the dates in time for next month's issue, we will publish a list of these events for the information of all interested.

Newbury and District Amateur Radio Society.—An Amateur Radio exhibition in March brought in some new members for this Club. G3CJU/A was in operation throughout, and members of the Reading Radio Society provided several Top Band contacts. The next similar event will be the Festival of Britain Exhibition (*see* separate box). Recent events have included a lecture on Frequency Measurement, with a demonstration on lecher wires for 400 mc calibration.

Luton and District Radio Society.—Meetings are held at the Surrey Street Schools every Monday at 7.30 p.m., and visitors interested in radio or electronics will always be welcome. Recent talks have been on Long Duration Recordings and on G3KG's two-metre converter.

Cambridge & District Amateur Radio Club.—Next meeting will be on April 13 at the Jolly Waterman; it will take the form of a "Dutch Auction" and it is hoped that members will take along plenty of gear. A recent very successful event was the lecture and demonstration on Amateur TV at the Cavendish Laboratory, where the Cambridge Club and the University Wireless Society joined forces. G2DUS and G3CVO, of the B.A.T.C. were the guiding spirits at this highly effective demonstration.

Wandsworth & District Radio Club.—The last meeting was devoted to TVI, but this time the problem was tackled at the TV set itself, with special reference to the forthcoming use of the 80-90 mc band. Next meeting is on April 18, 7.30 p.m. at Waldron Road School, Garrat Lane, S.W.18, at which there will be a lecture on SSB.

Dunfermline Radio Society.—This Club is looking forward to the use of a new permanent headquarters, leading to expansion and the installing of a club station. Meetings will be held on the last Thursday (next meeting April 26) but the Clubroom should be open at least two nights a week in addition. This new venture will need all possible local support; visitors and intending members are earnestly asked to get into touch with the Hon. Sec. (*see* panel).

Birmingham & District Short Wave Society.—A Radio Quiz at a recent meeting was a great success, and Club funds benefited slightly by the forfeits imposed! It has been decided, if possible, to establish a permanent Club station. Next meeting, on April 9, takes the form of an illustrated lecture on Building a Superhet Receiver; a second talk, on Lining-up and Testing, will be given on May 7.

Lincoln Short Wave Club.—The Club will be closing for a period, including Easter, but reopens on April 4 with a talk by G3XM on RCC Amplifiers.

Clifton Amateur Radio Society—The first two contests for the 1951 Championship Cup (3.5 mc Transmitting and Listening Contests) were won by G3EVV and D. Veasey respectively. Main items at recent meetings were a Quiz Night, a talk on Simple Scope Circuits, and a lively debate on CW *versus* Phone. Forthcoming: Novelty Competition—"Build an O-V-O in One Hour!" a D-F Lecture and Demonstration, and a demonstration of Long Playing Records. Membership totals 55 and attendances are good.

Brighton & District Radio Club.—A very full programme has been arranged for the future. Time for informal ragchew evenings is limited by the number of lectures and demonstrations in the offing. Meetings are held every Tuesday evening at the Eagle Inn, Gloucester Road, Brighton. Future events—Mullard Film Strip lectures and an advanced demonstration on Tape Recording.

Surrey Radio Contact Club (Croydon).—On April 10 this Club will be holding its 10th Annual General Meeting, and it is hoped that all members will be present on this occasion. The *venue* will, as usual, be the Blacksmith's Arms, South End, Croydon, and the time 7.30 p.m.

Wirral Amateur Radio Society.—The recent Annual Constructional Contest was won by G3FXT, and the high standard of work was maintained. On May 20 the first of the 1951 D-F Contests will be held, and if other clubs would like to join in they are asked to get in touch with Wirral's Hon. Sec. Forthcoming events: April 11 and May 2, Parts I and II of a talk on The CRO; April 25, Gadget Contest; May 23, illustrated talk on RF Heating. All meetings 7.30 p.m. at the YMCA, Whetstone Lane, Birkenhead.

City of Belfast Y.M.C.A. Radio Club.—They are organising an Amateur Radio Exhibition to be held on April 27-28, in the Y.M.C.A. Minor Hall, Belfast. This is the first venture of the kind tackled by the Club, and it is hoped to give the public some idea of what happens in the average amateur transmitting and SWL receiving station. The Club transmitter, GI6YM, will be in operation for the occasion.

West Kent Radio Society.—The AGM is to be held on April 11, 7.30 p.m. at Culverden House, and it is hoped that there will be a large attendance. Among recent events have been the annual dinner (March 28) and the first of a series of lectures by G8KG on Simple Basic Radio Theory; since the subject is thought to have a wide appeal, details have been circulated to schools and similar institutions in the neighbourhood.

Wanstead & Woodford Radio Society.—Forthcoming meetings are booked for the following events: April 10, "How I got the 1137 Going"; April 17, Practical and Theory; April 24, Electrons in Bottles.

Coventry Amateur Radio Society. — Recent talks have covered Laminated Plastics (with colour and sound film show) and Super-Modulation (with a contact from the lecturer's home, using the system). On March 12 the International Amateur Model Constructors' Society gave a demonstration of radio-controlled models before a large gathering. Future events: April 9, lecture on Mathematics; April 23, Junk Sale. Both at BTH Social Centre, Holyhead Road.

QAU Club, Jersey.—Although activity has not been very great during the winter, informal meetings are still held every Wednesday evening. A local enthusiast who has just completed one year in the RAF hopes soon to be the possessor of a "GC" call. A successful Ladies' Night has also been held recently.

Eccles & District Radio Society—At the recent AGM the principal officers were re-elected, and to celebrate the first anniversary of the Club a social evening was held at the Headquarters on March 9. This went off with a swing, and the Club has now acquired a band of regular enthusiasts who turn up every Monday. In the near future G3GGF is giving a series of talks for those who are hoping to get their licences in the near future.

Stoke - on - Trent Amateur Radio Society.—The weekly Thursday meetings (8 p.m., rear Cottage Inn, Oakhill) have been active both with talks and demonstrations and with operation and maintenance work on the Club Tx and Rx. Members have been pleased by the break from routine, which will be continued.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING THIS MONTH

BELFAST: S. H. Foster, GI3GAL, 31 Belmont Park, Belfast.
BIRMINGHAM: W. V. Shepard, 174 Gristhorpe Road, Selly Oak.
BRIGHTON: R. T. Parsons, 14 Carlyle Avenue, Brighton 7.
CAMBRIDGE: T. A. T. Davies, G2ALL, Meadow Side, Comberton, Cambridge.
CLIFTON: W. A. Martin, G3FVG, 21 Brixton Hill, London, S.W.2.
COVENTEY: K. Lines, G3FOH, 142 Shorncliffe Road, Coventry.
CRAY VALLEY: A. Swindon, 135 Station Road, Sidcup.
DUNFERMLINE: D. Leah, GM3FGH, 14 Hillwood Terrace, Rosyth.
ECCLES: E. Rayson, 11 Hartington Road, Winton, Lancs.
GILLINGHAM: C. E. Pellatt, G2FAQ, 101 Boundary Road, Chatham.
GRAFTON: W. H. C. Jennings, G2AHB, Grafton LCC School, Eburne Road, London, N.7.
LINCOLN: G. C. Newby, G3EBH, 10 Addison Drive, St. Giles, Lincoln.
LUTON: A. S. E. Radford, 37 Wilsden Avenue, Luton.
MID-KENT: R. Crust, G3MC, 26 Earl Street, Maidstone.
NEWBURY: A. W. Grimsdale, G3CJU, 164 London Road, Newbury.
NORTH MANCHESTER: H. B. Shields, G3GB, 10 Deal Street, Newton Heath, Manchester 10.
PORTSMOUTH: M. W. Pearce, G3BSR, 58 Hollam Road, Milton, Portsmouth.
PYE, CAMBRIDGE: J. L. Simpson, Pye Short Wave Radio Society, Pye Ltd., Cambridge.
QAU CLUB, JERSEY: Miss Valerie Hunt, Woodshield, Millbrook, St. Lawrence, Jersey, C.I.
RAVENSBOURNE: J. Wilshaw, 4 Station Road, Bromley, Kent.
R.E.M.E.: J. A. Theobald, G3EQM, Hazebrouck Barracks, Arborfield, near Reading.
STOKE-ON-TRENT: J. R. Brindley, B.Sc., G3DML, 45 Rosendale Avenue, Chesterton, Newcastle, Staffs.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
TAUNTON AND WEST SOMERSET: K. Farrall, 27 Victory Road, Taunton.
THAMES VALLEY: K. A. H. Rogers, G3AIU, 21 Links Road, Epsom.
TORBAY: K. Grimes, G3AVF, 3 Clarendon Park, Tor Vale, Torquay.
WAKEFIELD: W. Farrar, G3ESP, Holmcroft, Durkar, Wakefield.
WANDSWORTH: M. M. Wallace, 13 Auckland Hill, London, S.E.27.
WANSTEAD: M. Roots, Wanstead House, The Green, London, E.11.
WEST KENT: L. King, G4IB, Glenisla, Maidstone Road, Pembury, Kent.
W.F.S.R.A. (Bedfast Club): J. Woodward, G3GYR, 6 Council Houses, Rode Heath, Stoke-on-Trent.
WIRRAL: A. H. Watts, G3FXC, 38 Sandymount Drive, Wallasey.
WORTHING: F. H. Bettelley, 42 Annweir Avenue, Lancing.
YEOVIL: D. L. McLean, 9 Cedar Grove, Yeovil.

PANDA RADIO CO.

FOR YOUR ANTENNAE. H.D. 14s gauge copper wire, **7/9** per 100 ft. 75 ohm Flat twin feeder, **7½d.** per yd. 3in. ribbed glass insulators, 4 for **3/–**.

FOR 144 MGCS. U.S. Field Strength Meters, beautiful instruments, utilising a 1S5 tube, 0-1 m/a meter, Telescopic chrome antenna to 24ins. Range 100 to 155 mcgs. Finished black crackle in neat square box complete with carrying handle. Requires 1.5 and 45v. batteries—self-contained. 7in. x 7in. x 6in. **£3/15/0** carr. paid.

FOR T.V. 6H Indicator Units, absolutely NEW with VCR 97-4 EF50's and 3 EB34's, **79/6** plus 7/6 carr. New Selenium Rectifiers, 650v. at 15m/a, **3/3** each. 75ohm thin co-ax feeder cable, **9d.** per yd. 1355's Receivers. As specified for "Inexpensive T.V." **55/–** carr. etc. 7/6. Condensers, .1 mfd. 5kv. w., **5/6.**

TRANSFORMERS. New 500-0-500, 170 m/a conservative rating, and 4v.-4a. Primary 230v. 50c., **19/6** only. Carriage, etc. 4/6. New 680-0-680 200 m/a, 6.3v. 3a., 5v. 3a., Tapped Primary 100-110-130-200-225-250v. 50c. Tested 3000v., **28/6.** Post 1/6.

CHOKES. Still available see last issue.

FOR INTERFERENCE SUPPRESSION get one of our NEW Mains (230v. 5A. A.C.) suppressors and rest contented ! **5/9** only.

RECEIVERS. AR88 Ds, LFs, 342s, RME69, 1147s (complete units), HRO, also Eddystone 640, complete with Eddystone "S" Meter and instruction manual. As new, **£23/10/0.** Carr. paid.

BC221s. Yes we still have a few to suit the most discriminating. Prices from **£15.**

TYPE 74 UNITS. These are ideal for conversion to Oscilloscopes, and contain 230v. 50c. P.Ps. complete with VCR 139 tube. **£4/19/6** Carr., etc., 7/6.

VIBRATOR UNITS. New Mallory 4-pin 6 volt. Type 650, **3/9** only.

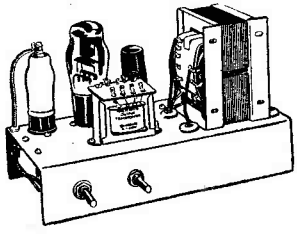
TRANSMITTERS. ET4336. Air Tested complete with valves and Xtal Multiplier, **£37/10/0** carr. paid. V.F.O., **£5** extra. H.P. terms arranged. Please send S.A.E. for our NEW lists. Export orders for small or large quantities promptly despatched to all parts of the world. Please add sufficient postage on all orders under £2.

Grams and Cables : PANDA, ROCHDALE

58 SCHOOL LANE, ROCHDALE

Telephone: ROCHDALE 47861

HI-FI



AMPLIFIER A1

for AC 200-250v only. Kit. incl. valves, for gramophone amplifier giving high quality reproduction. Simple instrctions with many illustrations enable even those without previous experience to construct this amplifier. Kit complete in in every detail down to solder tags and solder. Pre-drilled chassis, group board with all resistors, condensers, etc.

Complete kit with instruction manual ...	**£4-2-6**
Instruction manual only	**3-6**
Tone control kit ...	**5-0**

AMPLIFER TYPE A2 for AC/DC 200-250v.

Employs same fundamental circuit as the A1. Gives first-class reproduction. Kit complete in every detail.

Complete kit with instructions	**£2-19-6**
Instruction manual only	**3-0**
Tone control kit	**5-0**

RADIO TUNING UNIT TYPE RF1.

Complete Medium Wave Radio Tuning Unit for use with A1 or other AC amplifier. A "straight" TRF circuit is employed using two high gain pentodes. Reproduction is excellent. High sensitivity means it may be used in areas of moderate signal strength.

Complete kit with instructions	**£2-5-0**
Instruction manual only	**2-0**

Send for an Instruction Manual today— and see how simple these kits are to build

MAIL ORDER SUPPLY CO.

The Radio Centre

33 TOTTENHAM COURT ROAD, LONDON, W.1

H.P. Radio Services Ltd. offer—

Ex-Army Reception Sets Type R107

9 Valve receiver designed for CW and RT signals. Weight 96 lbs. Length 24" Height 13" Depth 17½" Frequency range 17.5-7 mcs., 7.25-2.9 mcs., 30-1.2 mcs. Highly Sensitive and Selective. A.C. mains 100-250 volts or 12 volt accum. Mains Consumption 31 watts Circuit RF Amplifier. Oscillator. Frequency Changer. Two IF stages (465kcs) Second detector. AVC. AF amplifier. Output Stage and Heterodyne Oscillator (beat). Three Types of valves used—EF39, EBC33, 6X5. 12 volt non sync. vibrator pack fitted. Monitor loud speaker built in. Amazing value

£16 16 0

carr. paid. (Brand New).

We guarantee satisfaction and safe delivery

H.P. RADIO SERVICES LTD.

Britain's Leading Radio Mail Order House

55 County Rd., Walton, Liverpool, 4.

Tel. : Aintree 1445

SMALL ADVERTISEMENTS

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

TRADE

METALWORK. All types cabinets, chassis, racks, etc. to your own specifications. Philpott's Metal Works Ltd., (G4BI), Chapman Street, Loughborough, Leics.

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

WANTED : BC-610 Hallicrafter transmitters, SX-28's, AR-88's, HRO's. Receivers and spare parts for above. Best prices. Write Box 864, c/o Spiers Service, 69 Fleet Street, E.C.4.

WANTED : Junction boxes for Hallicrafter transmitters JB70-A, also Antenna tuning units BC-939-A, and T-50 microphones. P.C.A. Radio, The Arches, Cambridge Grove, W.6. (*Tel. RIV.* 3279).

WANTED : Field Telephones type EE8, " F " and " L." Offers stating quantity and price to Box 865, c/o Spiers Service, 69 Fleet Street, E.C.4.

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

SMALL ADVERTISEMENTS

TRADE—*continued*

CIRCUITS : Command receivers ; BC624 modification FM/AM ; BC1206 ; WS18, 19, 21 ; 2/-. 4 Manorfield Close, Capenhurst, Cheshire.

AR88's **WANTED.** Good prices paid. Also **VALVES** Type 6J6, 6AK5, 6V6, 805, 807, 813, 832 and 833A. Your own price. New Ex-WD only. Box 906.

SUPER SKYRIDER SX28 receiver with 110/230v transformer, £35 ; buyer collects, or packing and carriage extra. Eddystone S.640, £20. BC221M frequency meter, with 230v AC built-in power pack, £15. Windsor 30A oscilloscope, £20. All in perfect order and condition. Cosmic Radio, Ltd., 129 Oxton Road, Birkenhead.

WANTED R.C.A. components for ET.4336 transmitter, modulation transformers, mains transformers, filament transformers, coils, chokes, etc. Box 910.

WALNUT " Viewmaster " cabinets, superb design. Components for " Viewmaster " and " E.E " Televisor in stock. S.A.E. for list. WIMBLE, 24 CULROSS STREET, LONDON, W.1.

QSL cards neat, attractive, at reasonable prices-samples. Lovedee, BRS.15643, Mill Street, Barwell, Leicester.

WANTED — BC-357 Marker Beacon Receiver. Can be without relay, but otherwise in good condition. Box 914.

WANTED AR88D or LF Receiver in absolutely first class unmodified condition. Write details and price to Box No. 916.

WANTED — BC221, 312's, AR88's, SX28, BEST CASH OFFERS — STATE CONDITION — MINT, GOOD OR ROUGH — WE WILL EITHER COLLECT OR ARRANGE PACKING AND TRANSPORT. PANDA RADIO CO., 58 SCHOOL LANE, ROCHDALE. (*Grams : Panda, Rochdale*).

3" Magslips, Mark II. Perfect. £3 pair, post paid. Engineering Facilities, Ltd., 29 Rea Street, Birmingham.

WANTED

BC 221 Frequency Meters

Write stating condition and price to

BOX 912

AGENCIES

LONDON REPRESENTATION offered to Provincial Firm of repute requiring good office address and all facilities, convenient City and West End. All commissions undertaken. Box No. 900.

READERS' ADVERTISEMENTS

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

H.T.9 Wanted. Good price offered for first class model as supplied by makers. Offers to G5HK, Manor Farm, Brimington, Nr. Chesterfield, Derbyshire.

SALE: 150W Phone/CW rack-built transmitter, 12 months old. Fully metered, built-in relays, etc., complete to last detail and in new condition. Cost over £100 new. Accept £60 or offer. Box No. 896.

B.2 Transmitter, complete AC p/p, coils, crystals, manual, £6. New Woden UMI, 27/6. As new; Labgear 150-watt coils for 80 and 40, 10/- each; also (for callers) new Westinghouse 45ft. sectional mast, £4. Two 35ft. wooden poles, £1. G3AAV, 166 Otley Road, Leeds 6. (*Tel.* 51277).

HOLIDAY in Jersey. Country sea view. Bed and Breakfast 2½gns. Suppers arranged. Godwin, GC3FXQ, Corfe Mullen, Les Gellettes, St. Peter's Valley, Jersey.

Q-MAX Model Q 5/10 with speaker and phones, 1950 purchase. Offers to Box 898.

REQUIRED one 1250v. 250-300 mA power pack. Smale, 23 John Street, Porth, Glam., S. Wales.

T.R. 1154/55 with A.M. Type 55/56 AC mains power packs to match. Complete ground station. Excellent condition. 2 new spare PT15's, headsets, etc. 1191A wavemeter. Cost nearly £70. Must sell, owner going abroad. Best offer secures. Ward, 33 Godfrey Road, Newport, Mon.

WEBSTER Wire Recorder. Latest model 180. Crystal Mike, high and low impedance output, switched, monitor speaker, 70-7000 cycle freq. response, recording time indicator, auto stop. Over one hour recording time, speech or music. Three spools wire, manual. Best offer. Box 897.

MARCONI B21 receiver, good condition, fitted bandspread, internal p/p, and all valves, £12. Carriage extra. Box No. 899. (Scotland).

MCR1 Rx, phones, coils, power pack. 3in. speaker, ex. cond. £6/15/0 or near offer? Leonard, 35A Hart Street, Henley-on-Thames, Oxon.

NATIONAL HRO power pack, 5 coils, spare valves, new condition. Sell, or exchange good Hallicrafter, S40A or similar type. Box No. 902.

MCR1, perfect condition, 100 kc-15 mc, complete with power pack AC/DC, phones and speaker, £7/10. or nearest. Box No. 901.

WANTED. Two HRO Receivers, panel mounting, complete with power packs for 230 volts. Also coils A, B, C, D, E, F, G, general coverage. All must be in new condition. GM8RV, 16 Bridge Street, Hawick, Roxburghshire.

25 Watt Tx with VFO and power pack. BC348 with p/p and S-meter. 4 valve converter. 1155 with p/p 1-V-2 battery Rx. Hilland, Headley, Bordon, Hants.

SMALL ADVERTISEMENTS

READERS'—*continued*

358X, 31 mc to 90 kc, with power pack, manual; unscratched. What offers? 27 Highbury Avenue, Salisbury. (*SAL.* 4305).

HRO Receiver (MX) with 115 or 230v. AC Power Pack. Nine coils 50 kc to 30 mc. Manual and calibration cards. Perfect condition throughout, as new. Offers over £25. (Bandspread 7 and 14 mc). Box 904

AVO Electronic Testmeter, brand new, £25. Hallicrafters SX24, new condition, re-valved and aligned, £20. Two Q5'ers less valves, 15/- each. GM3FUU, 15 Bonaly Road, Edinburgh 11.

HAM QRT owing pressure of business selling up. Gear includes AR88LF. £150 takes the lot. Send S.A.E. for details. Box 903.

HK257B's (8001) wanted, up to six. Box. 905.

AR88D, good condition, £30. BC221 Frequency Meter, £12. Details from 7 Warren Wood, Warren Road, Crowborough, Sussex.

HALLICRAFTERS SX28, perfect order, instruction book, £37. A.M. Avometer Type D, £7. Box 915.

FOR Sale — HRO Senior with power pack, 5 coils, 4 bandspread for Hambands, xtal phasing, perfect, good reason for selling. Best offer £20. Box 907.

SALE. 78 Rx and BC453. New, modified. A 40/80 metre superhet. Can be modified for 20/160. Circuit. £4/10/0 pair. GI3BVB, Cosy Lodge, Culmore Road, Londonderry.

VIBRATOR unit 6v-180v, 90 mA, 15/-. Woden H.O.P. O/P transformer, p/p 6V6's to 15 ohms, with negative feed back winding, £1. Q-Max absorbtion wavemeter, 40m coil, 15/-. or offers? Hobbs, 15 Vincent Road, Coulsdon, Surrey.

38 Set, mic., phones, £2/10/0. Collaro AC49 turntable and pickup, £4/10/0. 115 volt Variac, 15/-. Cheeseman, 77 Wood Lane, N.W.9.

AR.88 new, offers. Want Tx 1131, ET.4336, PA Gear. Exchanges considered. S.A.E. Box 909.

BC-221 Frequency meter, with valves, crystal, calibration chart. No case. £8 or offers? Box 908.

W/S 19 Tx/Rx, complete except p/pack and one 6V6 from intercom. Nearest offer £9. Dickey, Guyddfor, Llithfaen, Caerns.

TAPE or wire recorder wanted. Will exchange VRL Rx as new, manual, spare set valves. G3COI, 59 Darlington St., Wolverhampton.

SMALL ADVERTISEMENTS

READERS'—*continued*

BC.348R, internal 230v AC supply, as new, with official handbook, £17. Pye B/cast Rx, 3 wave, 5 valve superhet, 10 inch spkr, built-in aerial. Provision for Extn. spkr, gram pick-up. Excellent condition, £8. Box 911.

WANTED — Circuit diagram of Trophy 8. Loan or purchase. G3EMN, 20 Edencourt Road, Streatham, London, S.W.16.

WANTED. AR88D with S-meter, must be in perfect condition. GW3BJZ, Penrhiw, Aberffrwd Road, Mountain Ash, Glam.

1154, Four band, £3/10/0. 1154 three band Tx, brand new, £4/10/0. 38 Tx/Rx, with valves, in wood case, for battery, £2/10/0. MCR1 complete, £5/10/0. G13GXU, 13 Henry Street, Portadown, N. Ireland.

SCR-522 Tx complete, working SCR-522, less valves, tuning meter incorporated. SCR-522 Rx modified, working; black crackle rack for mounting Rx and Tx. All units new condition. Bargain £9 gns. Carriage paid. Q5'er, new, less 12A6, 12SK7, £2/15/0 c/p. 10 Clare Terrace, Falmouth.

SHORT WAVE MAGAZINE issues, 1947 (9), 1948 (12), 1949 (12), 1950 (7), *QST*, 1947 (10), 1948 (11), 1949 (12). *Wireless World*, 1949 (12), 1950 (12). Offers? Ness, 34B Market Place, N.W.11.

WANTED. American Type AT-2 antenna tuning unit, size 22ins. × 9ins. × 16½ins. possibly collect. Kemp, Woodham Walter, Essex.

B2 Receiver, needs BFO, £1. Power unit 247, 50/- (preferably buyer collects). Transmitting condenser 160 mmF, 10/-. Hardman, 34 Addison Road, Preston, Lancs.

SPARE HRO coil 1.7-3.5 mc bandspread. Will only exchange for 7-14 mc bandspread. Also have 7-14 general coverage. For sale. Denco DCR19, £35. G2AMV, 26 Coombe Road, Irby, Cheshire.

AR88LF and matching speaker — original makers' DB meter — grey crackle and chrome finish in show room condition. Really exceptional. Offers over £50. Box No. 913.

FOR Sale. *Short Wave Magazine*. June, 1946 and December, 1948 complete. Few copies since. Also some *Wireless Worlds*. One RF unit Type 24. Offers to J. O. Lawry, c/o Fulmer Court, Slough, Bucks.

WANTED Bendix type collapsible masts tripod mounted, also DST100 receiver. Quote best price. Captain Casey, American Embassy, Oslo, Norway.

£10 B2 Rx/Tx complete coils, key phones in perfect order — for sale or exchange. Clark, 39 Wimborne Drive, Pinner, Middx.

WANTED H.T.9. Must be first class outfit as supplied by makers. Offers to Beckett, Manor Farm, Brimington, Nr. Chesterfield.

SMALL ADVERTISEMENTS
READERS'—*continued*

ECO/PA 60w phone transmitter, 25 gns. BC342, 250v. AC, 18 gns. Television converter, 10 gns. 5/10 converter, with power pack, 10 gns. Other equipment. Offers? S.A.E. list. G3ATL/A, Hugglescote, Leicestershire.

THREE bargains. Carriage paid. BC1147A, 13-valve communications receiver 1.5 to 30 mc, similar AR88, brand new, full gen book, £20. (S.A.E. fuller details). Bendix 7-valve communication receiver, soiled, no pack or gen, 70/-. Taylor 65B signal generator, as brand new, gen book, £8. G3HHZ, 12 Kemble, Cirencester.

SALE: Eddystone gear; S640, good condition, £18/10/0. Rack complete with 5 unused panels, £5/5/0. Bug key, mint condition, £2/5/0. BC221 xtal and power pack, £10/10/0. Labgear Couplers 3.5, 7 and 14 mc, 12/6 each. Edinburgh district. Box No. 917.

EMIGRATING. Offers 150 watt 10 and 20 metre CW rack-and-panel transmitter. Best components. 6L6-807-P/P HK24G. Four power packs. Shanks, Four Hedges, Hurst Green, Sussex.

SENIOR HRO Receiver, coils and power unit, in perfect working order. £18. Stewart, 31 Moorfield Avenue, Hook, Surrey. (*Elmbridge* 7559).

HRO MX, eight coils, power pack, speaker, £25 or near offer. Room wanted. Nunn, 8 Blinco Grove, Cambridge. (*Tel.* 87024).

WANTED, T1131 rack cabinet. All letters answered. H. Lewis, 65 Leyborne Avenue, West Ealing, London, W.13.

STATION closing down. Efficient CW Tx 120 watts, quality components only. Eddystone 640, new condition. Avo Junior. Q-Max absorbtion meter. Many spares, coils, tubes, condensers, resistors, aerials, etc. What offers the lot? 67 Cecil Park, Pinner. (*Phone: Pinner* 1619).

WANTED: 70 cm receivers ASB7 or ASB8 unmodified, in good condition with valves. Spare valves for above, lighthouse type GL446A/B. Box No. 918.

R.1155, Modified to include Power Pack and output (phone and speaker), 10 gns. carr. paid. Barton, How Renwick, Friargate, Penrith.

Printed by The Courier Printing Co., Ltd., Tunbridge Wells, 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. *April*, 1951.