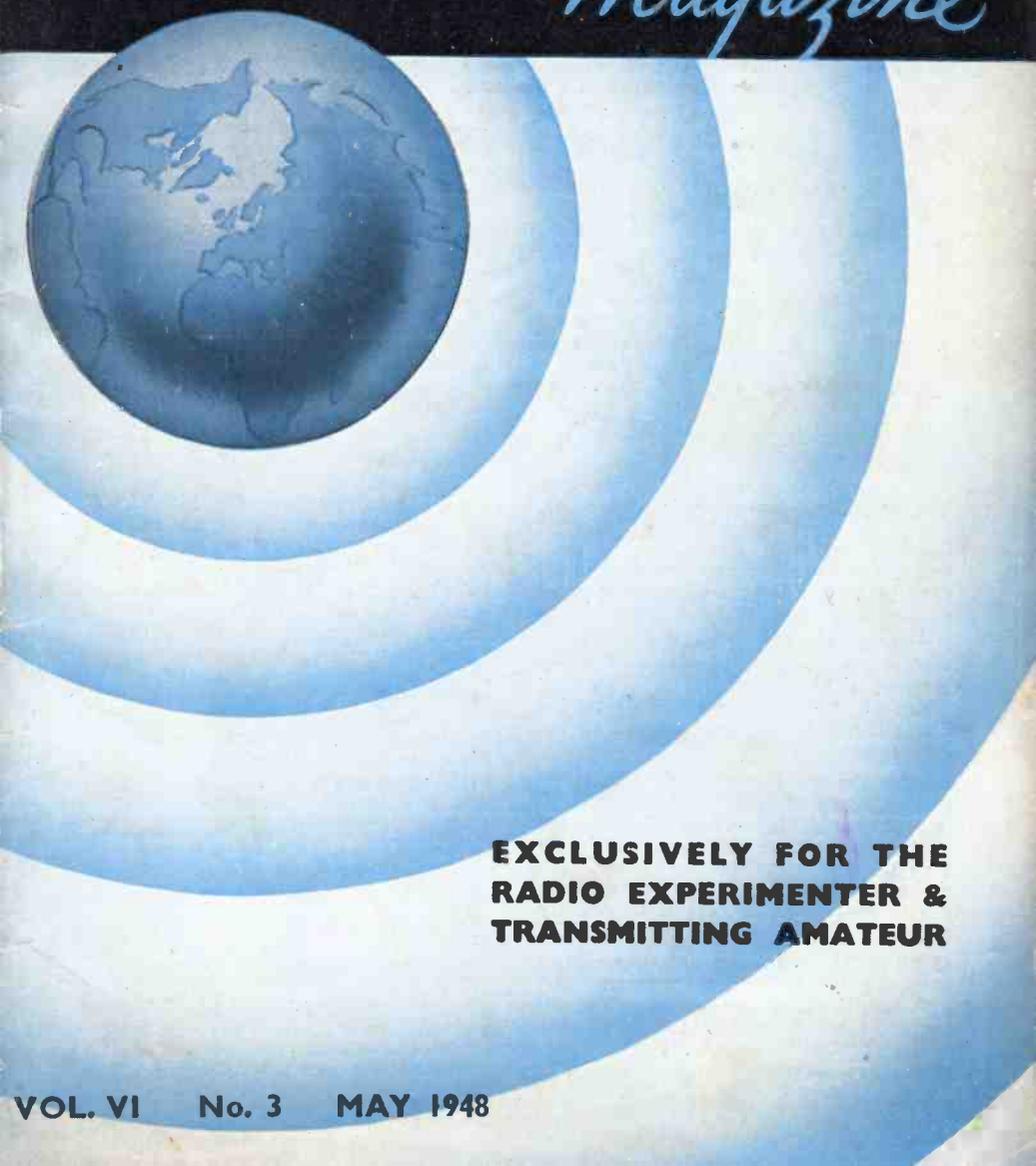


2/-

The
SHORTWAVE
Magazine



**EXCLUSIVELY FOR THE
RADIO EXPERIMENTER &
TRANSMITTING AMATEUR**

VOL. VI No. 3 MAY 1948

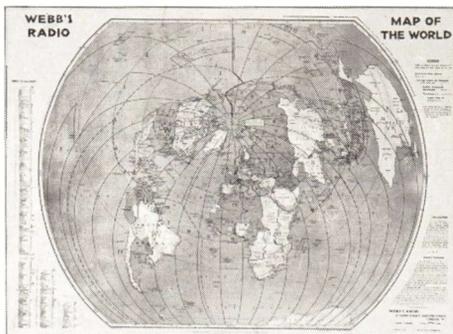
WEBB'S

BULLETIN NO. **1**

BACK in 1936, we printed a queer sort of Map, showing an elliptical North America, and a distorted Australia. This was on an azimuthal projection, giving untrue land areas but **Correct Directivity and Shortest Great Circle Distances Centred on London.** Many thousands of Radio men have proved its use time and time again.

WE ANNOUNCE
A NEW PRINTING

Completely up to date, with revised 1948 amateur call-sign prefixes, coded to country and time zone—combined with improved printing in multi-colours by Britain's premier Cartographers, Messrs. George Phillips & Sons.



The azimuthal projection is, of course, based on the Great Circle or shortest distance projection centred on London, and distances can be approximated in all directions by radial lines from that point to the circumference.

For the study of short-wave propagation such a map is essential. No directional antenna or beam array could be satisfactorily planned without reference to the Great Circle path from England to the objective.

Besides the peculiar projection an enormous amount of data of use to the radio man has been included. **Every International Prefix** has been clearly marked in heavy type with a predominating colour. An alphabetical list of prefixes is tabled at the side of the Map, coded to country and time zone.

Continental boundaries are very clearly marked; this at first sight may not seem essential, but it is frequently necessary to know in which continent a particular island or "Call" is located. For the man,

for instance, working for his W.A.C. certificate, consultation of an ordinary map *re* the continental positions of the Azores (C.T.2) would fail to disclose the information. The Webb's Map immediately positions C.T.2 in Europe. Standard time zones are also clearly indicated. Hour time zones have, with a few exceptions, been adopted by all countries, and their boundaries are indicated by heavy black lines, generally 15 degrees of longitude apart, excepting where local conditions, such as national frontiers, etc., entail some adjustment.

These hour zones are numbered along the equator, while certain half-hour zones such as Newfoundland and Kenya are numbered within their boundaries and special times such as Holland and Bolivia are duly noted. To ascertain the time in any part of the world in relation to Greenwich Mean Time, the zone numbers should be treated as hours. Thus, when it is 12 noon at Greenwich, it is 14 o'clock (or 2 p.m.) in Egypt, and 7 a.m. in New York, the difference in time between the two zones being in each case indicated by the small figures beneath the zone figures.

The map is printed in full colours on heavy white paper, size 40×30 in., and costs, in Great Britain, 4/6. plus 6d. postage.

A limited supply of maps printed on heavy linen with rollers is available at 11/6, plus 9d. postage.

Webb's Radio * 14, 50HO ST., OXFORD ST., LONDON, W.1.

THE
"AVO"
 ELECTRONIC
 TEST METER

4×10^6



This figure represents the ratio of measurement that can be made on the principal ranges of this versatile instrument. These measurements can be made with the simplicity of an ordinary multi-range test meter. In addition, the "Avo" Electronic Testmeter offers you the facilities of a laboratory valve voltmeter for use on frequencies from D.C. up to 200 Mc/s.

D.C. Volts : 2.5mV. to 10,000v.—Maximum input Resistance 111.1 M Ω .

D.C. Current : 0.25 μ A to 1 amp.—150 mV. drop on all ranges.

A.C. Volts : 0.1v. to 2,500v. R.M.S. up to 1.5 Mc/s. With external diode probe 0.1v. to 250v. and up to 200 Mc/s.

A.C. Output Power : 5mW. to 5 watts in 6 different load resistances from 5 to 5,000 ohms.

Decibels : -10db. to +20db. Zero level 50mW.

Capacitance : .0001 μ F to 50 μ F.

Resistance : 0.2 ohms to 10 M Ω .

Insulation : 0.1 M Ω to 1,000 M Ω .

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C 14013	40/60	13	25 feet	4 10
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Rothermel piezo-crystal headphones for extreme sensitivity and high-fidelity reproduction. Originally priced at £4/10/- per pair, we can offer a limited quantity (brand new and NOT Ex-Govt.) at 50/- per pair.

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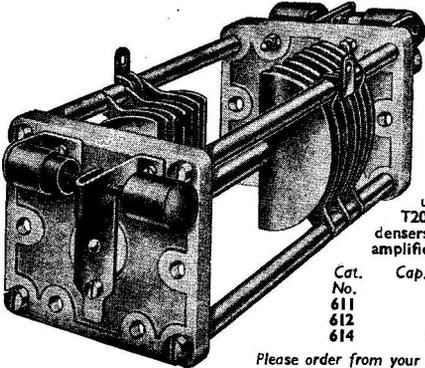
HARROW, MIDDX.

Telephone: HARrow 5778

EDDYSTONE and the AMATEUR

EDDYSTONE TRANSMITTING CONDENSERS

A range of Eddystone transmitting condensers is now available for immediate delivery. A standard type of construction is employed in all three, the ceramic end plates being 2½ in. square. Losses are extremely small.



The metal mounting plates supplied provide alternative methods of fitting—either directly to a metal chassis or on small stand-off insulators.

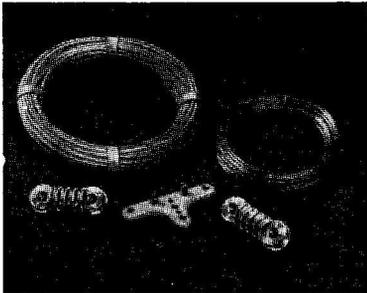
All three are of split stator type, and are therefore suitable for balanced and push-pull circuits. By trapping the stator plates together, additional capacity values are available for use in single ended or aerial tuning circuits.

The Cat. No 611 is particularly suitable for use with modern low capacity triodes such as the T20, 4304, and 35T. The built-in neutralising condensers enable a very compact and efficient push-pull amplifier to be constructed.

Cat. No.	Cap. per Section	Effective Capacity as Split Stator	As Single ended	
611	25 pF	12.5 pF	50 pF	39/6
612	50 pF	25 pF	100 pF	32/6
614	100 pF	50 pF	200 pF	36/-

Please order from your Registered "EDDYSTONE" Retailer, as we do not supply direct.

STRATTON & CO., LTD. WEST HEATH. BIRMINGHAM. 31



THE IDEAL TRANSMITTING AND RECEIVING AERIAL FOR THE AMATEUR

This very practical kit consists of a "T" strain insulator, 80 ft. of cadmium copper wire and 80 ft. of L336 balanced twin feeder with plug and socket to suit (see illustration below) and two glass end insulators. The "T" insulator in the illustration on which sensible terminals and "cable grips" are provided, has been designed to take the feed from the centre of a half-wave di-pole.

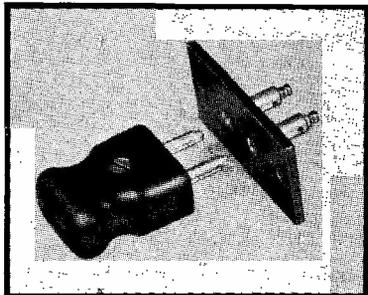
For receiving purposes, the length per half-section is not critical to within a few inches, but for transmission the lengths given are approximate only and must be slightly re-adjusted to the correct length from the formula:—

$$\text{Length of half-section in feet} = \frac{224}{\text{Frequency in Mc/s}}$$

Cadmium copper is supplied as this will not stretch—a most important matter if the aerial is being used for transmission. Suitable for 200 watts RF up to 28 mc/s. The complete kit L609. PRICE 35/9. The "T" strain insulator L333 supplied separately. Price each 3/3, also L336 balanced twin feeder at 7½d. per yard.

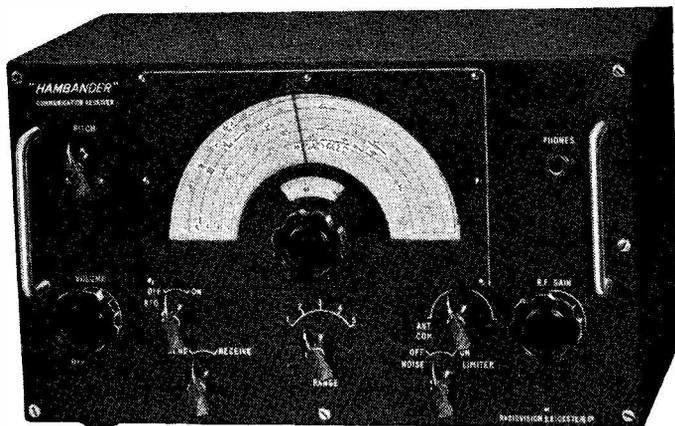
Short Wave Amateur Band		Short Wave Broadcast Band	
Frequency in Mc/s	Length in feet	Frequency in Mc/s	Length in feet
7.0	32.75	6.0	40
14.0	16.5	9.0	27
28.0	8.0	12.0	20
		15.0	16
58.5	4.0	18.0	13
		21.0	11

Length given is per half-section



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 - Metalmitc type CP31N, 0.005 mfd., 350v. wkg. Price 1/8
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 - Picopack type CE30N, 1 mfd., 350v. wkg. Price 2/6
 - Ceramic type OC30A, 2 pF, 350v. wkg. Price 1/3
 - Ceramic type OC30Y, 15pF, 350v. wkg. Price 1/3

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- 0.02 mfd. 750v. wkg. 9d.
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 - 0.02 mfd. 750v. wkg.
 - 0.05 mfd. 250v. wkg.
 - 0.1 mfd. 150v. wkg.
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 - 300pF ± 20%
 - 400pF ± 20%
 - 500pF ± 20%
 - 600pF ± 2%
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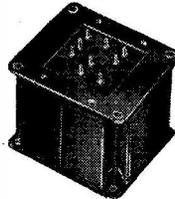
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P.T.M.16.	650-0-650	200 m/a

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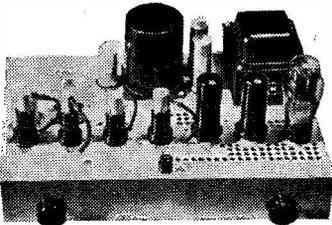
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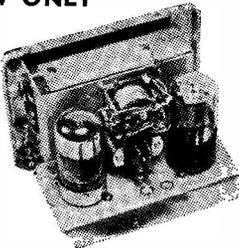
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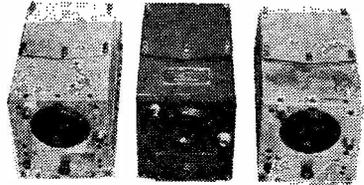
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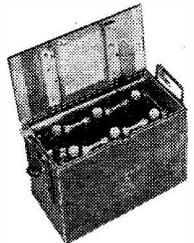
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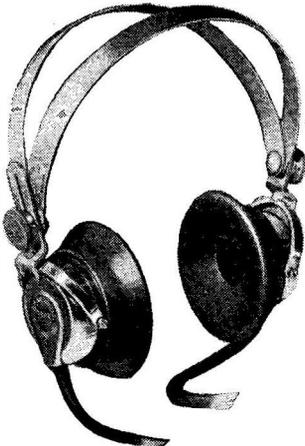
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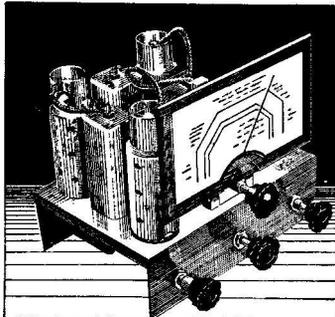
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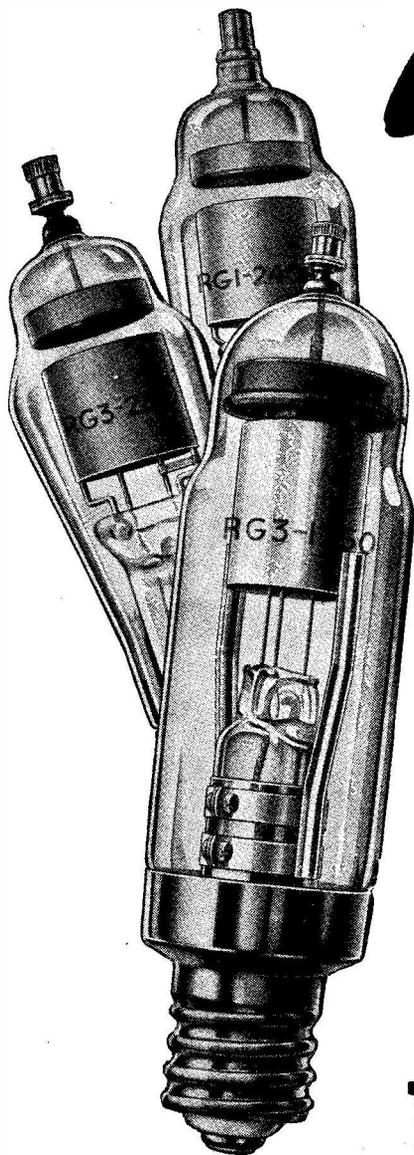
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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

Vol. VI

MAY 1948

No. 58

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

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

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EDITORIAL

Piracy

This is fast becoming one of the most difficult problems in modern Amateur Radio. Though "pirate" or illegal operation has been with us since amateur transmission first became possible—'way back before the 1914-18 war—it is only recently that it has begun to cause serious concern in the ethical sense.

Until 1939, piracy on the part of foreign amateurs was always tolerated by G's; it was, quite rightly, felt to be a matter between the individual and his administration. If he cared to take the risk, it was up to him—and it was even a point of honour not to prejudice his chances of evading detection, either by unwise QSL'ing or careless reference. That was all right for foreign pirates—illegal operation in one's own country was a different matter, and most British amateurs felt (as they do now) that under our liberal administration there can be no excuse for piracy.

But in the present situation we have the DA's operating blatantly in what is virtually British territory; there are OK's and SP's, out of favour on political grounds with the regimes established in their countries, driven under cover; we have a whole mass of doubtful stations in different parts of the world, mainly using spurious call signs.

Then there is the more serious difficulty automatically created by the action of Communist regimes in licensing only individuals considered to be "politically reliable"; since in effect this must often mean that such operators would be regarded as traitors to their own country if a freely-elected Government was in power, another ethical problem arises.

Piracy can only exist by the co-operation of the rest of the Amateur Radio world. In general, it is a bad thing for Amateur Radio—because it arouses the hostility of the authorities directly affected, and so in the end can only make it less easy for law-abiding amateurs to operate without disturbance.

Austin Frost G6FO.

RF Unit Type 27 Modified

Conversion for 50-60 mc Reception

By G. ELLIOTT, B.Sc., A.R.I.C.

THE RAF RF Unit Type 27 is becoming quite well known and has recently been available from many suppliers of ex-Government equipment. It was originally designed for Gee Airborne Equipment in conjunction with an IF amplifier and cathode ray indicating unit. The frequency range is about 65-85 mc, and the coils therefore require alteration in order to receive signals on the 50 mc and 58.5 mc bands. Apart from this, the electrical characteristics of the unit make it very suitable for use as a converter into a communication receiver. The addition of a voltage regulator in the supply to the oscillator is desirable, in order to stabilise signals when receiving on CW. It should be noted that the RF unit Type 26 is designed to cover the range 50-65 mc, but this unit does not seem to be commonly available.

The circuit diagram of the Type 27 is given in Fig. 1, and it can be seen that the tuning condensers are in series with the coils, which gives improved performance on VHF and enables larger tuning inductances to be employed. The modified circuit is shown in Fig. 2, incorporating a VR150/30 voltage stabiliser.

Winding of Coils

The first step is to re-wind the tuning coils. These will be found below the chassis beside the appropriate valve-holders. Between the Pye input socket on the front panel and V1 is the input transformer T, which is designed to match the feeder impedance to the impedance of the input circuit and also to help remove any signals on the intermediate frequency. This transformer can be left as it is, although if it is desired to couple the aerial directly to L1, a single turn loop of wire, wound around the coil from the Pye plug, will be sufficient.

Some difficulty may be experienced in removing the coils for re-winding, due to the connecting wires having originally been twisted on to the terminals before soldering. The procedure used by the author was to snip off the wires as closely as possible to the coil former, using an old

This unit is readily available on the surplus market and can easily be adapted to make a very useful converter for our 58 mc band. This article explains the modifications in detail.—Ed.

pair of pointed scissors (generally employed for cutting paxolin sheet). This enabled the coils to be removed easily and always left just enough wire for re-soldering afterwards.

In the first tests, $6\frac{1}{2}$ turns of wire were wound on the RF and mixer coils and $5\frac{3}{4}$ turns on the oscillator coil, but this seemed to need the full capacity of the trimmers to cover the range required, and the tracking was not good. So $7\frac{1}{4}$ turns of 20 SWG wire were used in the RF and mixer coils with $6\frac{3}{4}$ turns on the oscillator, which gave a higher L/C ratio and tracking was greatly improved. In every unit the correct tracking will have to be found by experiment, but for guidance the approximate positions of the trimmers in the author's modification are as follows—

RF Stage	.. Below chassis : nearly fully in mesh (C6). Above chassis : about $\frac{1}{4}$ in mesh (C3).
Mixer Stage	.. Below chassis, nearly out of mesh (C16). Above chassis : just over $\frac{1}{2}$ in mesh (C14).
Oscillator Stage	Below chassis : about $\frac{1}{2}$ in mesh (C30). Above chassis : about $\frac{3}{4}$ in mesh (C31).

Considerable variation in the positions of the trimmers on the RF and mixer stages seems to be possible, giving better tracking at different parts of the scale. It is best to try to ensure as even a response as possible over the whole range, making sure that maximum gain is obtained at 50 and 58.5 mc. All trimming was done with the front panel air-trimmer (C7) half in mesh. This trimmer permits response to be peaked at different points on the scale and allows for small variations in aerial input capacity.

Referring back to the coil winding, it may be a little difficult in some cases to wind on the last turn of wire, due to the

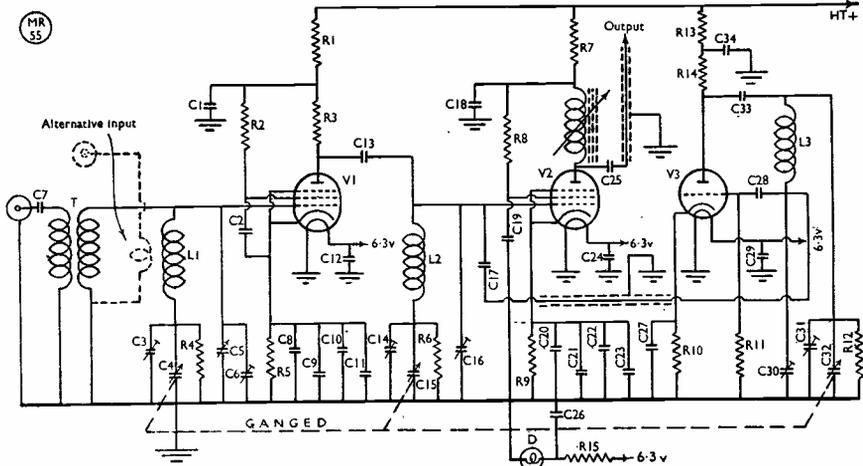


Fig. 1. Circuit of the Type 27 RF Unit. Values are given in the table.

Table of Values

Fig. 1. Circuit of the RF Type 27 Unit

- C1, C2, C8, C9, C10, C11,
- C12, C18, C19, C20, C21,
- C22, C23, C24, C26, C27,
- C29, C34
- C4, C15, C32, 3-gang = all 500 μ F
- C5 = 6.5 μ F
- C3, C14, C30 = 15 μ F
- C6 = 13.5 μ F
- C7 = 25 μ F
- C16, C31 = 7.5 μ F
- C13, C33 = 100 μ F
- C17 = 2 μ F
- C28 = 20 μ F
- C25 = 10 μ F
- R1, R7 = 2,200 ohms
- R2, R3, R11 = 10,000 ohms
- R4 = 120,000 ohms
- R5 = 150 ohms
- R6 = 47,000 ohms
- R8, R12 = 100,000 ohms
- R9 = 1,000 ohms
- R10 = 100 ohms
- R13 = 470 ohms
- R14 = 5,600 ohms
- R15 = 56 ohms
- V1, V2 = VR136 (EF54)
- V3 = VR137 (EC52)
- D = Dial lamp

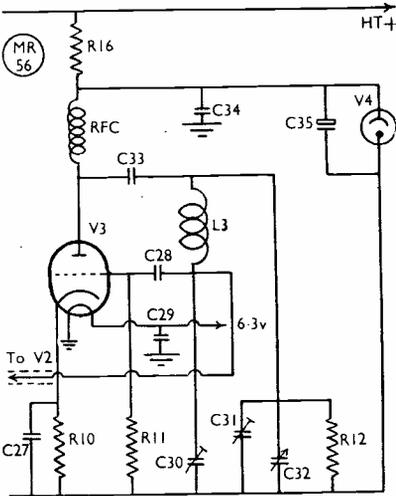


Fig. 2. Modified oscillator circuit.

Table of Values

Fig. 2. Oscillator Circuit Modification

- C35 = 8 μ F electrolytic
- R16 = 10,000 ohms for 350v. supply } 5 watt
- 5,000 ohms for 250v. supply }
- RFC = Eddystone VHF choke No. 1011.
- V4 = VR150/30 (OD3).
- Other values as before.

small size of the former, and it may overlap the previous turn—this is not important, however, provided the wire is wound on quite tightly.

Additional Screening

While the RF and mixer valves are themselves screened, and there is satisfactory screening below the chassis, there appears to be some possibility of interaction above the chassis, in the wiring

associated with the tuning condensers. Some slight instability observed in the author's unit was attributed to this, and accordingly a small screen was placed between the RF and mixer tuning condensers. There was obviously no need to extend this screen between the EF54's. The position of the screen is shown in Fig. 3, which also shows the arrangement of the VR150/30. The actual dimensions are given in Fig. 4.

Another aspect of instability concerns the earth connection to the unit. It was found here that self-oscillation tended to occur at some points on the scale when an earth connection was made to the main communication receiver. (This being an R1155, the connection had, of course, to be *via* a condenser.) When, however, the HT negative line was relied upon to provide the earthing, being at earth potential with regard to RF, no trouble was experienced.

Addition of the Voltage Stabiliser

The Type 27 as it stands gives a very satisfactory performance with regard to signal strength, but fluctuations in the supply voltage to the oscillator (caused by mains variations) result in small changes in frequency. This is very noticeable on CW signals as variations in the beat note, and can be quite annoying when trying to read a weak signal. The fault is completely cured by the voltage stabiliser. Also a little AC ripple was

noticeable on the author's model, and this was eliminated by the addition of an 8 μ F condenser across the stabilised supply.

The resistors R13 and R14 in the anode circuit of the EC52 are removed, and an RF choke (Eddystone 1011) is soldered in position in place of R14 (5,600 ohms). A lead is taken from the earthy end of the choke through the chassis, together with a lead from HT+. These run to the stabilising resistor R16, and the VR150/30, mounted on the back of the unit. The supply voltage here was 350 volts, and the most suitable value for R16 was 10,000 ohms. For a supply voltage of 250 volts R16 could be reduced to 5,000 ohms. In either case R16 is a 5-watt resistor, and is placed well out of the way of the oscillator coil and trimmers, as it becomes quite warm in operation, and would cause frequency drift. The dimensions of the mounting bracket for the VR150/30 are shown in Fig. 5.

Operation

The IF output coil, which is below the chassis in the anode circuit of the mixer, can be tuned between about 6 and 8 mc by means of the iron core. The most convenient frequency for the IF on the R1155 was found to be 7.6 mc, very high gain being obtained with practically no breakthrough from signals on that frequency. The coil is tuned by listening for maximum noise level on the receiver. Once the IF is set, the trimmers can be adjusted. It is best to use some sort of signal generator to mark the 49 and 61 mc limits for the scale, and the oscillator trimmers should be adjusted to give this range. Tracking then involves setting the trimmers on the RF and mixer stages below the chassis, and tuning to maximum noise level with the trimmers above the

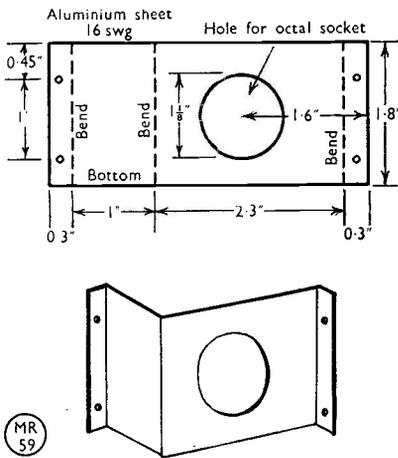


Fig. 4. Dimensions of the screen. Its size and shape are adjusted so that it can be fitted into place without dismantling the unit.

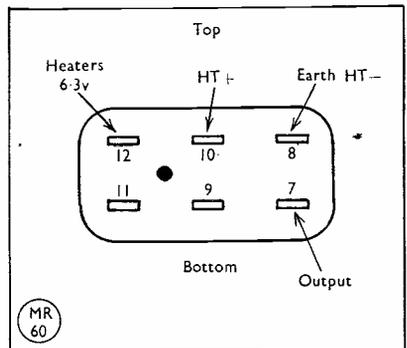


Fig. 6. Socket connections looking at rear of unit.

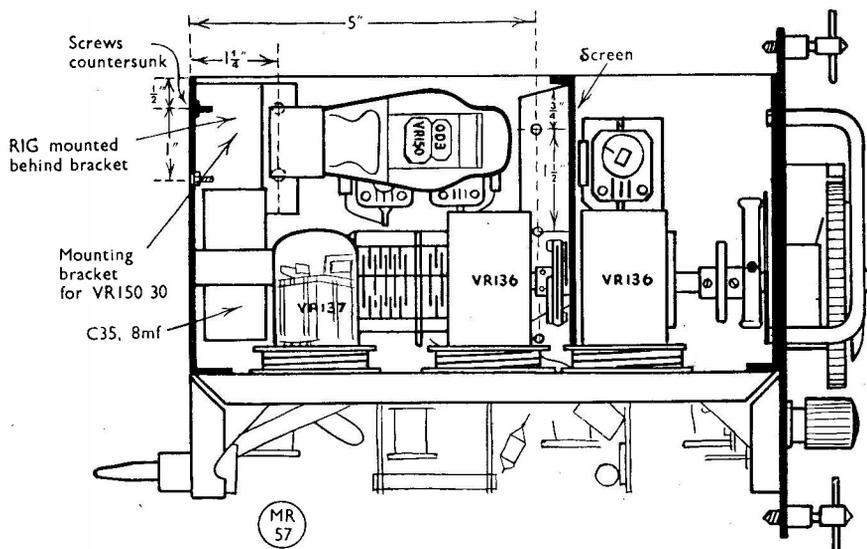


Fig. 3. Side-view sketch of the unit, showing position of the screen and the voltage stabiliser.

chassis, with the tuning condenser set at the HF end of the scale. The tuning is then altered to another part of the dial, and it is observed whether it is necessary to increase or decrease the capacity of the above-chassis trimmers to bring the circuits into tune again. The below-chassis trimmers are then adjusted again and the procedure repeated. Eventually, settings will be found where practically no adjustment of the above-chassis trimmers will be needed over the entire scale.

On the author's receiver, the position of the 58.5 mc band is around 20° and the position of the 50 mc band around 140°. The power plug connections are shown in Fig. 6.

Results obtained with this converter will be greatly influenced by location and aerial system, but it has been used at a poor location, at sea-level, with very simple aerials and has behaved very well. Under favourable conditions, S9 phone signals have been received from many stations up to 130 miles distant on 58.5 mc, and a few W's have been logged at good strength on 50 mc. The author wishes to acknowledge the assistance of Mr. J. Taylor in providing some of the circuit data.

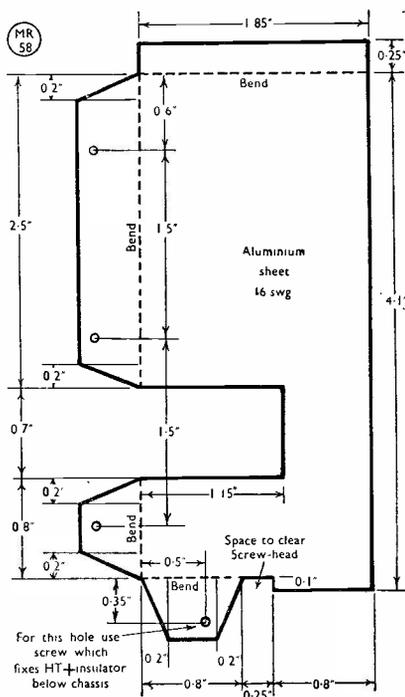


Fig. 5. Dimensions of the mounting bracket for the VR150/30 voltage stabiliser.

Amateur Application of Microwaves

Eddystone Prize-Winning Entry

By R. C. JENNISON (G2AJV)

RADIO amateurs of the present day, unlike the majority of their pre-war colleagues, tend to fall into two groups: those who are primarily interested in experimenting, and those who construct their own equipment as well as those who carry out original investigation. In the second group are those whose interest lies largely in the DX hunting and rag-chewing side of Amateur Radio.

It is to amateurs having a real interest in experiment and construction that the new microwave channels will at first appeal. Although these wavelengths have been very thoroughly explored by the Government research establishments and universities, yet the work done on them has tended to be directed along fixed and narrow paths. There is still much that the amateur can do in the field of original experiment, not only on receiving and transmitting equipment, but on fundamental research such as sunspot activity, solar noise and atmospheric absorption.

Private Line Working

One aspect that will appeal to many amateurs is the possibility of the use of very low wattage transmitters with small narrow-beam aerial systems to enable almost private-line communication to be established between two points. It should, however, be remembered that microwaves are not appreciably diffracted around obstacles in their path. The points between which communication is to be established should therefore, where possible, be chosen with care. Nevertheless, good results can often be obtained when there is no visibly clear path between the two stations; this is largely due to the interference pattern generated by multiple reflections and diffractions. It is extremely improbable that distances much greater than optical will be achieved, but the possibility of DX under freak conditions cannot be entirely ruled out.

The range of frequencies between 500 and 1,500 mc is one in which valves of fairly conventional design but of special construction are required, and the disc-seal types are now the most widely used. ("Microwave Oscillators using Disk-Seal

In November last, Stratton & Co., Ltd., manufacturers of the Eddystone "640" Amateur Band Receiver, invited entries for an Essay Competition with a "640" as first prize. Competitors had three subjects of Amateur Radio interest from which to choose—Micro-waves, Band-Planning or the Relative Merits of British and American Communications Equipment. A very large number of entries came in, but the independent panel of three judges selected the winning article unanimously.

It is reproduced here. We consider it an important and stimulating contribution to the literature of Amateur Radio, and readers will agree that it points the way to the practical use of our new frequencies.

R. C. Jennison, G2AJV, 25 years of age, is reading for an honours degree in physics at Manchester University. He served in the R.A.F. during the war, first as aircrew and was later commissioned in the Technical Branch, Signals. Interested in radio since 1934, his "second-string" activity is oil-painting, for which also he is the winner of a national competition. G2AJV was licensed AA in 1938 and obtained his full call in 1946.—Editor.

Tubes," *Proc. I.R.E.*, May, 1947. See also *Microwave Technique*, published by R.S.G.B.). Those amateurs who are interested in this part of the spectrum may expect to get excellent results over short distances with compact but fairly conventional aerial systems. There is considerable scope for experiment in this "no man's land" of the radio frequencies, for it has been largely neglected due to the difficulty of designing efficient tuned circuits and oscillators.

Centimetre Bands

The centimetre channels do not present such serious difficulties as entirely different and more efficient techniques may be applied. For most amateurs the chief obstacle at present in the application of these channels will be the difficulty in procuring a suitable oscillator or final amplifier for use in the transmitter. A few Government surplus klystrons and cavity magnetrons are available, but most of them do not lend themselves to amateur use. The cavity magnetrons invariably have fixed tuning and do not usually operate satisfactorily under CW conditions. Some of the klystrons can, however, be

pulled into the amateur bands (*Proc. I.R.E.*, December, 1947, pp 435, see Chart of Frequency Coverage of American Klystrons) and these will probably have to serve the amateur until a cheap, demountable klystron can be produced. Travelling wave tubes are excellent for the purpose, but it will probably be some time before they are generally obtainable.

Crystal Control

The transmitter itself may be crystal-controlled and the frequency multiplied up to the final stages by using standard technique and components. The operating frequency may then be obtained by using a klystron multiplier stage. Alternatively, the transmitter may consist of a self-excited oscillator using a klystron or magnetron operating in the required frequency band, and coupled directly to the aerial. If a klystron is used it may easily be simultaneously frequency and amplitude modulated, though pure frequency modulation or pure amplitude modulation require more complex apparatus.

Receiving Equipment

The most satisfactory receiver for use on the centimetre channels is a superhet with a klystron local oscillator and a crystal mixer. The IF strip can be anywhere in the VHF region, and apart from the fact that it should preferably be designed to have a fairly wide pass-band, it may follow normal practice and make use of standard components.

For those amateurs who wish to get on the air quickly and with the minimum of equipment, a unit consisting of a klystron local oscillator, a crystal mixer, and possibly one damped intermediate frequency stage, may be used as a converter to precede an existing 28 or 56 mc receiver, provided that the bandwidth of the latter is not too narrow. Unfortunately, the local oscillator will radiate from the aerial system, but until the bands are widely used, or if a narrow beam is employed, this will be unlikely to cause serious interference to other stations. Nevertheless, the local oscillator frequency should be arranged to fall within the amateur channel. The present 12-cm. channel is 150 mc wide, so this presents no difficulty. The radiation of the local oscillator can be turned to advantage by using it as a self-excited transmitter. It will be capable of generating ample power to cover the ranges possible in the centimetre spectrum. A simple converter on these lines might form the basis of a commercially produced unit which would appeal to those amateurs who prefer the



R. C. Jennison, G2AJV

article pre-fabricated for the purpose.

This system has one disadvantage—and that is in the relationship between its frequency stability and the selectivity of the receiver following the converter unit. This tends to make operating rather more intricate, but should not prove serious provided that the received signal is *not* frequency modulated.

Probably the most promising system is to use a klystron local oscillator with an intermediate frequency of about 30 mc and then to demodulate the signal a second time by using the synchrony principle. ("New Type Radio Receiver for A.M. Signals." *Electronic Engineering*, March, 1947, *et seq.* Also reprint in *Short Wave Magazine*.) This method tends to make the receiver both selective and stable, and has the great advantage that it holds on to unintentionally frequency modulated signals. A block diagram of a receiver of this type is shown in Fig. 1. It is suggested that separate RF units be built up for each microwave amateur channel and plugged into the synchrony section as required. Fig. 2 shows the same apparatus used for telephony transmission. The output from the AF amplifier is applied to the grid or reflector of the klystron and produces combined amplitude and frequency modulation.

Another system is to use the homodyne

principle and to substitute a wideband video amplifier for the synchrodyne unit described above. This method would not, of course, possess the high frequency stability of the synchrodyne.

Detection

The device most often employed for the detection of centimetre waves is the simple combination of crystal and catswhisker; it has an excellent noise factor when compared with other forms of detection, but otherwise has little to commend it. A klystron is inherently a noisy device and cannot give appreciable gain whilst maintaining an acceptable signal-to-noise ratio. Pre-amplification using a klystron as an amplifier therefore affords only a very slight increase in sensitivity, and as it considerably complicates receiver tuning, it is not a worthwhile proposition for amateur equipment.

The travelling-wave tube ("Travelling Wave Valve," *Wireless World*, November, 1946. Also *Proc.I.R.E.*, February, 1947) is far superior to the klystron as an amplifier. As its name implies, it causes the wave to travel at the same axial velocity as the electron stream, which is therefore continually modulated in density during its passage down the axis of a helical wire guide. This method produces an efficient amplifier of good noise factor with the great advantage that it can be made almost entirely aperiodic. It appears from the data already published that the travelling wave tube will be the answer to most of the problems of the amateur who is interested in the centimetre bands.

Aerial Systems

The aerial system presents no real problem. Although the majority of microwave radar devices and communication systems utilise a very narrow beam aerial system,

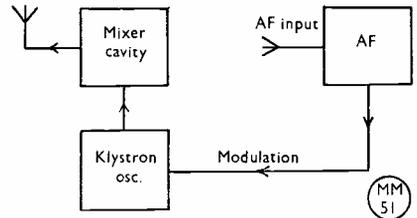


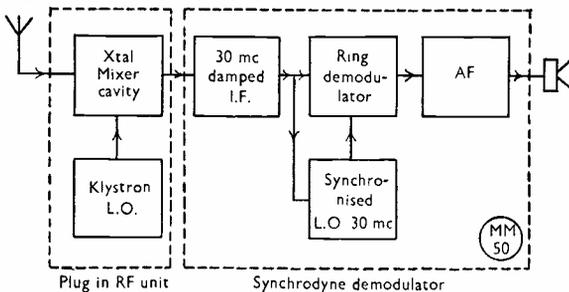
Fig. 2. A system of amateur telephony transmission on UHF.

usually with parabolic reflectors and waveguide feeders, a simple dipole (despite its diminutive size) will still form an efficient radiator where directional propagation is not required. Nevertheless, a remarkable increase in forward gain can be achieved by using a reflector, and as the transmitter power will inevitably be very small, it is probable that most amateurs will use this system. Converted car headlamps can be adapted to form excellent parabolic reflectors for use on wavelengths of the order of three centimetres and below.

Waveguides are very efficient as feeders for piping the RF from the transmitter to the aerial, but they are somewhat clumsy and costly items, and are not easy to construct if the losses are to be small. It will be a great advantage if commercially produced mixer chambers and pre-fabricated lengths of waveguide can be obtained. Good quality co-axial feeder, though it has considerably greater attenuation than waveguides, is quite satisfactory for couplings not exceeding a few feet in length, though waveguide mixers will still usually be required. The actual design of the feeder system and aerial will obviously be dictated entirely by the individual circumstances and requirements of the amateur.

Finally a word to those amateurs who have not previously worked on centimetre equipment. Do not be discouraged by the unorthodox components and the appearance of the equipment. Though it is in many ways vastly different from that used at the more conventional radio frequencies, the principles involved are fundamentally the same, and the methods of application, once they have been understood, are on the whole simpler in their conception.

Fig. 1. Application of Synchrodyne principle to UHF receiver design.



Regeneration In Superhets

Methods of Improving Receiver Performance

By A. D. ODELL (G3ACN)

ALTHOUGH regeneration is not favoured by commercial receiver designers, it is often the most economical and occasionally the best way of improving performance; and most amateurs are interested in any circuit which promises so much for so little. The writer, who is no exception, has expended a considerable

Our contributor shows how the performance of even the simplest superhet can be considerably improved by the careful application of one of the oldest principles in receiver technique—controlled regeneration.—Ed.

amount of time and effort in endeavouring to extract a full quart of performance from various pint-sized circuits, and begs leave to record certain conclusions in the hope that they may be of interest.

Reacting Detectors

One of the most remarkable examples of RF regeneration is shown by the amazing amplification obtainable in the simple reacting detector circuit, where a few watts of power radiated thousands of miles distant can be amplified sufficiently,

Table of Values

Fig. 1. Separate RF Regeneration Stage

- | | |
|----------------------------------|------------------------|
| R1 = 47,000 ohms, ½-watt | C4 = 100 µF, ceramic |
| R2 = 100,000 ohms, potentiometer | C5 = 50 µF, bandset |
| R3 = 100,000 ohms, ½-watt | C6 = 5 µF, bandspread |
| R4 = 33,000 ohms, ½-watt | C7 = 30 µF, trimmer |
| R5 = 1 megohm, ½-watt | C8 = 0.1 µF, paper |
| R6 = 250 ohms, ½-watt | C9 = 0.1 µF, paper |
| R7 = 47,000 ohms, ½-watt | C10 = 0.001 µF, mica |
| R8 = 47,000 ohms, ½-watt | C11 = 50 µF, bandset |
| R9 = 33,000 ohms, ½-watt | C12 = 5 µF, bandspread |
| R10 = 4,700 ohms, ½-watt | C13 = 0.01 µF, mica |
| C1 = 0.25 µF paper | C14 = 0.25 µF, paper |
| C2 = 0.01 µF, mica | V1 = Mullard EF36 |
| C3 = 500 µF, mica | V2 = Brimar 6K8G |

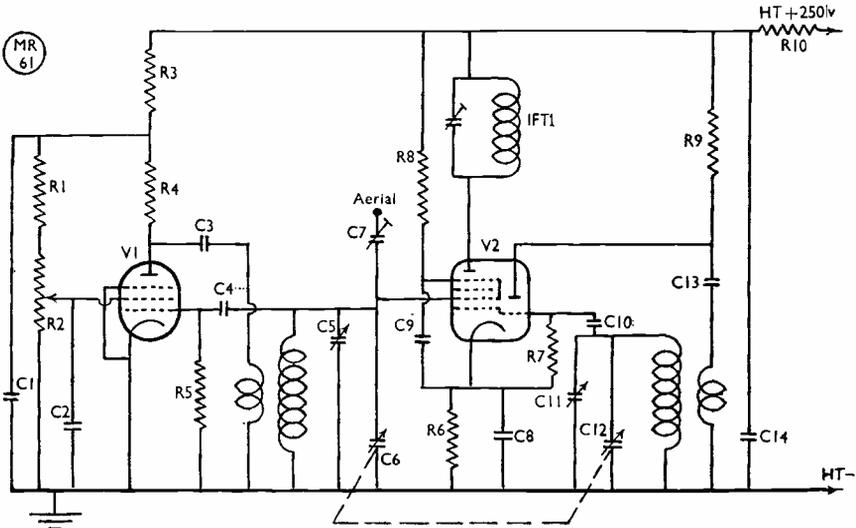


Fig. 1. Separate RF regeneration stage applied to the FC in a conventional superhet circuit. The advantages of this arrangement are discussed in the text.

in a single stage, to operate a pair of headphones. Unfortunately, any attempt to produce the same improvement in superheterodyne performance is doomed to failure, because the benefits obtained depend among other things on the strength of the received signal, the overall amplification, and the type of detector used.

The most favourable conditions occur in the O-V-O receiver where reaction is applied to the first tuned circuit and low-level square law detection is employed. In the case of the superhet, if reaction is introduced at a low-level part of the circuit it may degrade the signal-to-noise ratio. At a high-level point it confers little benefit and is subject to blocking by strong signals. In both cases it raises circuit impedances, necessitating care if instability is to be avoided, and by the time the circuit has been tamed, one is reminded of the familiar roundabouts and swings. However, by careful design it is possible to improve the performance of the simple FC-IF-Det-LF combination until it compares with receivers having an RF and two IF stages.

It is the writer's experience that regeneration is best introduced at the earliest possible point in the circuit, *i.e.* for the combination quoted above, the mixer grid. The usual way of accomplishing this is by inserting a small feedback coil in the anode with variation of mixer gain to provide control, but a little reflection discloses two inherent disadvantages of this method.

In the first place the control grid of most frequency changers is operated Class-A and the characteristically smooth control of the leaky grid detector will be lacking. Secondly, frequency changers are notoriously noisy and to feed back from anode to grid is to feed back noise and signal in equal proportions, resulting in practice in a degraded signal-to-noise ratio.

Separate Regeneration Stage

If, however, regeneration is produced by a *separate* low-noise valve using the leaky grid system of control then neither of these disadvantages should be present, and in theory the limiting value of the signal-to-noise ratio would be that of the low-noise valve. Fig. 1 shows the RF end of the writer's receiver which uses an EF36 to provide regeneration. The improvement in performance is considerable. Overall selectivity and signal-to-noise ratio are noticeably better: the increase in sensitivity is most marked, while image interference is conspicuous by its absence. Tracking problems are of course magnified.

If more than one band is to be covered the coils must be carefully wound, and either a separate RF trimmer or slow-motion band-set condenser is essential. In the circuit shown, the two 5 μ F bandspread condensers are ganged, and with critical regeneration the selectivity is such that the vanes of these condensers needed bending to maintain tracking over the relatively narrow amateur bands. There should be an absolute minimum of "pulling" between RF and oscillator tuning, and in this respect control-grid injection should be avoided, while AVC applied to the mixer may cause detuning or instability due to variation of valve input impedance.

In view of this formidable list of "do's" and "don'ts," it is as well to consider seriously the alternative of adding a conventional tuned RF stage, and the decision will to some extent depend on the space and equipment available and on the type of circuit. In most receivers there is room to add a midget RF pentode and trimmer, though a set of switched coils and ganged tuning condenser might necessitate major structural alterations.

IF Regeneration

Turning now to the IF amplifier, regeneration can conveniently be applied here by deliberately making the amplifier unstable; a small capacity of 1 or 2 μ F between anode and grid is a simple and effective method. Alternatively, if the cost of the receiver must be kept as low as possible, then the arrangement of Fig. 2 can be recommended. In this circuit a 6SJ7 combines the functions of detector and feedback amplifier, with a tapped BFO coil replacing the second IF transformer. The connections are as shown, with the majority of turns in the anode circuit of the detector and the plate of the 6SK7 effectively tapped down the coil and thus looking into a fairly low impedance. This is primarily a precaution against premature oscillation of the IF amplifier when the regeneration control is advanced, but also, in conjunction with the low value of grid leak, to lessen the likelihood of pulling and blocking of the oscillator when receiving CW signals. Rectified output is taken from the detector grid, and undelayed AVC may be obtained from the same point if so desired. The remainder of the circuit comprises a conventional AF stage feeding a cathode follower. This combination provides ample gain and eliminates the output transformer, but a high slope pentode may be substituted at some increase in anode current.

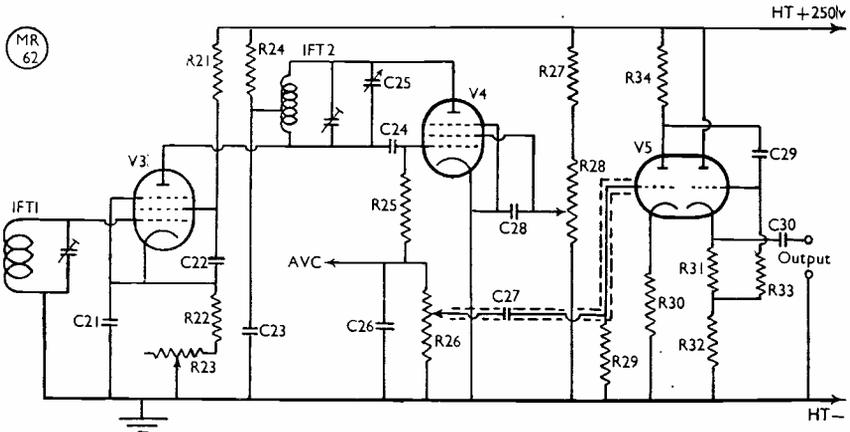


Fig. 2. Regeneration applied to the 2nd detector. Values are given in the table.

AF Regeneration

Regeneration in audio frequency stages has little to recommend it, as it results in a sharply peaked response having a long ringing time. This tends to smooth out rapid changes in amplitude and causes all but the slowest morse characters to run together. A better alternative is the use of a filter producing a rejection slot in the audio range, into which interfering CW signals can be moved by means of the BFO pitch control.

In conclusion, for the amateur who desires a low-cost receiver having above-average performance, the circuits of Figs. 1 and 2 may be successfully combined. Since space is probably the cheapest commodity in an amateur receiver, the various stages should not be crowded together; and more than average care should be taken over mechanical details—backlash and vibration become doubly annoying when selectivity is high.

In the original model no special precautions were taken as regards screening, but too much is better than too little and it is simpler to instal before wiring-up than afterwards. There should be no traces of hand capacity providing a good earth connection is made, and any

Table of Values

Fig. 2. Regeneration on the 2nd Detector

- R21 = 47,000 ohms, 1/2-watt
- R22 = 200 ohms, 1/2-watt
- R23 = 5,000 ohms, potentiometer
- R24 = 4,700 ohms, 1/2-watt
- R25 = 47,000 ohms, 1/2-watt
- R26 = 250,000 ohms, potentiometer
- R27 = 47,000 ohms, 1/2-watt
- R28 = 100,000 ohms, potentiometer
- R29 = 1 megohm, 1/2-watt
- R30 = 2,200 ohms, 1/2-watt
- R31 = 1,000 ohms, 1/2-watt
- R32 = 22,000 ohms, 2-watt
- R33 = 1 megohm, 1/2-watt
- R34 = 100,000 ohms, 1-watt
- C21 = 0.1 μ F, paper
- C22 = 0.1 μ F, paper
- C23 = 0.25 μ F, paper
- C24 = 100 μ F, mica
- C25 = 25 μ F, trimmer
- C26 = 200 μ F, mica
- C27 = 0.01 μ F, mica
- C28 = 0.1 μ F, paper
- C29 = 0.001 μ F, mica
- C30 = 0.25 μ F, paper
- V3 = 6SK7
- V4 = 6SJ7
- V5 = 6SN7GT

modulation hum should submit to the conventional treatment of a 0.1 μ F condenser between each side of the mains transformer primary and earth.

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London, W.C.1." as your QSL address. This will ensure your cards reaching us, and is a full and sufficient address from any part of the world.

All Band Long-Wires

Notes on Design and Radiation Pattern

by J. HUM (G5UM)

WHEN the writer removed from St. Albans to a locality ten miles further out in the country, he was fortunate to obtain a new QTH with half an acre of land attached to it. This, coupled with the statement on the Ordnance Map that the locality was 408 ft. up, suggested that it *might* be rather a good site from the radio point of view!

Another apparently favourite portent was that the subsoil, though commencing with a thin layer of the inevitable Hertfordshire gravel, was primarily clay. The subsoil at an amateur's station has a greater effect on propagation than he might think. If it remains moderately moist throughout the year (as with clay) better propagation may be expected than if it dries out quickly, as happens with more porous soils. It is significant that one of the GPO's most important radio stations—that at Cooling Marshes, near Rochester—is practically "built on water." It is also noteworthy that amateurs who enjoy a seaside location very often get out much better than their inland brethren.

It is all a question of the assistance afforded to radiation by the presence of water—and it is a question which might receive further attention from amateurs of an enquiring turn of mind.

Subsoil, siting and space, then, at the writer's new station seemed to be favourable. The next thing to do was to get busy with a builder's measuring tape and determine exactly what size of aerial and feeders could be accommodated. This would have been a tedious job with the usual 36-in. tape measure filched from the domestic workbasket, and any amateur likely to do much measuring up of aerial lengths would be advised to invest in a 50-ft. reel measure; it will be a tremendous time-saver.

Completion of the measurements showed that a 262-ft. aerial with 60-ft. Zepp feeders could be comfortably accommodated. But two masts would be needed and they would have to be sturdily erected to carry the weight of so much wire. Putting them up in winter-time would be no joke. Consequently, operations were postponed at that point. Clearly, it was going to be

If one has the space, a 1.7 mc half-wave aerial operated harmonically on the other bands is very much a worthwhile proposition. As this article explains, such an aerial can be fed in various ways and if operation is to be mainly on the HF communication bands, it need not be the maximum length if it is "long wire" in relation to the frequency in use.—Ed.

easier to get on the air on 5 metres with a single dipole in the loft than to start up on the lower frequencies at some problematic date in the future with the big aerial.

Five-Metre Interlude

The three copper-tube elements of a 5-metre beam were erected in the roof space and the co-axial feeder was passed through a hole drilled in a corner of the radio room ceiling. The effective height of this aerial was 15 ft. It produced a number of contacts in North London but nothing much else. It was decided to replace it with a dipole built in a rather different way. This was to consist of one continuous length of wire for dipole arms and feeders, with no soldered joints at all.

The wire used for this new dipole was 12 SWG enamelled. A 90-ft. length was to hand. At each end of this length a span 4-ft. long was measured off; these were to be the two arms of the dipole. The remainder of the wire was to comprise the feeder, for which service it was sheathed with sleeving. The two arms were loosely tied together after the remote ends of these wires had been separated and a Pyrex insulator slipped over them and reeved through to the top to keep the two arms of the dipole apart.

Next, the aerial was erected in the loft and the feeder section passed down into the radio room. Less than 20 ft. of feeder were required and the surplus was therefore snipped off.

When the new aerial was coupled to the 5-metre transmitter it gave considerably less loading than the other but considerably better results! The thought could not be suppressed that the old feeder, in spite of its polythene insulation and massive centre conductor, still presented quite a fair amount of pure capacity across the

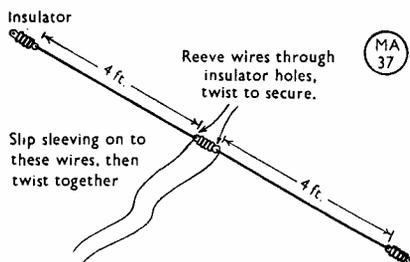


Fig. 1. Constructing a dipole and feeder system (for 5 metres in this case) using one length of wire.

output circuit (yes, it was supposed to be correctly matched !).

Whatever theory may have to say on this point the writer can most certainly recommend an "unbroken dipole" to anyone who wishes to erect something efficient, yet cheap and easy, for the 58 mc band.

Plastic Accessories

Having fulfilled the urge to get back on the air, the writer bent his attention once more to the 262-footer. There seemed no hope of erecting the masts during the winter months and the only thing that could be done was to build the aerial in readiness.

Two preliminaries to this end were : (1) Obtaining a dozen polythene feeder spreaders 6 in. wide, and (2) Making a Perspex window.

The spreaders were drilled each end with holes a little over 18 SWG in size to accommodate the size of wire to be employed for the feeder. They could later be made a tight fit on the wire by warming them gently until the polythene gripped the wire. Alternatively, they could be tightly bound to the wire with thread—preferably, perhaps, because not so permanent and therefore allowing for changes if these should later be required.

The Perspex window sounds a more forbidding requirement and may conjure up visions of those enormous Perspex panes fitted to radar workshops during the war through which to beam centimetre scanners. Nothing so elaborate was required at G5UM—nothing more, in fact, than a single sheet 12 by 9 in. to substitute for the glass in one of those standard 16-pane metal window frames. The top pane was knocked out and all residue of glass and dried putty removed from the surround; then the Perspex frame (already drilled 1/8-in. holes for the feeders)

was fitted in place and secured with threepennyworth of putty, and in three days was as solid as the original glass.

Those afflicted with steel window frames might care to try this method of passing an RF line through a normally immovable substance. It obviates drilling the solid steel or the glass—the latter a most tricky operation even if the glass can be removed intact, a rare feat.

Why 262 ft.?

After completing the feeders the next thing to do was to solder them to the aerial. The aerial itself consisted of two lengths of wire soldered together to make the required 262 ft. Bad practice? So it is said. But surely not, if the joint is beyond all criticism. The joint in this instance was made by baring both ends of the 12-gauge enamel wire, scraping them until they were really bright (a file will do this job better than glasspaper), tinning thoroughly for a length of 12 in. and then plaiting the tinned ends together, applying a thorough finishing coat of solder to ensure perfect electrical contact and to exclude air permanently.

Elementary, no doubt, but very important if joints must be made anywhere in an aerial or its feeder system.

Readers will be asking, no doubt: "Why 262 ft.?" Here are the considerations which governed the selection of that length.

The writer's pet band has always been 1.7 mc. A half-wave aerial for that band should have a length computed from the usual formula :

$$\text{Length} = \frac{492 (N - .05)}{F}$$

where N is the number of half-waves on the wire end and F is the working frequency in megacycles.

For the 1.7 mc band this length resonates best at a frequency of roundly 1785 kc. This is a few per cent. out for the HF edge of the band. On a docile frequency like 1.7 mc that never seems to matter much. But on a much more capricious band like 28 mc such errors decidedly do. So it was with a view to accommodating twelve 10-metre half-waves on the wire that its length of 262 ft. was computed.

By rule-of-thumb methods the newcomer to aerial theory may calculate that if one half-wave on 10 metres is 16 1/2 ft., then 12 should be 16 1/2 x 12 = 198 ft. This fails to take into account that mysterious factor called "end correction," which means that if you keep on adding half-waves to a given length of wire you must

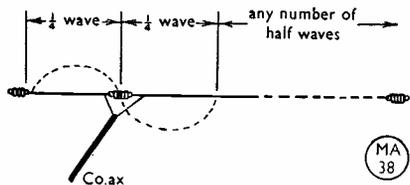


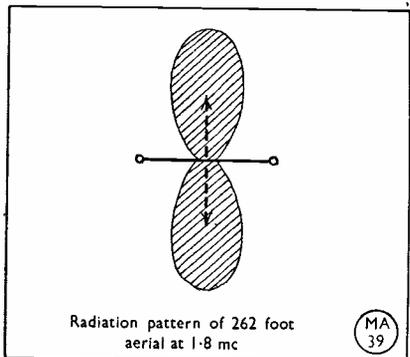
Fig. 2. Current fed long-wire aerial for one band only; this is a simple and effective arrangement for DX working on one of the HF communication bands.

increase your length of wire if you are to get them all in !

As it happens, the figure of 262 ft. is not accurate, though it is far less erroneous than 198 ft. All sorts of other complicating factors occur, such as the presence of nearby electrical obstructions.

So we get one half-wave on the 262 ft. at 160 metres, two half-waves at 80 metres and (near enough) twelve half-waves at 10 metres. That seems a reasonable state of affairs for an all-band long-wire, without much of the usual compromise about it either. Unfortunately, though, it does not fall harmonically true for 14 or 7 mc —though if it can be made to load at all on those bands by juggling the Zepp feeder tuning, it will probably radiate well simply because that seems to be a habit of a long-wire aerial on any band.

But all is not lost. Why not use the whole aerial plus feeder as a single wire end-on? It will have a length of 262 + 60 = 322 ft. At 14 mc nine half-waves require 315 ft. That seems near enough. On 7 mc five half-waves require about 348 ft. of wire, so with a 322-ft. length a parallel capacitance looks like the answer on "forty."



Radiation pattern of 262 foot aerial at 1.8 mc

80-ohm Feed—A Novel Method

Now, there is another way of feeding a long-wire aerial besides "Zepping" it. It can be fed with 80-ohm cable at the first current loop from the station end which, on 28 mc, will be about 8½ ft. long. An insulator is inserted at that point, and the 80-ohm feeder ends straddle it. The rest of the wire can be any length provided it totals an exact number of quarter waves.

As Fig. 2 shows, this amounts to a centred-dipole with a number of other dipoles "in series" with it and excited from it.

The 80-ohm feed, of course, applies to one band only. On all other bands the feeder itself functions as part of the radiator and the whole works as an end-on aerial. For instance, if it were desired to accommodate six half-waves at 28 mc, the total length would work out at :

$$L = \frac{492(6 - 0.5)}{28} = \frac{2927.4}{28} = 104 \text{ ft.}$$

Length of first quarter wave = 8½ ft. This is the feed point for the 80-ohm line.

By making the 80-ohm feeder 30-ft. long we then have a total length of 104 + 30 = 134 ft., which is precisely a half-wave at 80 metres. Most convenient !

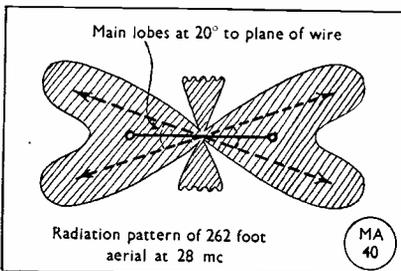
These examples show how a little "fiddling" with aerial and feeder dimensions can produce the correct lengths needed for operating on numerous bands.

Directivity

Finally, a word or two about that highly important factor—directivity.

In any long-wire aerial the main direction of transmission (and of reception) will be at right angles to the line of the wire *only at the resonant half-wave frequency*. See Fig. 3.

At higher frequencies your major lobes will occur at an oblique angle to the wire. As the frequency is increased and more and more half-waves are squeezed on to the



Radiation pattern of 262 foot aerial at 28 mc

Fig. 3. Radiation pattern of half-wave aerial, with the same wire operated on its 16th harmonic.

wire, these major lobes will come round closer to the plane of the aerial. By the time 12 half-waves are accommodated the major lobes are going off at 20 deg. In other words, most radiation goes in the same direction as the wire itself and the power gain will approximate to that given by a 3-element beam. See Fig. 3.

Though the foregoing deals mainly with

that comparatively rare phenomenon, a 262-ft. aerial, the principles still hold for the much more common 134-footer, and even up to a point for the 66-footer. By carefully studying these principles and cutting his wire lengths accordingly, the amateur will be able with little trouble to design himself a long-wire aerial that really works efficiently on bands widely separated in frequency.

More on the B.2

Further Notes on Tuning and Adjustment

By B. RANDELL, B.Sc. (GW3ALE)

THE information given here is intended to be complementary to the article by GW3ZT in the March issue of the *Magazine* and is meant to fill in one or two little gaps. It is feared that even now it may not be possible to give all the information which could be desired. However, the writer has managed to gather quite a mass of data on this remarkable transmitter-receiver, and would only be too pleased to help any individual who is in need of further assistance.

Tuning

At the top left-hand corner of the transmitter panel will be found a switch-knob having three positions marked "T," "S" and "R" respectively. When this switch is in the "T" (Tune) position the aerial terminal is disconnected from the transmitter and receiver, the receiver aerial lead is connected to earth, the key is short-circuited, the receiver HT is disconnected, and the transmitter HT supply voltage is greatly reduced by virtue of being fed through a dropping resistor. The meter selector switch is then turned to Pos. 3, in which condition the meter will read the PA grid current (15 mA at full-scale deflection). The CO controls (that marked "PA Grid" is really the CO anode tuning condenser) are now adjusted to give maximum deflection on the meter, and the meter selector switch is turned to Pos. 6, in which condition the meter will read the PA anode and screen current (120 mA at full-scale deflection). The "Aerial Coupling" control is now set to Pos. 10 and the

These notes will amplify the information given in our March issue, when GW3ZT discussed the Trans-Receiver B.2 equipment in some detail.—Ed.

"Anode Tuning" knob is adjusted so that the meter needle dips to minimum value. The transmitter is now tuned as far as is possible without actually going on the air.

At this juncture it is fitting to mention that if, in spite of all efforts at tuning, it is found impossible to get any grid current into the PA it is advisable to turn the meter switch to Pos. 4, where (so long as the send-receive switch is in the "T" or "S" position) the meter will read oscillator grid current, and hence indicate whether the troubles lie with a faulty crystal.

Aerial Adjustment

When the transmitter has been set up as described the send-receive switch should be turned to the "S" (Send) position. The key is now pressed and the anode tuning control is readjusted to the minimum current position—this readjustment is necessary as the aerial is now connected and will alter the previous setting. The aerial coupling control is turned to Pos. 9, and the anode tuning control is again set for minimum current, which must be noted. If this current is less than 65 mA (325 on the meter) then the aerial coupling condenser is put on Pos. 8 and the anode tuning control is again readjusted. This procedure of moving the aerial coupling control one step and tuning for minimum dip by means of the anode tuning control is repeated until the meter reads 325 on the scale (65 mA); the PA will now be feeding the maximum amount of RF into the aerial.

Provided that a start is always made with the aerial coupling control in Pos. 10, this method will always result in maximum RF to the aerial, as has been proved by means of a 0.0.5 amp thermo-couple RF meter, and is perhaps simpler to carry out than the method suggested by GW3ZT.

The aerial coupling system itself is only a modified form of single-section Collins coupler, and the reader will immediately identify the aerial coupling control as the "load" condenser and the "anode tuning" control as the "resonate" condenser. Incidentally, the writer has had great success with this aerial coupler and using 6 ft. of wire and no earth has had contacts on 7 mc over a distance of 200 miles in daylight with a report of 579. Using 30 ft. of wire and no earth on 3.5 mc he has had a report of 579 over a similar distance. It is worth trying the B.2 transmitter without an earth whatever aerial is used, as under some conditions a gain of 2 S points has been reported when the earth has been disconnected and the aerial matching readjusted!

It must be remembered that the PA current of 65 mA which has been quoted is the sum of anode and screen currents and represents an input of approximately 27 watts. Provided the transmitter has been tuned as described the power delivered to the aerial when working on the crystal fundamental frequency will be 20 watts.

Correction

It will have been noted that in his article GW3ZT mentioned the crystal oscillator as a 6F6. Actually, the valve employed is an EL32 which has characteristics similar to a 6F6 but has a top-cap grid connection.

While he was, of course, perfectly correct in referring to each unit as being housed in a shockproof (and, incidentally, waterproof) steel case, it is worth while remembering that these are only transit cases and the whole unit—transmitter, receiver, power pack and box of spares—was designed to fit into a case approximately 18 in. × 12 in. × 6 in., this being the most suitable guise for the equipment when used by the people for whom it was primarily intended! This portability has of course obvious advantages for use in the field, and in this form the weight of the entire unit is a little under 30 lb. With the modulator suggested by GW3ZT, a larger case would have to be used and the total weight would be increased.

In conclusion, it may be stated that a B.2 is now the writer's only radio equipment as he has moved away from the home QTH and the usual conglomeration of gear is out of the question on the grounds of immobility. It is hoped that GW3ALE will be on the air with it by the time this appears in print.



Robes of Office. W. H. Malcolm, Esq., J.P., active as G6WX, has just been elected Mayor of the City of Coventry. He has been on the air since 1934, and with 112C worked post-war, is in line for the DXCC. This has been done on 14 and 28 mc, with two transmitters and a remote-controlled rotary beam array for both bands. All readers will join us in wishing G6WX a happy and successful term of office, and will congratulate him on achieving the highest civic honour in one of the most important business and industrial areas in the country, with its long historical associations and great war record.

ALL CLEVER STUFF!

Several readers with classical instincts hastened to put us right in the matter of that comment "*What's Xantippe, anyway?*" on p. 103 of the April issue, pointing out that it should have been "*Who's Xantippe,*" to which the answer is "*A quarrelsome woman*" or "*The wife of Socrates.*"

Now, curiously enough, we did know all this (in any case, we are pretty careful to look up what we don't know before committing it to print!) but our allusion was to Frisby Dyke, the Man from Liverpool in *ITMA* ("*Wor's Perspicacity*")—so acknowledgments are due to Socrates and Handley. . . . And we still don't like "*Zantippy*" as the word-name for X in the phonetic alphabet.

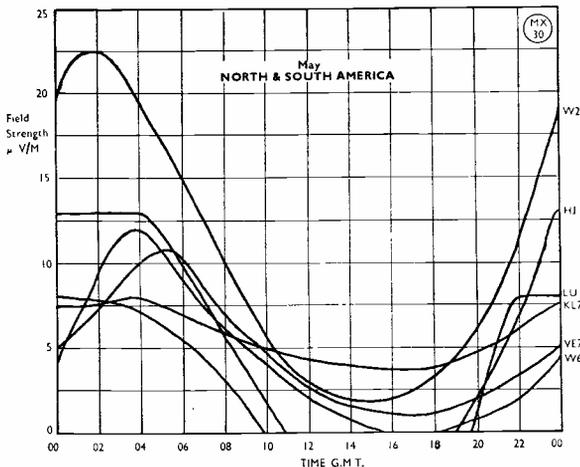
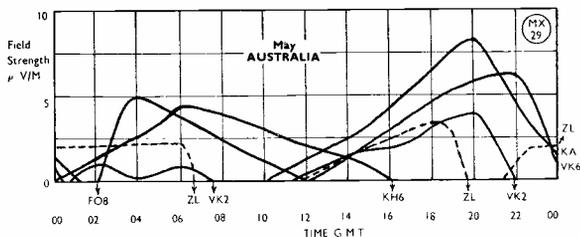
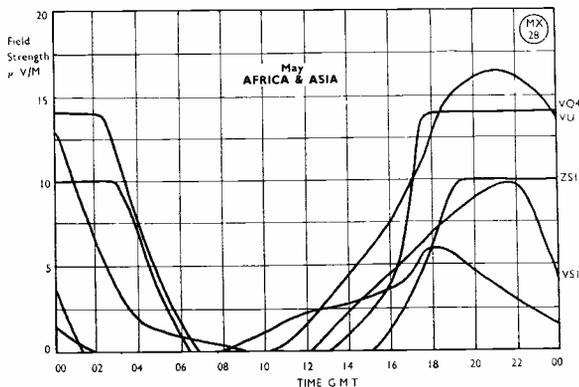
Twenty-Metre DX Forecast

Predictions for May

by I. D. McDERMID,
A.R.T.C. (GM3ANV)

THE only areas now showing their theoretical maximum field strength as indicated by a flat top at the peak of the curves are VQ4, ZS1, HJ and LU. All other areas in America, Africa and Asia now show drastic attenuation as compared to winter conditions. It will be seen that the Great Circle routes passing close to the Polar regions are those which suffer most. Hence, this month should prove useful for providing contacts with areas lying roughly south of this country, such as Africa, Central and South America. VQ4 is unusual in that at 1700 GMT it reaches a greater field strength than VU, and similarly ZS1 at 2000 GMT peaks above VS1. KA shows little alteration since last month; and the maximum field strengths for VK6, VK2 and ZL have only dropped a small amount. However, the morning period of activity for VK2 has receded by two hours and ZL reaches its maximum by 2200 GMT, which is six hours earlier than last month.

The general summer decline by the end of this month will have very nearly put an end to consistent long-distance contacts by virtue of the interference to be expected from European stations—with the exception of the early morning, when this interference will be at its lowest ebb.



DX COMMENTARY

ON CALLS HEARD, WORKED & QSL'd

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

The DX reporter's task seems to become more difficult each month! Whether conditions are good or bad, some of the people work all the DX, and all the people work some of the DX; so two questions seem to remain unsolved. They are (a) what *is* DX? and (b) Have conditions been good or bad?

At all events, April has been the good month that we quite safely predicted. Apart from short spells of quiet conditions the DX has been there most of the time on all bands, and the BERU Contest, as usual, brought out many operators who seem to hibernate between seasons. Normally, one looks on the bands as being inhabited by DX and QRM; but during the BERU week-ends the DX *is* the QRM!

Most of the keen types have been climbing up (or, in some cases, rushing up) the ladder this month. The 1948 list is headed by G8KP (Wakefield) with 38Z and 111C—but he is only at the top by virtue of his post-war score, as SVIRX (Athens) also has 38Z and 111C to his credit! These two have certainly pushed the boat out since last month. Next in order we have G2AJ and G2EC, followed by your panting commentator, who has only managed to add ten countries (and no Zones at all) to last month's score. . . . But that's what comes of having to write about the DX instead of working it!

Next month, for a change (and at the request of many correspondents) we are reverting to the post-war scores for deciding the Order of Merit, with the 1948 scores in the third and fourth columns. In this connection it is worthy of note that three of our DX men have reached the score of 40 Zones (post-war) since last month. They are G3DO (Sutton Coldfield), G4CP (Dudley) and G3AAE (Bournemouth). The welcome appearance of C8YR in Zone 23 has naturally had something to do with this! And G3DO, remarking that he has been chasing Zone 23 since 1938, worked both C8YR and C8LS at the end of March; the latter apparently is perfectly genuine and a new one in the "Lost Horizon" region.

Hot-under-Collar Department

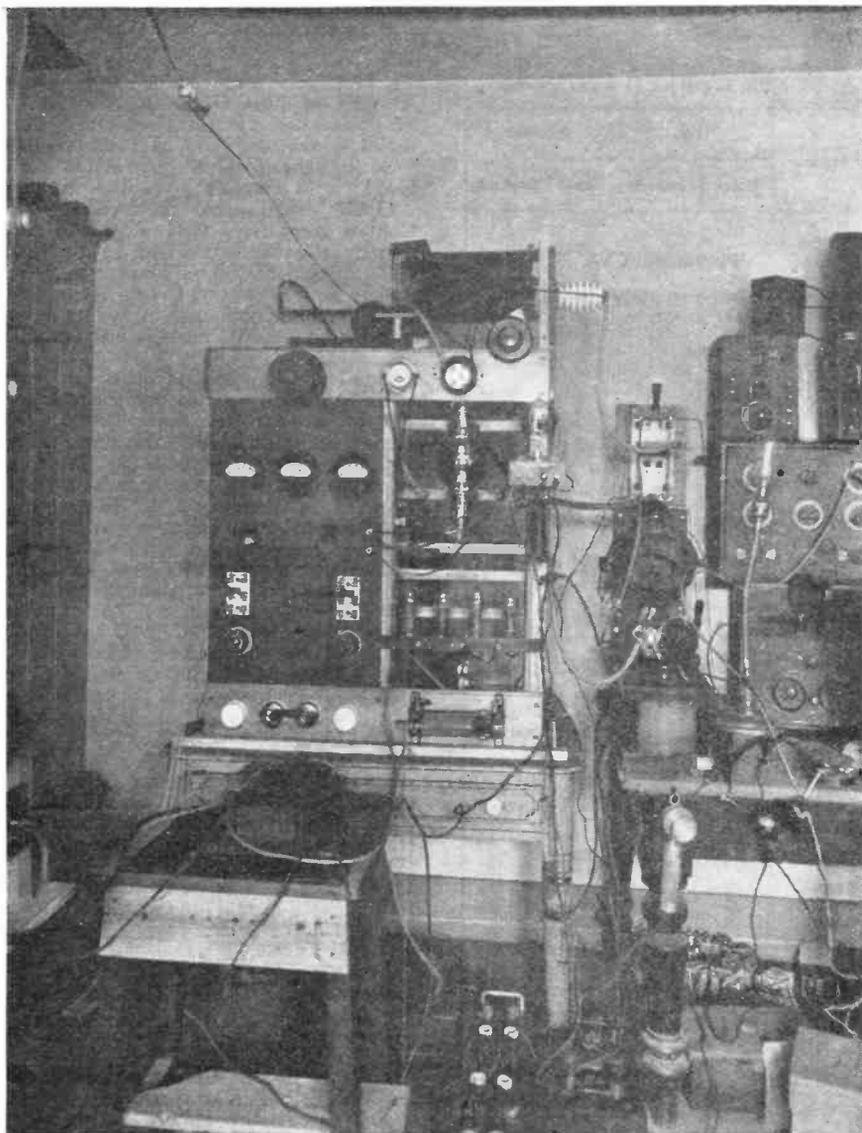
The life of a commentator is certainly not all beer and working DX. We, who write scathing denunciations of spivs and the like, are expected to set a high standard (not unnaturally) and when we apparently fall down on it, we are rebuked in no mean terms. A little episode during the month reminded us that in the great DX scramble some things can happen which may result in an operator being unfairly condemned, or at least misjudged. This seems to be what occurred in our case: A DX station was in QSO with a G, but apparently lost him during the contact and called CQ again. We answered the DX—all innocently, like—and made contact. No trouble at all, and no fuss or bother—until a card arrived from the G concerned, more in sorrow than in anger, telling us that we had pinched his DX station from him in the middle of a QSO! Now had it been anyone else, he would probably have got away with it—but *not* your harassed commentator. How fortunate that he really had a clear conscience (on this occasion, anyway)!

In the course of the correspondence, the G concerned put forward as his opinion that operating is *better* now than before the war, and quotes the number of high-speed QSO's that go on. Yes—the speed is all right, and even the procedure but, we repeat, not the *notes*! We quite agree that you seldom hear a bad one on 7 mc, but on 14 and 28 the rough old T6 and T7 things that float across our dial are not imagination. And on 7 mc, of course, *anyone* should be able to get T9 out of a VFO. (Or on 14, for that matter—but we do admit that 28 becomes a little more difficult.)

So, we say again—there *are* far too many bad notes around. And even if the owners send nice and fast, the notes are *still* lousy.

The Month's DX

No particular high-spots except for those C8's—but the general level of



G2DX, of Camberley, as set up for the first two-way G/VK contact, November 26, 1924, on 86 metres. The Australian was 3BQ of Box Hill, Victoria. This is a photograph of outstanding interest in the history of Amateur Radio

activity has been tremendous. One small point worth mentioning is that the 14 mc band seems to improve as the morning goes on. We cannot remember this particular condition before, but it has been unmistakable this month. Sometimes at 0700-0800 GMT it has been full

of short-skip Europeans, with nothing much in the way of DX, and yet at 1000, or even, in extreme cases, 1100 GMT, the signals from W6, KH6, KL7 and VE7 have been terrific.

Other strange phenomena on 14 mc have been the simultaneous arrival of

ZONES WORKED LISTING

Station	1948		Post-war	
	Zones	Countries	Zones	Countries
'Phone and CW				
G8KP	38	111	40	170
SV1RX	38	111	39	145
G2AJ	37	98	40	160
G2EC	36	101	—	—
G6QB	36	90	40	156
G3DO	35	94	40	153
G3BI	35	68	38	107
G3AAE	33	73	40	117
G3TK	32	71	39	123
G4CP	31	82	40	133
G8IP	31	71	39	113
G3DAH	31	64	31	72
G2WW	29	87	39	157
G2HPF	29	48	31	90
G8PL	28	72	28	86
G2BXP	26	57	36	93
G2AVP	26	47	38	104
G5MR	26	33	39	106
G6XX	25	47	35	96
G5FA	24	69	24	74
G8KU	24	60	35	102
G2AO	24	36	36	103
G3BDQ	23	54	36	94
G4AR	22	59	38	122
GM3CSM	22	45	24	53
G6PJ	22	40	39	76
G2BBI	17	44	17	45
G3ACC	15	32	30	86
G5HH	14	41	30	83
G3DCC	14	32	14	23
'Phone only				
G3DO	31	79	37	120
G3DAH	30	60	30	68
G2BXP	26	57	32	79
G6CB	25	31	29	65
G8QX	24	58	34	108
G3ZI	21	42	37	122
G2BBI	17	41	17	41
G2VJ	16	24	25	56

VK, ZL, C, VS6, ZS, W and South America at 2200 GMT or thereabouts, on several nights during the month, and, on 28 mc, the persistence of Asiatic signals (VS6 and the like) until as late as 2000 GMT.

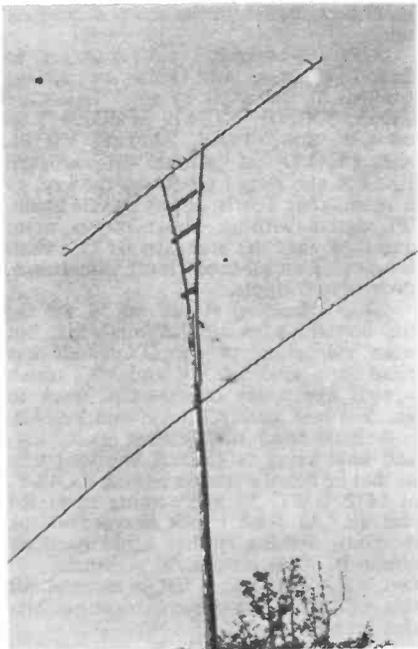
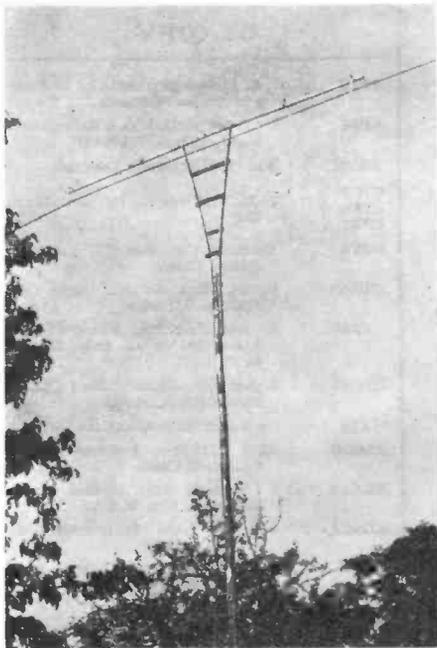
G5CP (Sale) took the ARRL DX Contest fairly seriously (on 'phone) and scored just under 30,000. But he adds that G6PD (Manchester) is known to have put up at least 50,000! One interesting QSO at G5CP was with a W8 using 4 watts input on 29.7 mc—he was R5 and S8, too.

G8KP (Wakefield), as befits the man at the top of the list, has been cleaning up everything that has been going. He worked his 100th country this year on the 95th day, and on the 104th day the score stood at 111. (But we bet it isn't more than 366 on December 31!) He says that MD1 and MD2 are going to count as two separate countries shortly; and asks us to make it clear that PK6 now stands for Celebes and Molucca Islands, and PK7 for Dutch New Guinea. 'KP, among others, has unearthed CZ2AC (Monaco) for a new one, and has also added VP1AA and LZ2AA. He tells us that G6ZN (Horbury) has just worked his first W6 on 14 mc with his 3-watt battery rig—a real QRP triumph.

G3DO (Sutton Coldfield) is more than somewhat pleased at having found both C8YR and C8LS; and on top of that his card from VR6AA arrived! G3TK (Leigh) has added to his total with CT3AB, HK4AF, VP4TI, VS9GT, UF6KAC and some other nice ones. He only lacks a UM8 for "WARC," if we can call it that. Has anyone ever heard or worked one?

G2BXP (Birmingham) is climbing that ladder with help from XE1AC, UB5KAG, EQ1RX, MD3MB and others. G6XX (Goole) is pleased about FE8AB, VK6CM, HH2HF, C6YZ and other rare ones. By the way, FE8AB is our old friend FQ3AT/FE with a new call.

G3AAE (Bournemouth) is naturally elated at having collected his 40 Zones (post-war), thanks to C8YR and VQ8AF. Others coming his way were KG6CE, CZ2AC, LZ2AA, KV4AA and a UP2. He wants calls and frequencies of stations in Utah, which are scarce with him. G2AVP (Stradishall), and others, mention that C6YZ says he is in Zone 23; but CQ has ruled that no C6's are in Zone 23, so that is that. They are certainly a borderline case and a most unsatisfactory one. 'AVP also heard AC4YN but thinks it may have been a phoney; G2AVP now



OK1AW has a 14 mc rotary Windom, consisting of dural tube carried on a supporting structure. Right-hand view shows how the radiating element can be lowered.

uses an aerial 12 half-waves long on 14 mc, which seems much better than the old dipole.

A new call on the list is G2BBJ of Westcliff, who first came on the air last June. He uses 807's with 120 watts and a "VS1AA" aerial, mostly on 14 and 28 mc. He says that on the latter band ZL4BN has been heard on two occasions working Europe up to and after midnight. Nice new ones from G8IP (Hampton) are FE3AB, F8NE (Corsica), KS4AI, C8YR, UI8AE, VO6EP and so on. G5MR (Bognor Regis) is another lucky one with a C8YR contact to his credit; he was fortunate in catching him just as the QRM was piling up, and got him by calling off his frequency—Spivs please note. So all that 'MR wants for complete bliss is one of those Mexicans in Zone 6.

G3BI (Seer Green) rang the changes by finding C8LS, the newcomer. We hope he is genuine, and he certainly does seem to be. G3DCC (London, N.8) remarks on the signal from W6AY, using a kilowatt and a 12-element beam on Europe. 'DCC, on the other hand, is trying an

indoor dipole on G8PL's lines, curled round the shack. His chief grouse is that the people who habitually call CQ DX seem to have an uncanny knack of dropping themselves on the frequencies of the weak and interesting DX signals.

G2WW (Penzance) throws what may be a new country into the arena, telling us that OQ5AS is in Ruanda Urundi, a Belgian-mandated territory which issues separate stamps from the Belgian Congo. He, too, has collected CZ2AC and LZ2AA, to say nothing of VS9GT in Trucial Oman. (We shall really have to start looking round for some of this—we're slipping badly!)

G3ACC (London, S.E.22) has built herself a transmitter which she says is "the sweetest thing"—a Pierce oscillator with a 6C5 and a KT63 for the top band. With 6 watts it has worked France. Margaret has met ZS6GH, the YL who has travelled almost round the world visiting amateurs and collecting her QSL's in person, and says the idea sounds so good that she hopes to try it. 'ACC has worked KV4AA, FT4AN and several

other new ones, and the score is creeping up.

G2PL (Wallington) still manages to find new ones, and must be getting towards the 200 mark by now. Latest are ZD8B, VP7NH, CT3AB, W0OZW/KS6 on CW, and VP2KS, ZM6AF, VR5PL and PK4VD on 'phone. He worked EK1AA and found G6ZO on the key, so it seems that Jim is on his travels again. 'PL agrees with us about rotten notes and says that the standard of G signals is reaching an all-time "low" with chirps, thumps and ripple.

G2AJ (Hendon) stayed on 58 mc for the first three months of this year, but since his return to the DX bands has piled up a score of 37Z and 98C, which sounds like pretty concentrated work to us. His best were KM6AH and FE8AB.

A letter from John Carter (ex-XAEK, and now living at Church Stretton) tells us that he heard a station signing AC4KY, at 1612 GMT, 14 mc, coming in at R5 and S6. As John is not licensed at the moment, nothing further could be done about it. The amateur's nightmare, in fact! But can anyone tell us more about this AC4KY? No one else mentions him this month.

G3BDQ (St. Leonards) has now pushed up to 150 watts with a pair of PT15's into a dipole 12 to 18 feet high, and has been pulling in some good stuff—such as UA0KFA, VP9E, FM8AD, C1DK, VQ4KTH and UW5LJ (but who the heck is that?). 'BDQ also tried a bit of QRP, and worked W4IML with a tritet 6L6 and an input of 4½ watts.

GM3CSM (Glasgow) says conditions up there have not been too bright, although on 28 mc he has collected AP4A, KP4DJ, CX4CZ, VQ4FCH and four PZ1's. On 14 mc he has had two QSO's.



... See what I mean, Mr. Fanwert, it's all experimenting with these amateurs. ...

DX QTH's

AP2D	J. K. McDowall (GM3AR), 15 Ruthven Avenue, Giffnock.	
AP5B	D. T. Boffin (G3HS), 4 Race Course Road, Lahore, Pakistan.	
AR8BC	Box 1119, Beyrouth, Lebanon.	
C7CY C7TS C7TY	T. M. Yen, Box 12, Taiyuan. Shensi, China.	
C8YR		Yu-Ruey Chi, Box 73, Lanchow, Kansu, China.
CT3AB		Ferraz, Rua de St. Maria 261, Funchal, Madeira.
CZ2AC	Rosetta Mancini, Vicolo Teatro Ristori 10, Verona, Italy. (<i>Station in Monaco</i>).	
HI8WF	Walter Fox, Central, Boca Chica, Dominican Republic.	
HV2B	c/o Radio Station, Vatican City.	
J9ACD	AP0 331, c/o Postmaster, San Francisco, Calif.	
KG6AW/VK9R	R. Seaman, 2537 Hollins Street, Baltimore, Md., U.S.A.	
KG6CJ	AP0 264, c/o Postmaster, San Francisco, Calif.	
KS4AI	R. W. Bird, Swan Island, West Indies, via Tampa, Fla.	
LZ2AA	Box 123, Sofia, Bulgaria.	
ST2FU	BOAC, Wadi Halfa, Anglo-Egyptian Sudan.	
TG9AD	Box 299, Guatemala City.	
VP2AG	AP0 855, c/o Postmaster, Miami, Fla.	
VP2KS	St. Kitts, Leeward Islands, B.W.I.	
VP5AW	AP0 861, c/o Postmaster, Miami, Fla.	
VQ4NET	N. E. Tomlinson, Box 1010, Nairobi, Kenya Colony.	
VR4AA	J. D. Davies, Honiara, British Solomon Islands.	
W0SQS/Two Jima	AP0 86, c/o Postmaster, San Francisco, Calif.	
ZD1BD	Royal Signals, Freetown, Sierra Leone, W. Africa.	
ZS6NU	Aeradio Palapye, Palapye Road, Bechuanaland.	

with Ham Whyte, VE3BWY. To LU9EV goes the distinction of the speediest DX QSL we have heard of; GM3CSM worked him on Sunday night and had his card the following Saturday morning. G8PL (London, N.W.3) exercised his indoor aerial by raising Zone 2 with VE8NB, and Zone 19 with UA0KFA. Then, later, he raised KH6HJ for another new country and zone. Other useful items from 'PL concern 15MG, who claims to be in Trieste; HV2B, claiming Vatican City; CZ2AC, a YL operator in Monaco, who is back in Italy by now;

and LZ2AA, giving a QTH in full. The last three certainly seem to have stirred everybody up this month.

G5FA (London, N.11), no longer a hero of the 7 mc band, says HV2B told him he was an operator at the big station in the Vatican City, and he was on the amateur bands with an experimental rig using a 100TH in the final. 'FA also raised TAIC, who promised to QSL direct; KS4AI, CR6AI and (of course) CZ2AC. Comparing 14 mc with 7 mc, G5FA remarks that it took him two whole winters to work 43 States on 7 mc; now he's done it in five weeks on 14! He says he has worked West Coast stations at every time of day except between 1130 and 1500 GMT. Finally, on the subject of Russian QSL's, 'FA says he is doing nicely and recently received 19 of them from Box 88, all in one batch.

New Prefixes

A useful letter from the Secretary of Basingstoke Amateur Radio Society gives these prefixes, received direct from MT2E recently:

Cyrenaica	MD1 and MC1
Tripolitania	MD2 and MT2
Eritrea	MD3 and M13
Somalia	MD4 and MS4

The first prefix in each case is for military personnel, the second for civilians. It will also be news to some that Trieste is now using MF2.

3.5 mc Achievement

Having heard, indirectly, that G8VB (London, W.5) had *Worked All States* on 3.5 mc 'phone, we naturally had to check up on it. And it's quite right—he has, and all Canadian districts as well! We regard this as the outstanding DX achievement since the resumption. G8VB was living in Belgium before 1939, and was well known on the air as ON4HS. He had a severe blow as the result of the war, having lost all his property in Belgium. An article by G8VB on his 80-metre activity is in preparation, as we feel that readers will want to hear more about such a station.

7 mc

Very little news from the QRM band this month—in fact only one letter, from G2FTK (Coventry). He uses 20 watts to a "W3EDP" aerial and has been working

the W's regularly between 0630 and 0830 GMT, together with KZ5ND and some interesting short-distance contacts. The 7 mc band comes in for a lot of miscellaneous comment from the many readers who have written on the subject of Band-Planning. They all seem to feel that "40" will be completely useless to *everyone* unless it is marked down for CW only.

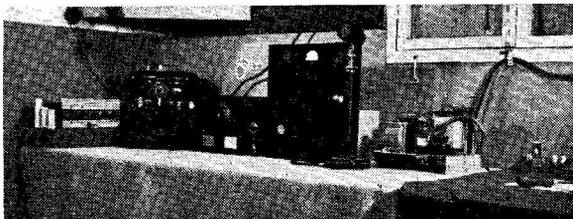
G3CEI (London, S.W.16) writes chiefly on the subject of band-planning, but adds that he would like to thank the three-way local QSO party on 7060-7075 kc for making the pursuit of W's so much more interesting in the early mornings!

Spivs and All That

G2SA (Burnham-on-Crouch) has been more than usually annoyed by the most blatant form of spivbery—VFO users who swish into the middle of a QSO and in the most barefaced manner proceed to call the chap he is working. And 'SA adds, "Still too many foul notes and long calls on 14 mc."

W. H. Noble, a listener in Streatham, quotes, in full, a 'phone QSO between two G's on 28 mc. Time, 2030 GMT. The gist of it, strained out of the drivel, was, "Come on, chaps, never mind the Television; also there may be some DX on, but don't worry about that either." The DX was on, in the form of the ARRL Contest—helped no end by local G QSO's at the LF end of the most active DX band at the time. We've got 'em on the list!

Freddie North (VP6CDI) also suffers from spivs. Via G3XP of Bournemouth he asks us to pass on this message: "I do most sincerely ask G stations not to call me when they hear me calling another country or call-sign. I will be happy to work any G who calls me on a CQ, but I will *not* work any G who persists in calling when I am trying to work elsewhere. I will *not* work the VFO merchants who QSY on to my frequency; I am



General view of MD5NB, Suez Canal Zone, Egypt.



An impression of VS6AC.

keeping a black book of these and will never work them until they cease this practice." That is 'CDI's ultimatum— but fancy it being necessary !

The Pirates

Only one case of piracy is reported this month. G2HF (Wellington, Som.) says he cannot cope with the increasing flood of QSL cards reporting his signals on 7 and 14 mc, on which bands he has not worked for a year or more.

Miscellany

G6PJ (Sheffield) worked K1NAA, who gave his QTH as Rhode Island, and 'PJ was nearly tricked into thinking it was a new country . . . G2NJ (Peterborough) is haunted by oblique strokes. Besides having a /P and an /A and an /A/P licence, he seems fated to work stations with calls like OK1TY/1. Why the /1 is a mystery . . . G6CB (London, S.W.19) asks whether twenty months is long enough to wait for QSL's from GI, GW, EI and GM? He worked them all in 1946 but can't get the cards ! . . . G8JC (Droitwich) queries all the Norwegian prefixes; they seem to use anything between LA and LJ. We know LB is used for portables, and LF, LH and LJ seem to belong to the three services . . . And if you hear or work XG6A during the next couple of months, he will be quite genuine, ship-borne somewhere between here and New Zealand.

QRP Again

G5MV (Scarborough) remarks that he seems to work DX easily, whether on 150 or 50 watts, but the kick is not there any longer. As he says, "With the old 10 watts, what a thrill you got when the DX fellow did come back." Trouble with going QRP nowadays is that if the others

don't do it as well, you are liable to be left out in the cold. GM3BLQ (Angus) remarks that there is a comparative scarcity of information about rigs from 25 to 50 watts rating. He looks on push-pull 807's as QRO and says, "I don't think there is much need for all that input from 7 mc downwards." 'BLQ uses much lower power and hopes to make a nice rig with an 815; he wonders why these valves are not more popular over here.

From Overseas

The much-travelled G3CDR (*H.M.S. London*) has now added French Indo-China to his personal QSO's. Owing to the political situation no licences have been issued there, but he did meet an engineer from Radio Saigon who was anxiously waiting for the ban to be lifted. 'CDR also visited Singapore and North Borneo, and he actually writes from Manila, although there are no KA's in the town since the Americans left. But ex-ET3Y is on the spot and hopes to have a KA call soon. 'CDR himself cannot acquire a VS6 call unless he gets a shore job in Hong Kong. Hard luck, because he has a QTH ashore, but his job is afloat—so no call.

MD5AK (MELF) is still very active on 14 and 28 mc, and his post-war score is 37Z and 147C. He has a nice little transmitter comprising a 6V6/6L6 twenty-watt job with 350 volts on the anodes. It is a suitcase-portable and has made lots of DX contacts. 'AK promises to send along a further description of it.

ZD4AM (Tafo) is still on the Gold Coast, although he was expecting to be home by the time he wrote. The riots held things up, and unfortunately Harold had packed his rig. But at the end of February, when he was last on the air, he worked KB6AD and VR2AR. He is probably in "G" at the moment, and we look forward to hearing that he has been having some personal QSO's.

Late Item

Just as this issue was going down, a very interesting letter came in from VS9ET, of Trucial Oman, Arabia. Some quick extracts are: "The callsign was the biggest difficulty . . . someone else there had been using VS9GT, so I adopted that prefix. . . . Do not know how many zones or countries I worked, as I left in a hurry without my log, and haven't yet seen a Zone Map ! . . . The rig was a lash-up of old junk, 6L6-807, 10-15 watts, but the signal seemed to get everywhere with a Windom

12 ft. high. . . . Actual location 25° 21' N., 55° 24' E. . . . Ran out of cards, so many of the boys will still be waiting, but this will be put right when the logs and records come through. . . . The Californian Kilowatt Gang were a nuisance." VS9ET's home address: R. G. Cary, Field House, Wainfleet-St.-Mary, Skegness, Lincs.

So that's the lot for this time, and it only remains to give next month's deadline for letters, claims and all the rest of the news which makes this feature. It is first post on May 13—addressed "DX Commentary," *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. Until then, Good Hunting and Down with Spivs. 73 and BCNU.

ARE YOU HERE?

Cards are held for the stations listed below. As we have no record of your QTH, please let us have a stamped, addressed envelope, with your name and callsign; send it to BCM/QSL, London, W.C.1, which is the full postal address of our QSL Bureau. If you would like your call to be entered under "New QTH's" (which automatically ensures eventual appearance in the Call Book), mention it when sending in your envelopes. It will be in the appropriate place in the *Magazine* as soon as space becomes available.

G2AA, 2AB, 2ALV, 2AOL, 2AON, 2ARJ, 2ARW, 2ATY, 2AXN, 2BDM, 2BMP, 2BVA, 2CCO, 2CFK, 2CFC, 2DAZ, 2DPA, 2DPP, 2FBD, 2FCS, 2FFX, 2FGQ, 2FJS, 2HDJ, 2HIA, 2HJQ, 2HMU, 2HOW, 2IU, 2JT, 2ND, 2RJ, 2RN, 2TQ, 2TZ, 2UB, 2UX, 2WL, 3AAF, 3AAP, 3ADD, 3AFC, 3AGV, 3AHH, 3AJL, 3AKL, 3ALD, 3AMN, 3APH, 3ATO, 3AUS, 3AZP, 3BAE, 3BAN, 3BCF, 3BDC, 3BEZ, 3BFN, 3BHQ, 3BIQ, 3BIT, 3BKW, 3BNA, 3BQG, 3BSZ, 3BTO, 3BVN, 3BWJ, 3BXP, 3BYI, 3CAX, 3CCD, 3CDS, 3CEH, 3CEW, 3CJP, 3CJX, 3CLT, 3CLU, 3CLX, 3CME, 3CMG, 3COF, 3COO, 3COW, 3COZ, 3CSX, 3CUE, 3CUP, 3CUY, 3CVF, 3CVM, 3CVX, 3CWV, 3CWX, 3CZO, 3DAG, 3DAV, 3DBH, 3DDA, 3DDC, 3DDH, 3DDK, 3DFI, 3DFV, 3DJO, 3DJQ, 3DRQ, 3JV, 3WY, 4FG, 4HB, 4OF, 5JW, 5PZ, 5RD, 5SV, 6IF, 6KO, 6KQ, 6MO, 6OX, 8DJ, 8OU, 8PM, 8ZZ, GC2ASO, GD3AGG, G13CSK, GM2BGH, 3AJR, 3BVO, 3BXV, 3BZY, 3CEJ, 3CIX, 3DBS, 8MA, GW3BYZ, 3CF, 3DDS.

FIRST CLASS OPERATORS' CLUB

PRESIDENT: GERALD MARCUSE, G2NM

HON. SECRETARY:

CAPT. A. M. H. FERGUS, G2ZC

Membership of the F.O.C. now stands at the new record of 140 active operators, after 18 months' post-war running; the Club's financial position is very sound, and two members have recently been kind enough to make donations.

Another welcome gift has been offered in the shape of a second silver cup for an annual contest, and the Club is now discussing what form this event should take.

The F.O.C. has elected, unanimously, its first honorary member—C. L. Ward, G5NF. Activities under consideration are a Club dinner and a members' operating period on 58 mc; incidentally, it is of interest to note that at the Fiveband Dinner on February 21 last, a quarter of those present were F.O.C. members, thus effectively disposing of the suggestion that the Club is interested only in 3.5 mc! It is, of course, on this band that the normal Club meetings are held; in this connection, it is proposed to adopt, as an experiment, the 3560-3580 kc area as the F.O.C. Calling Band, to help keep members together during the Club operating periods.

Recently, votes have been taken on the suggested AT Code (a large majority *against* its adoption) and on the use of "QSY" as defined in the March issue of the *Short Wave Magazine*; it has been decided to try the latter procedure, again by a large majority vote.

Election Notice

In accordance with the Rules, the following have been elected to active membership of the F.O.C.:

H. C. Harrison, G3ACR (Burton-on-Trent); A. L. Lloyd, G3AKY (Sheffield); Capt. G. F. Steven, GMSBA (Berwick); W. F. Self, ZL4CK (Dunedin); F. E. Frame, ZL4BQ (Dunedin); W. Gibbs, W1DTS (Lexington, Mass); W. A. Wilson, ZL1BY (Te-Kuiti); J. A. Partridge, G2KF (Edenbridge); P. R. Gollidge D2DW (*Home address*: Raleigh, Essex); F. E. Wingfield, G2AO (Malvern); J. Pollard, G3IY (Burnley); J. E. Bell, G3CKL (London); J. Deminal, F8EX (Athis-Mons); P. C. Bond, G3BEG (London); C. L. Fenton, G3ABB (Wallington, Surrey); G. A. Partridge, G3CED (Broadstairs); R. C. Eldridge, G3AGQ (Benson, Oxon).

Low Power Working

Some Practical Considerations

by G. WHITEHEAD (G2ACZ)

FREQUENT references to low-power working have appeared in various issues of the *Short Wave Magazine*, and these have prompted the writer to compile his own experiences in this particular field. QRP operators would seem to fall under two headings: those who experiment with low power although having facilities at hand for high-power working when required; and those who by necessity are restricted to the use of low power. The writer is in the latter category, since no mains supply is available. Bearing the latter point in mind, some sort of power source had to be provided.

Heavy capacity batteries for use with rotary transformers are expensive these days. What is more, they are extremely heavy and difficult to transport to the nearest charging station. Therefore, recourse was had to dry batteries. Dry batteries have increased considerably in price during the last few years, but, as the writer has proved, form a good, trouble-free and inexpensive source of HT for the low-power amateur transmitter.

Before going further it is felt that it should be made clear that low power, as defined by the writer, is between 5 watts and 1 watt and even less, and not in the 20-30 watt region, which is still referred to by some transmitters as QRP.

It is not intended to explain all the various QRP arrangements that have been tried, but to discuss the existing apparatus used at G2ACZ and giving the most satisfactory results to date.

Valves

Ordinary 2-volt battery receiving valves are used, preference being given to Power and Superpower types. Battery pentodes have been tried, but better efficiencies result by using triodes. Modern British and American 6-volt heater valves have been used and give slightly higher efficiencies, but the necessity for a heavy-duty battery to supply heater current outweighs this advantage. Therefore, the problem of the power supply is dealt with by employing the standard capacity dry HT battery and the 2-volt LT cell.

To the experimenter, QRP has been—and always will be—of great interest for its own sake. Many operators who could go QRO prefer to get their results with low power. This article will enthuse and encourage those who, by reason of lack of mains or other considerations, must use the simplest transmitting gear.—Ed.

With dry batteries for a transmitter plate supply every effort must obviously be made to restrict the current drain to the lowest possible limit. This point will be emphasised later when the question of power doubling, or the addition of a frequency doubling stage arises.

Standard transmitter circuits can be used. Less consideration need be paid to voltage insulation and receiving-type components may be put in throughout.

Practical Design

The writer's transmitter consists of a CO stage capacity-coupled to the PA. The valves are both triodes, type PM2A. Battery bias is used on the PA and the transmitter is keyed in the common negative HT lead. The same plate voltage is applied to both stages of the transmitter when using either 120 or 240 volts HT.

It will be noted that no intermediate buffer or frequency doubling stage is incorporated in the transmitter. When it is desired to operate the transmitter on 3.5 or 14 mc, the PA is operated as a power-doubler stage, 1.7 and 7 mc crystals being provided. This latter suggestion will no doubt be received unfavourably by some operators. However, as previously mentioned, the addition of a frequency-doubling stage will put an additional drain of at least 8 to 10 mA on the power supply and with batteries this can be ill afforded. If the PA is heavily biased and hard driven, extremely good efficiency can be obtained as a power doubler with only a slight loss of output compared to a PA stage operating on the fundamental crystal frequency.

Therefore, weighing advantages against disadvantages, the power doubler idea is found to be the best at G2ACZ. The

following figures, for the PA unloaded and tuned to resonance with 200-240 volts HT, are those obtained with the writer's own transmitter :

Fundamental	1 to 2 mA.
Power doubling from 1.7mc..	3 to 4 mA on 3.5 mc.
Power doubling from 7mc ..	4 to 5 mA on 14 mc.

These figures will show that reasonably good efficiency is obtained when doubling at what is virtually a saving of 5 to 7 mA over the resulting drain if a doubler stage was incorporated.

In order to restrict CO anode current to a reasonably low level when using 200 volts on the plate, the grid resistance across the crystal should be 50,000 to 75,000 ohms. If insufficient drive is obtainable with this value of grid resistance when using 100 to 120 volts HT, it is simple enough to put a lower value of resistance across the crystal socket in such a way that it can be easily removed when higher plate voltage is to be used.

No special constructional details, either technical or practical, need be mentioned. Any suitable layout or circuit may be used and it will be readily appreciated that a low-power transmitter of the type discussed can be built in a very small and compact form.

Results

Surely the best judge of the performance of low-power transmitters and the most convincing argument to put forward in support of the cause of QRP is an account of actual results obtained. The writer has spent a considerable time on the air, mainly on the 1.7, 7 and 14 mc bands, using inputs of between .01 and 4 watts. For general use, an input of 3 watts is employed. This seems to give optimum results and little or no further increase in signal strength is reported when the power is increased to 6 watts (the maximum safe input obtainable with the valves mentioned). Reducing input to 1 watt results in a decrease of about one "S" point only in signal strength.

With 1 watt, all parts of the British Isles have been worked on CW in the 1.7 mc band. An input of 3 watts gives very good results on this band and reports are quite comparable to the average 10-watt signal heard on the band.

On 7 mc, all parts of the British Isles have been contacted in addition to Europeans. The aerial used for 1.7 and 7 mc tests has been a 132-ft. wire about 15-ft. high and fed to the transmitter through a Collins coupler. A waterpipe earth was used for the ground connection.

The writer's interest is at the moment centred on 14 mc in an effort to show what can be done with low power on this band. The aerial in use is a folded dipole and input is maintained as near as possible to 3 watts to the power-doubler stage. W's have been worked with an input of 2.8 watts and numerous European contacts have been made with reports varying from S5 to S8. Comparatively little time has yet been devoted to this band, but the writer is convinced that QRP DX is only a matter of patience and opportunity, considering the present state of the 14 mc band.

Telephony

In summing up the question of QRP, it is emphasised that operation should be restricted to CW. The writer has used 'phone on the 1.7 mc band with good results on local contacts, but the long life of dry batteries is realised only on CW due to the intermittent discharge and they no longer become an economical proposition on telephony unless extremely low powers are used. Standard capacity dry batteries will last approximately three months with normal use on CW. The batteries installed by the writer three months ago still show more than 100 volts per battery on load.

Ordinary battery type valves will stand 240 volts on the plate quite safely if treated with care. Tuning up should be done with reduced voltage and the normal "power" type triode will run at 5 watts input on CW without any trouble.

In closing, the writer would like to stress that, although a little more patience may be required when using QRP on the present overcrowded bands, a great sense of satisfaction and achievement can be experienced when making contacts with very low power. It is also advocated that intending applicants for a transmitting licence should obtain first-hand technical and practical knowledge in amateur communication methods by constructing battery-operated equipment. It is simple to build and can be assembled from receiving parts, often of the old base-board mounting type, and can be understood by the beginner with greater ease than the modern chassis type of construction.

It is hoped that those would-be amateur operators, who are at present deterred through lack of mains supply, will be encouraged to go forward with their plans. It is also hoped that stations at present using high power will be encouraged to try experiments with reduced power.

THE VHF BANDS

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

GDX Quiet—

New Activity—

Spor-E Prospects—

144-420 mc Equipment

JUST for once we seem to have no real headline news. No doubt, this is the lull before the summer European DX starts. The second M.A.W.E. was not favoured with outstanding conditions and activity was not as high as we had hoped. From some parts of the country we hear that it was renamed "Magazine *Inactivity* Week End," but we are inclined to agree with G3COJ (Hull), who suggests it was really "Inaudibility Week End"! From our own observations activity was undoubtedly above average and G2XC at least enjoyed some good contacts.

However, once again the sun shone, so that gardening and other domestic responsibilities took their toll of the hours. It is even suggested we announce a M.A.W.E. every week-end throughout the summer to ensure plentiful sunshine!

Outstanding date of the month appears to have been April 15, but we cannot write from personal experience as unfortunately we were only on for a brief spell that evening. Those who were active, however, experienced remarkable conditions.

Troposphere Survey

On the subject of tropospheric propagation, we are informed by the Air Ministry that a detailed investigation of super-refraction conditions (i.e., "ducting") is about to be made by RAF aircraft operating from Malta. As the Air Ministry says, super-refraction is by no means unknown in the British Isles, but it is generally more pronounced in warmer climates. In fact, in Malta during the summer, such conditions are almost continuous, and some remarkable VHF results are regularly obtained—hence this expedition of aircraft and meteorologists to the Mediterranean. It is hoped to be able to summarise the results of the investigation in these columns.

Six Metres

Since the brief opening of March 27 reported in "Flash" in our last issue, no further 6-metre DX has been forthcoming—except that on the morning of March 28, G6XM heard MD5KW for a short while. In a letter, W8MVG says he will be looking for G's in November 1948!

Individual Reports

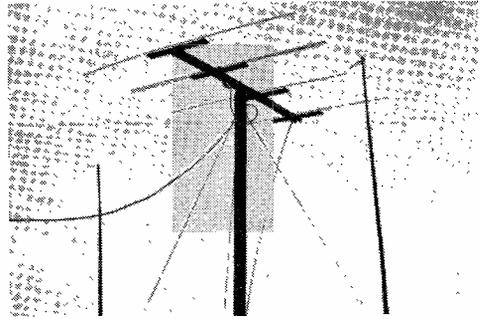
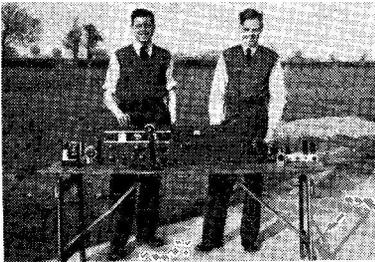
Four reports come from Hull; G3ALD, G3COJ, G5GX and G6OS are all active. G3ALD is a newcomer and is using a modified SCR-522 as Tx and a convertor (two EF54's as RF, EF54 mixer and EC52 oscillator) into an HRO for reception. He is on 59.12 mc nightly from 1900 BST and asks for assistance in catching up with G5GX and G6OS. G3COJ gives April 15 as his outstanding night when he

THE FIVE BAND CLUB

Secretary: E. J. WILLIAMS, B.Sc., G2XC

FIRST LIST OF MEMBERS

G8TS	J. St. C. Ruddock (Farnham)
G2ADZ	H. W. Parker (Oswestry)
G2HLF	R. J. Lee (Heathfield)
G6KB	W. O. Greener (Checkendon)
G5MR	V. G. Mellor (Bognor Regis)
G6OS	J. W. Gill (Hull)
G3DA	A. B. Boswell (Handford)
G3BTC	W. G. Green (Welling)
G2CIW	J. F. Moseley (Brentwood)
G3IS	N. W. White (Rugby)
G2HDY	J. Ballard (Roehampton)
G3DCV	A. R. Watson (March)
G5MA	R. Munday (Ashted)
G2CWL	C. K. Haswell (Haslemere)
G5PY	R. Clark (Clapham Park)
G2NH	E. A. Dedman (New Malden)
G4RO	A. E. Read (Welwyn)
G3BXE	G. Cameron (West Wrattling)
G3PZ	R. Waite (Gloucester)
G4IG	R. Brett (London, S.E.26)
G6FO	A. Forsyth (Maids Moreton)



G3BUR/A is active on 58 mc from Bassingham, Lincs., using a modified Type 26 for Rx, and a 4074A in P/P in the final of the transmitter. Various aerials have been tried, including the beam pictured. Best DX so far is G4LU, with G6XM heard.

heard 12 counties. He will be QRT for a while but hopes to be on the band again before the EDX season is over. G5GX, who reached his century on April 15, heard an F9 on 58.7 on April 4, but in general has found conditions ghastly. G6OS regrets that so many give 58 mc such a short trial and quickly forsake it due to lack of patience. His calls heard during M.A.W.E. No. 2 appear in the appropriate space.

G5BD (Mablethorpe) mentions the interesting point that ST2FT is now active on 5 and 6 metres. A double hop spor-E might reach him, so here's hoping! We now have the necessary confirmation that the first two-way G/W8 on 6 metres was made by G5BD and W8MVG. The latter heard, and was heard by, G6DH earlier, but their attempt at a QSO was abortive, so the "first" goes to G5BD. While on this subject we are provisionally allotting the first G/W4 on 50 mc to G2BMZ, but he is not at all sure that he was first; so if you have a prior claim let us have it. The list published herewith can now be regarded as authentic and will stand as the record of the achievements of those who essayed 50 mc.

G2ADZ (Oswestry) has been trying out a modified R.1481, and comparing it with his 0-V-1. He found the first week or so of April extremely poor; twelve days passed without a QSO. The G2XC/G2ADZ schedule continues at 1900 BST nightly. Signals from Oswestry are audible in Portsmouth almost every evening, but frequently too weak for contact to be made.

Among the newcomers during recent weeks is G3DCV (March), using a Type 37 Tx and Type 27 convertor into an

HRO, which has been working out well. G8RO (Tangmere) has also been active, using an 807 PA to a dipole aerial. A beam is under construction and will probably be in operation by the time this is in print. His frequency is 58592 kc. G6HD (Beckenham) has an 834 and a 3-element c.s. beam. He has contacted G4LU and G5MQ and found April 15 useful help in climbing the counties ladder.

G2AUA (Wellingborough) now has a Type 27 convertor and a 3-element beam in the roof. The Tx is 25 watts to an 832. G2AUA is active most nights from 2215 to 2245 for the benefit of anyone requiring Northants.

Tests between a long-wire and a 2-element w.s. beam have been engaging G2CWL (Haslemere). The beam, only 18 ft. high, has to compete against the 40 ft. of the long wire, but even so is superior to N.E. and S.W., though the long-wire has it in some other directions. This is what many of us have found, the polar diagram of the long-wire being very marked at this frequency, due to the high angle radiation being of no effect in tropospheric work.

G3DA (Handford) asks southern stations to listen for him on 58.8 and 59.44 mc, every evening between 1900 and midnight.

G8KL (Wolverhampton) comes up with a nice list of Calls Heard, and remarks that he has since discovered that when G4OS was working portable, he was operating from Flintshire and should have been signing GW4OS/P; this contact, and a recent QSO with G5RP (Berks.) puts G8KL in the "18C worked" category.

G3BXE (West Wrattling, Cambs.) will have the congratulations of us all on again

achieving the top seat in "Counties Worked"—G5LO (Oxon) gave G3BXE his 31st county on March 24, and the total of stations worked is now 126. Well done, OM! He is another who, aspiring to the VHF Century Club, is having great difficulty in getting the cards, though 'BXE himself QSL's 100 per cent. He also passes on the information that the EF91 is a very useful valve for the early stages of the 144 or 420 mc Tx.

G4RO (Welwyn, Herts.) has been working hard to make up for lost time, and with his 3-element c.s.r.b. has rolled in 78 stations for 16 counties since February 28—which seems to us like remarkably good going. G4RO/G8KZ run a schedule at 0030 clock time most nights, and always look round for someone else to bring in! G4RO's best DX to date is G5BD and F8ZF, both over 100 miles, and he has heard three other F8's, the Torquay stations, the Oswestry boys, and G5MQ. He is another who asks that we mention this matter of failure to QSL.

G2ADR reports that he is the only active 5-metre station in York, having started up towards the end of March. He is on nightly from 2100 BST and during week-ends, with CW and 'phone, an RK-34 in the PA connected P/P with 20 watts input, a modified Type 27 converter into

an Eddystone ECR, and a dipole 60-ft. high, with a 4-element w.s.r.b. under construction—in fact, all the essentials for successful operation on 58 mc. G2ADR's list of stations worked (see Calls Heard) represents a useful three weeks' transmitting activity; it has also been reported to him that G2ADR has been received in the South—could anyone confirm, please?

G4LU (Oswestry) brought five new stations in on the night of April 15—G8AL (Chingford); G6HD (Beckenham); G2ADR (York); G3ALD (Hull), and G6SQ (Southport). G4LU is also in fairly regular contact with G2AOK/A (Stow-on-the-Wold), and G2AK and G5LJ in the Birmingham area; other new Midlanders worked are G6FK and G8KL (Wolverhampton) and G5BJ (B'ham.).

Another newcomer is welcomed in G3BUR/A, active from an RAF station near Bassingham, Lincs. Rx is a modified Type 26 converter into an AR-88, and best GDX worked so far is G4LU and G3NR, with G5BJ, G5JU, G6VX and G6XM heard.

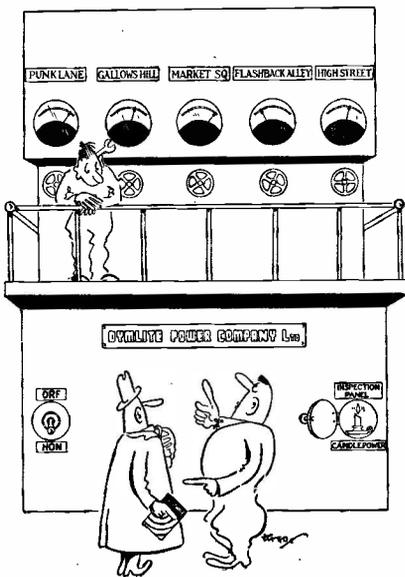
G2AOK/A, well known on the band and regularly active from Stow-in-the-Wold, writes in for the first time; the log to date shows 62 stations worked in 21 counties, with 42 cards held. An interesting point is that G2AOK/A is operated with a 12-volt accumulator as primary supply; the Rx is a Type 27 into an R.103A, the Tx runs 18 watts input in the PA, and the aerial is a 3-element w.s.r.b. 55-ft. high. G2AOK/A is there 2000-2300 BST on week-days, and 1300-1700 on Sundays, frequency 58880 kc, and keeps schedule with G5LO at 2000 every evening.

G/GM Working

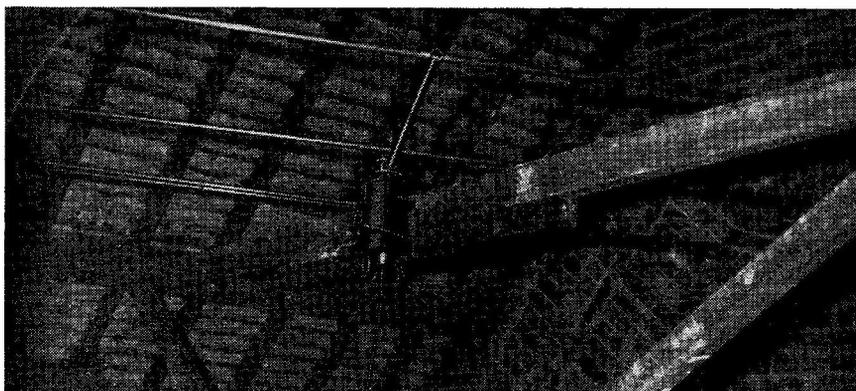
Just as we closed for press, G5GX reported that he and G6OS opened a schedule with GM3OL at 2200 nightly, starting on April 20; as at the 26th, GM3OL had been heard every evening in Hull, and worked two nights in three. GM3BDA is also coming through to Hull, and G3BW (Whitehaven) is receiving the Hull boys. All this is excellent going, as a glance at the map shows that the distances are not inconsiderable, with much high ground intervening. We hope to have something more to say about these contacts next month.

The Two-Metre Band

G2NH and G6VX have had an interesting time comparing several types of 144 mc convertors. Two different modifications of some Western Electric homing gear having four acorns (954), and a third Rx, of the



"... Push up on Flashback Alley, Joe; chap here in for the five-metre contest."



G3APY, Kirkby, Notts, who is doing well with the GDX, uses a two-director folded dipole beam assembly in the roof space, with selsyn motor control. Elements are of $\frac{1}{2}$ -in. copper tube, the directors each being 93-in. long with 30-in. spacing. The driven element is 193-in. total length round the fold, with a 72-ohm feeder line, slip-ring connected.

trough type, using 6AK5 RF and 6J6 osc-mixer, all showed great promise. But G6VX thinks a crystal controlled convertor which he has just completed is going to be the answer. It consists of two 6J6 RF stages, with a combined 6C4 mixer and cathode-follower for IF output. The oscillator section is 6C4 crystal osc. and two 6C4 FD's with output on 130 mc. The main Rx is then tuned from 14 to 16 mc* for the 144-146 mc band. On this, the notes are beautifully clean and stability is a pleasure, for as G6VX says, "One can maul all around the Rx and no jumping signals". The coils are all 4 turns of 16 SWG of $\frac{1}{2}$ -in. diameter. The signal-to-noise ratio is excellent. G6VX thinks that only one 6J6 will really be required, as they definitely out-perform any pentode.

G2NH's Tx is : 8 mc crystal with EF50 tritet to 24 mc, QVO4/7 tripler to 72 and another doubling to 144 mc, driving an 829 PA. It is just like a low frequency transmitter to handle.

The 70-cm. Band

Our note last month about the ex-U.S. Navy equipment Type ASB-7 has brought in a surprisingly large number of requests for further information. It is indeed gratifying to know that there is so much potential interest in these new VHF bands. Below are some further details of the modifications outlined last month.

* (With this system a perfectly screened main receiver is essential, in order to prevent direct pick-up of even the weakest signal having its fundamental in the busy 14-16 mc band.—Ed.)

The circuit as it stands consists of a 2C40 "lighthouse" RF stage on 515 mc, a 955 first mixer, and 955 osc., the latter on 480 mc giving a 1st IF of 55 mc, Two

SIX METRES

LIST OF FIRST CONTACTS

Canada			
G5BD/VE1QZ	1620	Nov. 5, 1947	
G5BY/VE2KH	1323	Nov. 20, 1947	
G5BY/VE3ANY	1544	Nov. 20, 1947	
Canal Zone			
G6DH/MD5KW	0855	Nov. 10, 1947	
Egypt			
G5BM/SU1HF	0900	Nov. 16, 1947	
France			
G6DH/F8ZF	2035	Dec. 10, 1947	
Netherlands			
G6DH/PAØUN	0750	Mar. 10, 1948	
South Africa			
G5BY/ZS1B	1230	Nov. 7, 1947	
U.S.A.			
G6DH/W1HDQ	1302	Nov. 5, 1947	
G6DH/W2AMJ	1345	Nov. 5, 1947	
G5BY/W3OR	1325	Nov. 22, 1947	
G2BMZ/W4HVV	1510	Nov. 16, 1947	
G5BY/W5JLY	1530	Nov. 16, 1947	
G5BD/W8MVG	1510	Nov. 5, 1947	
G5BY/W9ZHL	1555	Nov. 22, 1947	
G5BY/WØIFB	1632	Nov. 22, 1947	

6AC7's operate as 1st IF amplifier, the gain being controlled by varying the screen voltage of the second of these. The second mixer is a 6AC7, with a 6J5 as osc on 39 mc, giving the second IF as 16 mc. Two further 6AC7's follow as amplifiers on this frequency with a 6H6 detector, 6AC7 video amplifier and 6AC7 cathode follower output.

The modifications recommended by W5AJG in the American *Radio News* of July 1947 are mainly concerned with the output stages. The 6H6 is arranged so that its second section acts as a series noise limiter to reduce ignition QRM. The detector load resistor consists of the usual RF filter and two $\frac{1}{4}$ -megohm resistors in series, the limiter valve anode being connected to the junction. The limiter is automatically biased by the rectified carrier voltage.

The video amplifier stage is removed and replaced by a 6SN7, one half acting as audio amplifier with a volume control

in its grid circuit, and the second half is fed from a tapping on the lower $\frac{1}{4}$ -megohm of the detector load, which can take the form of a potentiometer. The S-meter is in the anode circuit of this valve, its zero being set by adjustment of the potentiometer. No cathode bias should be applied to this section of the 6SN7.

The cathode follower output is replaced by a normal 6V6 audio stage working into a small speaker. For power supply, 300 volts at 100 mA should be available for HT and 6.3 volts at 5 amps for LT.

At the RF end of the circuit, the oscillator should be arranged to work 55 mc *higher* than the signal frequency. Thus, for reception on 420 mc the oscillator requires to be 475 mc. As it is already set for 460 mc the change involved is small, and is easily covered by the main tuning control already on the set. It may be necessary to shunt a few micromicrofarads across the input of the mixer to get it to reach 420 mc.

We are considering reproducing the circuit of the modified audio section of the receiver; if we do, a copy will be sent to those who have asked for it. By the way, we are told that some of these sets are still available in this country—so keep your eyes open.

Sporadic-E

As there are so many newcomers to VHF operation since this time last year, we think a few notes on spor-E may not be out of place. This is primarily a summer day-time phenomenon, but its appearance at other times is not unknown, and on rare occasions it may continue till well after dark. On 5 metres, its incidence is heralded by the sudden appearance on the band of signals from distances varying between 400 and 1,200 miles. This includes most European countries and part of North Africa. Stations in Italy and Southern France have proved to be the most frequent in appearance in past years, and in general the spor-E ionisation which is responsible seems to occur more frequently in the Mediterranean area than in northern Europe. But there have been several instances when signals from SM and OK have been coming in well with no signs of anything from the south.

On some days the effect is general, and on others "clouds" of ionisation appear to exist giving good propagation in one direction only, or to one area only. The condition usually develops and ends quite suddenly and no reliable forecasts are available. There is in fact considerable

FIVE-METRE COUNTIES WORKED LIST Starting Figure, 14

Worked	Stations
31	G3BXE (126)
30	G2MR, G5BD, G5BY, G6VX, G6XM (210)
29	G2NH (230), G5MA
28	G2ADZ (101), G2XC (242), G5MQ, G6LK (225)
27	G3BLP (144), G4LU, G5BM, G5PY
26	G2AJ (179), G5RP, G6MN/A, G8UZ
25	G2CIW (122), G2RI, G8SM
24	G3IS
23	G3ABA, G3MY, G3PZ, G4IG (163), G5GX (101), G6OH (129)
22	G2ATK, G5IG, G6YU
21	G2AOK/A, G4AP, G6KB (109), G8KZ
20	G2YL, G5JU
19	G2NM
18	G3BK, G8KL
17	G2KF, G6CW, G6LX, G8QM/A
16	G3AAK, G4RO, G5LQ, G6HD
15	G4AJ
14	G2HDY, G5BJ, G6UW

Note: Figures in brackets after call are total of different stations worked: starting figure 100.

doubt as to its cause. It must be emphasised that Spor-E is quite distinct from tropospheric propagation and although suggestions have been made regarding its connection with thunderstorms and weather fronts, to the best of our knowledge, no definite link-up has ever been proved.

To those wanting to work or hear this fascinating EDX, our best advice is to keep as continuous a watch as possible from mid-May through to September. Look for commercial harmonics, e.g., IRE around 59 mc, and also watch for short-skip on 28 mc which is due to the same effect. Most of the Europeans operate at the LF end of our present band (like most of us), but it is worth searching from 56 mc occasionally, as one or two may be outside the band. Another point to remember is that due to the higher angle radiation involved in this type of work, low-lying stations will find it *much easier to work EDX than GDX*. Further, try rotating the beam, as the great circle route is not always the correct one.

We shall be listing the spor-E openings as Activity Summaries (see *Short Wave Magazine*, July-September 1947), so please let us have, in as much detail as possible, all you hear and work in the way of EDX this summer. Dates and times of contacts, band openings and closings, and all similar relevant data, will be greatly appreciated and credited in the lists. This collated information is of the greatest value to those investigating VHF phenomena, and a complete record will only be possible with *your* help.

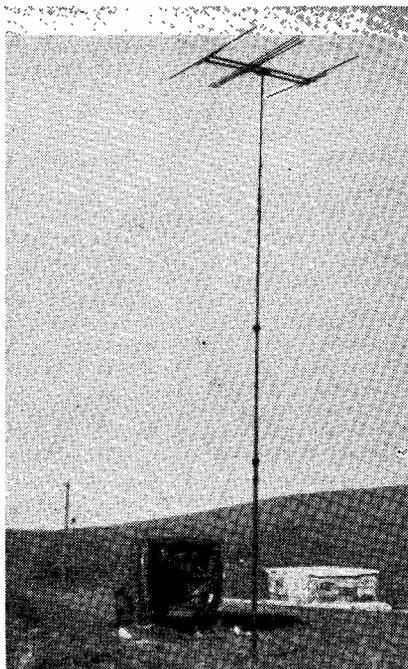
As a matter of interest, we might add that the first recorded instance of spor-E last year was on May 14, when the I's came through—so look out!

The Clubs

The main topic of conversation on the 5-metre band during the past month appears to have been the VHF Century Club, and it seems to have acted as a great incentive to QSL! Several operators have spent more than an evening writing out cards for contacts extending far into the past, while others, who have not QSL'd for years, have gone so far as to place orders for cards! If anyone is short of G2XC's QSL, please let us know at once and we will rectify the matter.

Several points concerned with the VHF Century Club have been raised, and we have decided to introduce the rules below to cover some of them:

(1) Cards should be sent by registered post to the address at the end of these notes. They will be returned in a similar way.



G2AJ/P as set up recently on Dunstable Downs. The business end of the outfit was in the van.

(2) Stations worked from a portable QTH may be counted, *provided* they have not already been included in the list of those worked from the normal home QTH.

(3) All applications for membership must be accompanied by a signed statement that the applicant has replied 100 per cent. to all QSL's received and will continue to do so.

(4) Operators who have worked more than 100 stations (but who have not the QSL's to prove it) may claim *associate membership* by sending a list of the 100 stations. Full membership will be strictly limited to those who can produce the cards.

(5) The VHF Century Club is open only to members of the Fiveband Club.

The Fiveband Club has been welcomed by most of our correspondents and the first list of members, in order of receipt of applications, is given in this space. Several who have expressed interest have not actually applied for membership and if this is an oversight may we ask them to send us a formal application consisting of a statement of interest in 5-metre work, and a promise to support all organised events to the best of their ability.

A business meeting to discuss matters of interest to the club will be held in due course. Among the suggestions already

put forward is one for a regular meeting night on 3.5 mc, in order that north and south members, out of contact due to poor 5-metre conditions, could discuss the state of the band, schedules and so on. We are not sure whether we favour this or not, but your own ideas on the subject will be welcomed.

Activity List

Pressure on space has prevented appearance this time of the third (supplementary) list of active VHF stations, which contains 56 call signs not previously given; with the two lists already published in our March and April issues, this adds up to a grand total of 212 G stations known to us to have made at least an appearance on the band during the last three or four months—representing a very creditable and encouraging volume of activity and indicating the great potential interest there

is in VHF operation. We are maintaining careful records of all stations known to be on, and revised lists will be published from time to time.

In Conclusion

The next Magazine Activity Week-End is May 9-10, when we hope conditions will be good and that we shall not have any more of these cracks about MIWE! Let us have your lists of calls heard and worked, and may we once again ask that they be set out as they appear in these columns, because it saves us such a lot of unnecessary work.

Thanks to those who have written this month, and the address for next time, is, as always, E. J. Williams (G2XC), *Short Wave Magazine*, 49 Victoria Street, London, S.W.1.—and the latest date is May 15, *certain*. Don't forget M.A.W.E. No. 3!

FIVE-METRE CALLS HEARD

G3IS, 59 Eastlands Road, Rugby, Warks.

Heard or Worked: G2AK, 2ADZ, 2AOK/A, 2COP, 2RI, 3ABA, 3BJQ, 3BYE, 3BOB, 4LU, 5BJ, 5GX, 5LJ, 5PP, 5RP, 5US, 6OS, 6VX, 6XM, 8UZ, 8VM. (During 30 days ending April 14.)

G3DCV, 75 Elwyn Road, March, Cambs.

Worked: G2OI, 2XV, 2XC, 2AUA, 2CPT, 3BGW, 3BXE, 3IS, 3WW, 3CUA, 5BD, 5RP, 6OS, 6VX, 6XM, 8AL, 8WV. (March 30-April 15.)

G3COJ, 18 Allderidge Avenue, Hull.

Heard: G2APW, 2FKZ, 2RI, 3ABA, 3BUR/A, 3IS, 3WW, 4LU, 5LJ, 5MA, 5MQ, 6LC, 6OH, 6VX, 6XM. (March 23-April 15.)

G6OS, 95 Parkfield Drive, Hull.

Heard: G2ADR, 2BMC, 2CPT, 2OI, 3IS, 3ABA, 3ALD, 3COJ, 5BD, 5GS, 5GX, 6BH, 6BX, 6MN/A, 6VD. (M.A.W.E. No. 2.)

G2HLF, 9 Theobalds Green, Heathfield, Sussex.

Heard or worked: F8AA, 8GH, 8NW, 8ZF, G2ADZ, 2AJ, 2BB, 2CIW, 2CWL, 2FKZ, 2FZR, 2KI, 2MR, 2MV, 2NM, 2QV, 2UJ, 2XC, 2YL, 3AAT/A, 3AUS, 3AUA, 3BOB, 3BTL, 3BYU, 3CU, 3CUA, 3CWW, 3FP, 3HT, 3NR, 3VB, 4AP, 4IG, 4MR, 5BY, 5HN, 5IG, 5LQ, 5MR, 5MQ, 5PY, 5RP, 5US, 5ZT, 6HD, 6NF, 6PG, 6UH, 6UW, 6VX, 6WT, 6XM, 8AL, 8SM, 8TJ.

G2NH, 75 Woodlands Avenue, New Malden, Surrey.

Heard: G2AJ, 2BDX, 2CWL, 2FKZ, 2HDY, 2HLF, 2KI, 2KG, 2XC, 2ZV, 2UJ, 3AEZ, 3BOB, 3FP, 3BYU, 3VB, 4CG, 4KO, 4RO, 5AM, 5BJ, 5KJ, 5LQ, 5MR, 5RP, 5US, 5VY, 6HD, 6KB, 6VX, 6XM, 8AL, 8KZ, 8SM. (M.A.W.E. No. 2.)

G3YH, Bedminster, Bristol.

Heard: G2XC, 3BXE, 5LO, 5MQ, 5US, 6VX, 6XM.

Worked: G2BMZ, 4AP, 5MA. (March 15-April 14.)

G6HD, 40F Wickham Road, Beckenham, Kent.

Heard: G2ADZ, 2AJ, 2AZL, 2BDX, 2BMZ, 2HLF, 2KG, 2KI, 2UJ, 3BFP, 3BPT, 3VB, 3BXE, 3BYU, 3AAT/A, 5KJ, 5RP, 5US, 5VY, 6GR, 6NA, 6VX, 8AL, 8RS, 8SK.

Worked: G2KF, 2NH, 2CWL, 2FKZ, 2HDY, 2XC, 3FP, 3AEZ, 4CG, 4KD, 4RO, 5LQ, 5MR, 6NF, 6XM.

G2HDY, 169 Huntingfield Road, Roehampton, London, S.W.15.

Heard: G2AJ, 2CWL, 2FBU, 2HLF, 2KI, 2NH, 2XC, 3BYU, 4KD, 4RO, 5KJ, 5LP, 5MA, 5US, 6VX, 8AL.

Worked: G2FZR, 2KO, 3AUA, 3BXE, 6HC, 6HD, 6XM. (April 10 only.)

Heard: G2CWL, 2FKZ, 2HLF, 2NH, 2XC, 2ZV, 3BWS, 4CG, 4RO, 5CD, 5KJ, 5LQ, 5RD, 5VY, 6HD, 6NA, 6NF, 6NR, 6VX.

Worked: G3FP, 5AM, 8RS. (April 11 only.)

G2ADR, 19 Fellbrook Avenue, Beckfield Lane, Acomb, York.

Worked: G2ADZ, 2BH, 2BMC, 2CPT, 2OI, 3ALD, 3ARS, 3ATM, 3COJ, 3DA, 3ZK, 4LU, 4RQ, 5BD, 5GX, 6BH, 6BX, 6LC, 6MN/A, 6OS, 6YO, 8IC, 8SJ.

Heard: G2IN, 2QM, 3ALY, 3APY, 3BLP, 3UI, 5MQ, 6FO, 6VX, 8IQ, 8SI, 8UR, 8W5UO.

G4RO, 7 Blakemere Road, Welwyn Garden City, Herts.

G2AJ, 2FBU, 2FZR, 2HLF, 2KG, 2KI, 2NH, 2UJ, 2XC, 3AAT/A, 3BGW, 5AM, 5KJ, 5LQ, 5US, 6GR, 6HD, 6NF, 6VX, 6XM, 8AL, 8KZ, 8WV. (All during M.A.W.E. No. 2, April 10-11.)

G8KL, 3 Broome Road, Wolverhampton, Staffs.

G2ADZ, 2AOK/A, 2APW, 2NH, 2OI, 2XC, 3ABA, 3BLP, 3DCV, 3IS, 4LU, 5LO, 5MA, 5MQ, 5PP, 5RP, 5US, 6OS, 6XM, 8AL. (All heard or worked month ending April 18.)

G4LU, Avalon, Pant, Nr. Oswestry, Salop.

Heard: G3DA, 5MQ, 6LC, 8ID, 8UZ.

Worked: G2AK, 2ADR, 2AOK/A, 2ATK, 2OI, 3ABA, 3ALD, 3IS, 3LN, 5BJ, 5GX, 5LJ, 5LO, 6FK, 6HD, 6OS, 6SQ, 6XM, 8AL, 8KL, 8UR, 8WV. (All during period March 15-April 15.)

G2AOK, Church Street, Stow-on-the-Wold, Cheltenham, Glos.

G2ADZ, 2AK, 2APW, 2ATK, 3ABA, 3HC, 3IS, 4LU, 5BJ, 5LJ, 5LO, 5PP, 5US, 8KB, 8KL. (All worked March 15-April 15.)

Wide-Band VHF Aerials

Designing a Cone-Type Dipole for 58 mc

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

(The Yagi directional aerial system, involving the use of an excited element with one or more parasitics as reflector or directors, has for amateur work the serious disadvantage of a narrow band-width, the efficiency falling off rapidly if it is operated off the frequency for which the system is designed. The author shows that a dipole consisting of two cones apex-to-apex, built up of wires and fed at the centre in the ordinary way, can be made to give a constant resistive match over the whole of the 58 mc band.—Ed.)

IN the present two VHF bands available for amateur use, a considerable gain in signal-to-noise ratio can be obtained by making use of directive aerial systems. In the 2300 mc band this is done by a radiator of large aperture, such as a paraboloid excited by a sectoral horn or a cylindrical dipole, but in the 58 mc band large apertures are inconvenient and a Yagi-type directive array is more commonly used.

Complex arrays, with parasitic directors and a reflector, suffer from frequency sensitivity; that is to say, the Q of the system is too large and the elements must be cut to within an eighth of an inch (58 mc band) for optimum match to the feeder. This is a tedious business, and in the event of a change in frequency being made, the aerial will present a mismatch.

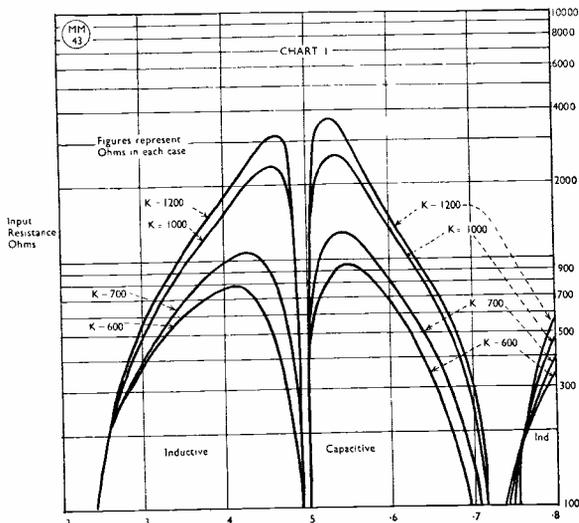
Television, with its wide sidebands, demands an aerial with a band width of at least 4 mc, a condition rarely fulfilled by the ubiquitous dipole and reflector of commerce. It is the purpose of this article to provide information which will enable a wide-band exciting element to be made to suit individual conditions.

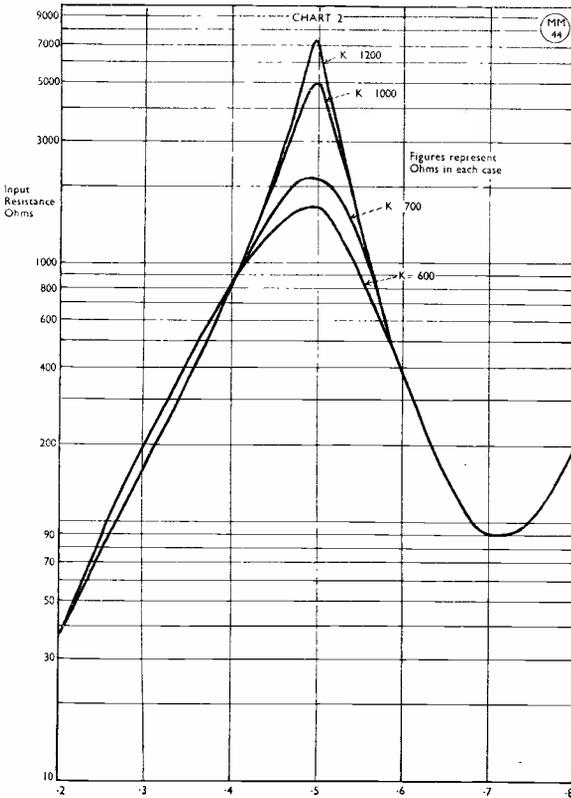
Factors Influencing Band Width

There are wide band aerials in use at HF, of which the Rhombic is the most common. This aerial is very large and not easily rotated, even at 58 mc, but it does have a frequency range of approximately 2 : 1, if the wires are suitably

spaced. It differs from the dipole in that it is terminated by an artificial load, which represents a loss, but makes the input impedance substantially resistive and constant over the range of operation. This loss is not acceptable for transmission at limited power in the amateur bands, but owing to the directivity of the aerial it can be allowed on the reception side.

Owing to the presence of directors and reflectors in the Yagi system of obtaining directivity, the input impedance of a dipole exciting element is lowered to an inconvenient value. The amateur then folds his dipole to raise its impedance to a value approaching that of obtainable feeder lines. This process of folding has another and very beneficial effect (not often appreciated) namely, of increasing the band width of the element. It is found that





This will match into a suitable cable easily and the aerial problem is solved. At VHF things are not so simple. We expect the aerial to operate over a wider frequency range and then we spoil it by bringing bits of wire near it to alter the polar diagram. The aerial resents this and shows its displeasure by changing its impedance over the operating frequency range.

The method adopted to portray the behaviour of such an aerial is to represent it as a length of transmission line, whose characteristic impedance we shall call K , terminated by an output impedance, Z_t . For a simple element, unaffected by nearby objects, the length is that of the element itself. If Z_t were entirely resistive and equalled K , then the aerial would be a perfect match to a cable of impedance K at all frequencies. This is not possible, though aerials have been made which approximate to it over several decades of frequency range, and in any case these aerials would

not be suitable for amateur use as the gain is very low.

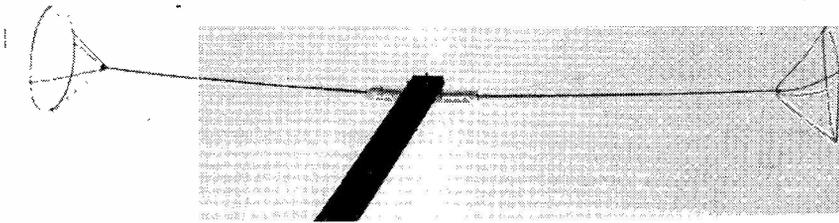
Simple Wide Band Element

There is, however, a very simple element which can easily be made to give resistive match over the whole 58 mc band and a not so serious mismatch over the American 50 mc band. This is the "fat" dipole. There are several ways of fattening a dipole; it can be made as a wide cylinder, two cones either base-to-base or apex-to-apex, or spherical. Details are to be given of the apex-to-apex cone type as it is felt that this results in the easiest construction. A solid body is unnecessary; for our purpose, eight or ten wires uniformly spaced around the circumference of a circle can simulate a solid body.

It is first necessary to decide what input impedance is desired, this depending on the characteristic impedance of the feeder that is to be connected to the aerial. An

increasing cross-sectional area of the element is one of the most potent factors in the quest for wide band aerial elements. In general, the greater the cross-sectional area, the greater the band width and the lower the Q . It might be thought that a high- Q aerial would be a desirable thing, especially after reading some of the advertisements. The case is the same as the tank circuit of an RF power amplifier, in which the current is wanted in the load and not as a large wattless circulating current. The aerial is designed to be lossy, the loss occurring in the radiation resistance and not, it is hoped, in the ohmic resistance of the conductors.

At HF we represent the aerial by a series or parallel combination of radiation resistance, inductance and capacity. The length is chosen so that the inductive and capacitive reactances cancel, leaving only the radiation resistance, which for a half-wave dipole is 73 ohms approximately.



General view of G3AAT's wide-band dipole, design data being given in the text.

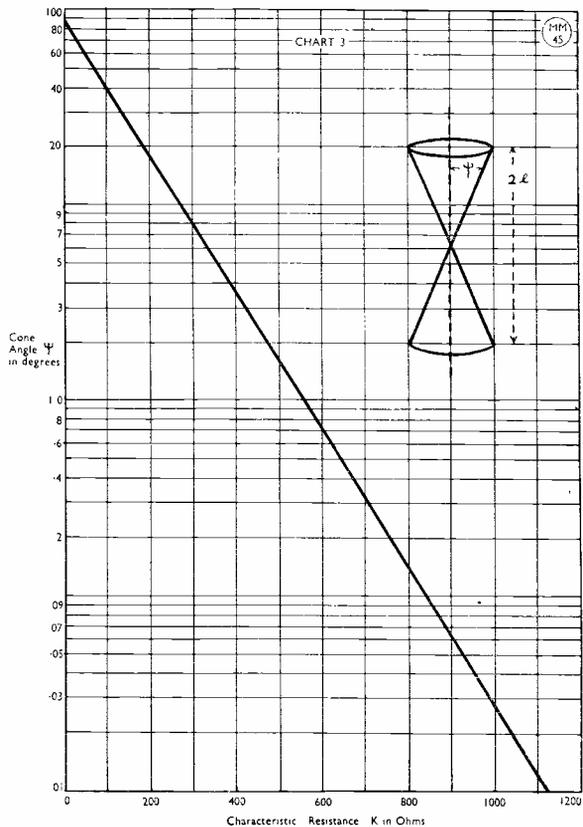
aerial length must be chosen from Chart I such that the reactive component is small, lengths of $.25\lambda$, $.49\lambda$, and $.73\lambda$ being suitable. (λ is the wavelength corresponding to the mid-frequency of the band.) Next refer the chosen length to Chart II, where the input resistance desired should be taken and the value of K found which will enable the aerial to be built. If there does not appear to be a value of K which will satisfy Chart II, then the aerial cannot be built to have the chosen input impedance and a different length or impedance must be tried.

Having found K , the characteristic impedance, the cone angle can be found by consulting Chart III, and the aerial can be built. Note that the different lengths which give small reactance are somewhat different in their characteristics. At $l = .23\lambda$ the input resistance is nearly independent of K , but that at $l = .49\lambda$ the input resistance is much higher and varies with K . This is a very useful length, especially if the impedance is to be lowered by the proximity of parasitic elements. At $l = .75\lambda$ the input resistance is again independent of K and remains constant at about 90 ohms over a large range of length; also, the variation of reactance with length

is less here. The aerial is a little large, its total length being $l = .46\lambda$ and the cones will be a bit unwieldy.

Some Further Points

It is quite in order to combine these



elements into an array, either with driven or parasitic elements, but if thin-wire elements are used all the advantages are lost. For parasitic elements, the cylindrical form of construction is advised. The lengths of cylindrical elements are approximately the same as for thin-wire ones, being slightly shorter in all cases and not so critical.

The effect of parasitic elements upon the input resistance of the driving element is dependent on the length and spacing of the parasitic elements and is not amenable to simple graphical calculation.

The pruning of wide-band elements is not easy and should not be necessary, owing to the wide band, but spacing can easily be varied to give optimum radiation. Balance to unbalance transformation should theoretically be done by one of the well-known wide-band systems, but in practice it can be done by a quarter-wave skirt, or even omitted entirely.

The writer uses a $\cdot 25 \lambda$ element, with a characteristic impedance of 300 ohms, fed by 200 feet of 47-ohm coaxial feeder, balance to unbalance transformation being by quarter-wave skirt. No parasitic elements are used and the aerial height is 60 feet. From reports it appears to radiate the normal figure of eight pattern, but the snags appear on reception. Owing to the bad location, unity aerial gain and excessive feeder length, signals are received rather badly on an S27, lately provided with an

RL37 triode RF amplifier. A pre-amplifier at the base of the aerial, with T-R switching should remedy this state of affairs. The match to the feeder seems to be as calculated, for standing waves on a feeder of this length would be disastrous from the points of view of both transmission and reception.

As a matter of interest, the television programme is received well above the noise level on most nights, in spite of the cross polarisation. Harmonics of CW stations which occur in the 50-70 mc range are all received and it is possible to hear some signals in the 28 mc band—but it is not claimed that the acceptance should be that wide! It ought to be possible to obtain a band width of some 4 mc, with a gradual falling off outside these limits.

SUBSCRIPTION NOTE

We are still able to take direct subscriptions to the *Short Wave Magazine*, but only to commence from the month following the issue in which this notice appears. If you are having difficulty in getting the *Magazine* regularly and on time, 20s. remitted to us will guarantee it being posted to you direct, on the day of publication, for twelve months. Write the Circulation Manager, Short Wave Magazine, Ltd., 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 call signs, or changes of address of transmitters already licensed. All addresses published here are automatically included in the quarterly issue of the Call Book in preparation. QTH's are inserted as they are received, up to the limit of the space allowances. Please write clearly and address on a separate slip to QTH Section.

E18T	M. P. MacCarthy, Spike Island, Cobh, Co. Cork, Eire.	G2FKJ	S. H. Robinson, 51 King Street, Huddersfield.
G2AAS	H. E. Sutton, Boston Road, Horncastle, Lincs.	G2FMN	E. J. Casey, 14 Arbutnot Road, London, S.E.14.
G2ABR	R. Mayman, 27 Tennyson Avenue, Hull.	G2FQD	A. L. Rogers, 25a Arwenack Street, Falmouth, Cornwall.
G2AWA	A. W. Allan, B.Sc., A.M.I.E.E., 38 Kipling Avenue, Wells, Bath.	G2FRI	T. J. Swain, 34 Howgate Road, London, S.W.14.
GW2BBO	L. W. Osmond, 61 Windsor Road, Penarth, Glam.	G2FRI/A	T. J. Swain, 22 Brunswick Road, Withington, Manchester, 20.
G2BQY	P. Woodhouse, 65 Wall End Road, London, E.6.	G2HGR	J. E. Askew, 10 Peel Street, Westhoughton, Bolton, Lancs.
G2BWN	J. F. H. Weller, 5J Grove End House, St. Johns Wood Road, London, N.W.8.	G2HHX	C. L. R. Bullock, 46 Central Avenue, Northfield, Birmingham.
G2DGS	K. Bloodworth, 178 Sovereign Road, Earlsdon, Coventry.	G2HJV	F. C. Soans, 39 Northumberland Road, Leamington Spa, Warks.
G2DRG	A. B. Watt, 11 Holly Road, Handsworth, Birmingham.	GM3AKN	R. Milne, 3 The Quadrant, Penicuik, Midlothian.
G2DXB	F. Chester, 12 Burns Grove, Nunthorpe, Grimsby, Lincs.	G3ARR	T. B. Welford, 11 Ash Close, New Malden, Surrey.

- G3AAU A. J. Hill, Lesley Cottage, Elm Park, Stanmore, Middx.
- G3AVZ F. R. Steckel, 10 Maple Grove, Bellfields Estate, Guildford, Surrey.
- G3AYD B. H. Payne, 11 Ingram Way, Greenford, Middx.
- G3BGI H. T. Wright, 16 Balaclava Road, Fishponds, Bristol.
- G3BHJ/A O. J. Russell, B.Sc., 7 Rosebery Gardens, London, W.13.
- GM3BJG J. H. Cheevers, 140 Old Inverkip Road, Greenock, Renfrewshire.
- G3BLU H. D. Stanley, Plantation House, Eaves Lane, Cheadle, Stoke-on-Trent, Staffs.
- G3BMR Beamanor Amateur Radio Society, 24 Brandhill, Woodhouse Eaves, Loughborough, Leics.
- G3BPC G. R. Grubb, A.M.I.P.R.E., Ardeen, Talbot Road, Cliftonville, Margate, Kent.
- G3BPU Admiralty Electronics Society, D.E.E. Dept., Foxhill Hutments, Bath.
- G3BSI S. T. Smith, 35 Claremont Road, Westcliff-on-Sea, Essex.
- G3BSK M. L. W. Prickett, 33 Hermitage Road, Solihull, Birmingham.
- G3CAW P. A. Woods, 218 Old Christchurch Road, Bournemouth, Hants.
- GM3CCK J. L. Twatt, 37 Albert Street, Kirkwall, Orkneys.
- GW3CDH E. E. Evans, 36 St. Mary Street, Risca, Newport, Mon.
- GM3CDL A. A. Carstairs, Roselea, Fleming Place, St. Andrews, Fife.
- G3CGV H. Brocklehurst, 14 Lloyd Road, Handsworth Wood, Birmingham.
- G3CHN R. V. Thorn, Broadley Farm, Sway, Hants.
- G3CHT G. W. Hopkins, 13 Park Lea Road, Roker, Sunderland, Durham.
- G3CMI J. A. Scott, 6 Whitaker Street, Batley, Yorks.
- G3CMT A. H. Hooke, 6 Summervale, Ilminster, Som.
- G3CNE E. Pearce, 29 Douglas Road, Balby, Doncaster, Yorks.
- G3CNR F. Goodliffe, 23 Lancaster Road, Uxbridge, Middx.
- G3COF J. D. Bradford, 7 Byron Street, Bradford, Yorks.
- G3CRF B. Jones, 4 Windsor Road, Plymouth, Devon.
- G3CRR A. E. Glozier, 40 Lancaster Avenue, Barking, Essex.
- G3CSU T. Kitching, 29 Belvoir Street, Hull, Yorks.
- G3CTB J. Nowell, P.O. Radio Station, Highbridge, Som.
- G3CTN R. T. Poeton, 66 Lakewood Road, Henleaze, Bristol.
- G3CUG P. Chastney, 2 Bull Lane, Dagenham, Essex.
- G3CUR R. Collette, 47 Fairlawn Mansions, London, S.E.14.
- G3CUU R. Bennett, 79 Acre Street, Denton, Manchester.
- G3CWI F. K. Rawson, 16 Mountcastle Road, Leicester.
- G3CXR Radio Officer E. H. Clegg, Derby House, Rochdale Road, Greetland, Halifax, Yorks.
- G3CYK N. Cooper, 52 Wakefield Avenue, Marfleet Lane, Hull, Yorks.
- G13DAJ A. McGugan, 134 Ballycastle Road, Coleraine, Co. Derry.
- G3DAO P. Cutler, The Greyhound, 33 Windsor Road, Beaconsfield, Bucks.
- G3DCB R. Leventon, 27 Eims Road, Worksop, Notts.
- G3DEM J. Page, 21 Longley Street, London, S.E.1.
- G3DEU F. W. How, 25 Brunswick Place, Hove, 2, Sussex.
- G3DFK T. Thornton, 23 Northwick Avenue, Worcester.
- G13DFR Capt. P. J. English, R.Sigs., 43 Kings Road, Knock, Belfast.
- G4JF C. B. Phillips, 181 Kingston Road, Staines, Middx.
- G4RX P. E. Taylor, Broom House, Pedwell Ashcott, Bridgwater, Som.
- G6HN J. A. B. Horner, 15 Belmont Road, Brislington, Bristol, 4.
- G6IF M. E. Tapson, 5 Squirrel Lane, Booker, High Wycombe, Bucks.
- G6OA G. H. Miller, Squirrels, Chestnut Avenue, Walderslade, Chatham, Kent.
- G8FO F. Booth, Shenfield, Nabb, Holmfirth, Yorks.
- CHANGE OF ADDRESS**
- G2AGX W. G. Taylor, 79 Elm Avenue, Eastcote, Ruislip, Middx.
- G2AIB C. P. Sime, 36 Central Avenue, Harton, South Shields.
- G2CKK P. King, 13 Rita Place, Folkestone, Kent.
- G2COU C. Page, 18 Highfield Road, Luton, Beds.
- G3AIR J. F. Wort, 42 Hermon Hill, London, E.11.
- G3AIR/A F./Sgt. J. F. Wort, RAF Cranwell, Lincs.
- G3AST J. A. Plowman, 28 Studley Road, Luton, Beds.
- GM3BCD T. Simpson, Lynnwood House, Hawick, Roxburghshire.
- G3BYS K. Daniels, 8 Mayfield Avenue, Prittlewell, Southend-on-Sea, Essex.
- G3WH Capt. J. P. Edwards, Orchardlea, Droitwich, Worcs.
- G4CN K. N. Greenaway, 43 The Grove, Kettering, Northants.
- G4HP H. C. Doherty, Deanshaugh, The Chase, Kemsing, Kent.
- G5CX C. J. Pill, 22 Alcester Road, Bromsgrove, Worcs.
- G5NF C. L. Ward, Culver, 19 Weydon Hill Road, Farnham, Surrey.
- G8JV G. Henderson, Ellastone, South Darley, Matlock, Derby.
- G8QR R. F. C. Brake, 129 Queens Road, Norwich, Norfolk.
- CORRECTION**
- G3CVK P. Boulton, 28 Perdiswell Street, Barbourne, Worcs.

Here and There

Taylor Instruments

They tell us that, effective immediately, their instruments will be sold under the trade-name "Windsor," in order to allow them more scope in certain export markets in which the American Taylor Instrument Co. operate; there is no connection between the two concerns. Our Taylor's have just completed their tenth year of trading.

Fat Blue Sparks

The other evening we were watching the vivid and vicious lightning which accompanies those freak "dry" thunderstorms occasionally experienced in this country. We then remembered that our various skywires were not tied down to earth, and hastened to the radio room to put this right. Fat blue sparks were snapping round the output tuning panel, and it was clear that the aerials were collecting a heavy charge. The immediate intention was to discharge the main aerial and button it to the earth strip. In the flap, we accidentally touched one of the dipole feeder terminations and got a kick which caused us to crack our cranium on the sharp edge of a heavy cabinet Tx. Bemused, but still determined, we reached for the other feeder and collected another paralysing jerk. By this time, the whole room seemed to be full of the fat blue sparks, and it was some time before the ends of the aerials could be caught and safely earthed down.

All this unpleasantness could have been avoided if proper methods (now provided) of earthing the whole aerial system had been installed in the first place. Large aerials can build up charges which are capable of giving a very nasty, if not a lethal, shock. So take warning and fit earthing switches!

New Zone Map

Though there has been some unavoidable delay in getting the full-colour version of our Zone Map through the production processes, ample supplies are now to hand.

Size 21 in. by 35 in. over-all for wall-mounting, this new Map is printed on heavy linen-backed paper, with the prefix

lists amended to March, 1948. The Map itself is drawn to a great circle projection centred on London and is thus correct, near enough, for the whole British Isles. It gives actual beam alignments, rough distances and time based on GMT for all parts of the world relative to London; Zone areas are clearly shown, and there are many place names, as well as the prefix lists for each DX Zone.

This five-colour production is a first-class job in every way, and will look well in any station. It is sent out packed round a cardboard tube (which, if possible, we should like to have back, please!) to avoid damage, costs only 6s. post free, and is available for immediate delivery. We have also done another small reprint of the original 3s. 9d. version.

These Maps can be obtained on application, with remittance, to the Circulation Manager, Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1.

QRPP

A reader reports overhearing a 28 mc contact between W6YIL and a G3; nothing unusual about this—except that the W6 was using 3 watts. Then he went QRP to 0.25-watt input and was still S4, not very much weaker than many other W6's on the band at the time with their QROO. It makes you think!

D2 QSL Bureau

All concerned should note that the QSL address for D2 cards not sent through the various bureaux is Capt. J. S. Howe, E & E Branch, 100 HQ, Bad Salzuffen, B.A.O.R. It seems that many cards are still being sent to the old QTH, which is causing delay and confusion.

Coil Winding Machines

It is not always remembered that the manufacturers of the well-known "Avo" test instruments also produce a wide range of coil winding machines of every description, with which they are doing a large export business in markets previously exploited by foreign competitors. These machines and their accessories are fully described in a beautifully printed and illustrated catalogue, just received.

THE MONTH WITH THE CLUBS

FROM REPORTS

Club Secretaries can make these notes of much greater value to their own clubs by observing one or two simple facts—in particular, the day of publication. This month we have received several reports, written on about April 12, giving details of a "forthcoming meeting" on any date between April 16 and 28. As our publication date is May 5, these will clearly be of little help to the Club!

So please, in future, watch the dates, and let us have details of meetings a month earlier, if possible, so that none of them will "miss the boat" altogether by falling between the date of reporting and the date of publication.

As the number of reports increases—there are no less than 35 clubs included this month—the need for brevity becomes still greater. So please make the reports as full of meat as possible; and if you simply want to announce the dates of forthcoming meetings and the programmes thereof, don't be afraid of doing just that and no more.

Next month's reports are required, please, by first post, on May 13. Address them to Club Secretary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1.

And so we proceed to this month's news.

Wirral Amateur Radio Society.—Recent meetings consisted of a successful Junk Sale and a talk on the Franklin Oscillator by G8BM. The two May meetings are on the 5th and 19th, 7.30 p.m. at the YMCA, Whetstone Lane, Birkenhead—new members cordially welcomed.

Coventry Amateur Radio Society.—The president of CARS (Councillor W. H. Malcoln, J.P. G6WX) has just been accorded the honour of election as Mayor of Coventry. At a recent meeting of the Club sound advice was given to RAE candidates, and a discussion on receiver design followed. The Annual Dinner was an outstanding success, with an attendance of 70. An interesting future event will be a visit to Droitwich on June 12.

East Surrey Radio Club.—At the April meeting the club heard a series of recordings of amateur transmissions, made by G2DYM of South Devon. G8HH was in the chair.

Sunderland Radio Society.—They have now secured new headquarters at Prospect House, Prospect Row, Sunderland. Meetings are being

held on Wednesdays and Fridays—7.30 to 10.30 p.m. A General Club Business meeting is held on the first Wednesday, with lectures of general interest on the other Wednesdays, Fridays being given over to the beginners. The call-sign G3CSR has been allotted, and the Club Tx is on the air on 3.5 and 7 mc.

Bournemouth & District Amateur Radio Club.—This is a flourishing concern with a membership of 60, with its own premises and its own transmitter (G3AYG). We are hoping to publish details of this gear in due course; meanwhile we hear that a W7 has been worked on a dipole of ordinary flex slung six feet above ground inside the club-room! Outdoors aerials are being erected on 50-foot steel masts.

Romford & District Amateur Radio Society.—Romford now has its own "Shack," and members have been hard at work repointing walls, fitting windows and installing fluorescent lighting (source of noise?). The club transmitter, G4KF/P, is awaiting final touches.

Worcester & District Amateur Radio Club.—At the April meeting it was decided to go ahead with two stations for NFD, run by G3NL and G3BDS. Anyone interested is asked to get into touch with G3NL or the Club Secretary. The meetings on the third Tuesday night of each month are being well supported, with keen interest in the Morse classes—new members will be welcomed.

Stourbridge & District Amateur Radio Society.—The main event at the April meeting was a discussion on the lively subject of "VFO versus Crystal". Naturally, many interesting and controversial points were brought up. Meetings are on the first Tuesday of each month, in the Science Block of King Edward VI School.

Bradford Amateur Radio Society.—Membership is steadily increasing and meetings are well supported. The last meeting on the syllabus is on May 11, when a GPO engineer will give an illustrated lecture on Radio Interference. After this date informal meetings will be held on alternate Tuesdays at Cambridge House, Little Horton Lane, Bradford.

Worthing Radio Group.—On May 6 the club will meet, as usual, at Oliver's Cafe, Southfarm Road, to hear a lecture on "Directive Properties of Short Wave Antenna Systems." The lecturer will be Mr. J. B. McMillan, M.A., B.Sc., of the EMI Institutes.

Derby & District Amateur Radio Society.—Two Nottingham amateurs, G8DD and G8QZ, give a lecture-demonstration, using UHF apparatus, on the Properties of Aerial Systems at the April meeting.

Baldock & District Radio Club.—This club has been formed very recently, and all would-be members in the district are asked to contact the hon sec., whose name and address

appears in the panel. It is intended to cover all aspects of radio, and a junior section for the under-18's is also under way. The April meeting was held on the 20th at Morch's Cafe.

Reading & District Amateur Radio Society.—The first AGM was held during April. At the election of officers the only changes were the Secretary and Treasurer, who did not stand for re-election. (New Secretary's QTH in panel). After the business, Dr. Lemon gave his Presidential Address on "The Amateur Licence." Meetings are on the second and last Saturdays of the month, at Palmer Hall, West Street.

Grimsby Amateur Radio Society.—This Club is justly proud of Mr. R. Jennison, G2AJV, who won the Eddy-stone 640 Receiver in the recent competition. Two new call-signs have appeared among the membership—G3DAE and G3DFV. Membership is steadily growing; meetings are held every Thursday, 7.30 p.m. at 115 Garden Street.

London Transmitting Society.—They are still active (it was formed in 1938) and will meet on May 6, 8 p.m. at Stag House Civic Restaurant, Broadway, Burnt Oak, Middx. Secretary's QTH in panel.

Leeds & District Amateur Radio Society.—Membership here has reached a new high record. New officers are about to be elected, and the Club's transmitter is nearly complete. At present they are running a B.2 on 3.5 and 7 mc. Meetings are held on Fridays, 7 p.m. at Swathmore Settlement, Woodhouse Square, Leeds.

Cray Valley Radio Transmitting Club.—Membership now includes 34 licensed amateurs, and meetings are held on the third Thursday of each month. The venue is the Adult Education Centre, Lamorbey Park, Halfway Street, Sidcup. From May 6 onwards, however, informal "open house" meetings are also to be held on the first Thursday of each month at the Royal Hotel, Mottingham.



The Risley Radio Society, Warrington, Lancs, operate G3CIC. Here are some of the members of the club.

London Short Wave Club.—This club has now been given its pre-war call-sign, G2CIR, and the Club Tx will be on the air each Thursday night on 7 or 14 mc. The Thursday meetings are held at The Crown, Battersea Park Road, Battersea, and new members will be welcomed.

Wanstead & Woodford Radio Society.—Recent activities have fallen rather below the normal run, but interest is being aroused by the May-Day Fete, in which the Club is taking an active part. A DF Field Day is also on the cards for June or July.

Catterick Amateur Radio Club.—Weekly meetings are held on Tuesdays, at which lectures are given on a wide variety of subjects, and a large workshop is available to members. Several aerials are already up, but a real "antenna farm" is to be "planted" in the near future. On the receiving side there are ten receivers. A new committee was recently elected, and a sub-committee is helping to run the club *seven* days a week.

Tees-Side Amateur Radio Society.—Meetings still attract a good attendance and are now held every other Monday. The next is on May 12—7.30 p.m. at the Club-Room. A visit has been arranged to the Middlesbrough Police installation, and a second one to the telephone exchange is also in the offing. The Hon. Sec. would like to hear from anyone in the district willing to lecture on technical subjects, as well as from any would-be members.

Birmingham & District Short Wave Society.—At the April meeting, members heard an interesting talk on 14 mc conditions, followed by a description and demonstration of an oscilloscope. At the next meeting (May 10) four newly-licensed amateurs will talk about pitfalls to be avoided by the beginner.

Stoke-on-Trent Radio Society.—This club still meets every Thursday and has recently arranged a ten-weeks' programme of lectures, demonstrations and quizzes. They recently held a very successful exhibition in Hanley, and are now trying to work out a scheme to exchange lecturers and ideas with other clubs. They also inform us that a Leek and District Radio Club has been formed in the district: the Secretary is Mr. W. L. Woodcroft, 35 The Crescent, Leek, Staffs. We have not heard from the new Club directly, but thank Stoke-on-Trent for a truly fraternal act in introducing them to us!

Southend & District Radio Society.—Over 80 members and friends attended the recent Hamfest. Competitions and the ever-popular "swindle" were well supported, and the winners were presented with numerous valuable prizes, donated by leading component manufacturers and by friends of the Club.

Aberdeen Amateur Radio Society.—This Club has had a somewhat stormy passage owing to the theft and destruction of its BC342 by a

temporary member! After a hue-and-cry reaching well over England it was found that similar episodes had occurred elsewhere, and the miscreant is now off the air with nine months. Aberdeen are operating again, however, with a transmitter-receiver on the 3.5 mc band.

R.A.E. & Farnborough District Amateur Radio Society.—A new feature called "Monday Forum" will be launched on May 10, at which members will discuss their various activities in Amateur Radio. On May 24 there will be a lecture on Radio Control of Aircraft and Models. Both meetings are at 7.15 p.m. and new members will be welcomed at them.

Retford & District Amateur Radio Club.—Retford moved into new premises at 8a Bridgegate, Retford, and meetings are held on Mondays (Morse and general meeting) and Fridays (lectures). On May 7 there is a talk on Propagation,

on the 14th one on Communications Receivers. The 21st is booked for a talk on Aerials, and the 28th for Prefixes and the Zone System. All are at 7.30—and new members welcomed any night.

Sutton & Cheam Radio Society.—Membership has now passed the 50 mark, including fourteen local transmitters. At a recent meeting G4CG spoke on the modification of the Type 27 Converter. Mr. Harris, who took second place in the *Magazine* 5-metre Contest (receiving section), also spoke of his experiences during the contest. The Club is now at the end of its first year, and is looking forward to the second. Meetings on first and third Tuesdays at the Red Lion, Cheam.

Hi-Q Club, Giffnock.—Recent discussions covered the subjects of high-quality sound reproduction and "boffle" speakers, the FM enthusiasts naturally being in evidence. The Club's expert on meters

and measuring instruments (Mr. I. B. Jamieson, B.Sc.) is returning to his home at Moray Firth and members will now have to contact him by radio!

Radio Society of Harrow.—Forthcoming meetings are as follows: May 18—Practical Workshop Hints; June 1—UHF Problems; June 15—Transmitter Problems, by G4GB, G2TA and G2DD; July 13—Loudspeaker quality reproduction. Note the new Secretary's QTH, in panel.

Merseyside Radio Society.—Forthcoming meetings are on May 15 (Conversion of Surplus Equipment) and May 29 (Field Day Discussion). A constructional contest is being run, and a useful-looking Information Bureau has been organised. The *Merseyside Amateur Radio Review*, a sheet published by the club, contains full details of all activities.

Following are the names and addresses of the Secretaries of Clubs whose reports appear herewith. They will be glad to hear from prospective members and to offer every assistance.

- ABERDEEN (GM3BSQ).** A. D. J. Westland, GM3BQU, 17 Beaconsfield Place, Aberdeen.
- BALDOCK.** N. F. Wilshire, G3CEU, 13 The Tene, Baldock, Herts.
- BIRMINGHAM.** N. Shirley, 14 Manor Road, Stechford, Birmingham 9.
- BOURNEMOUTH (G3AYG).** F. C. White, G3XP, Chester House Hotel, Chine Crescent, Bournemouth.
- BRADFORD.** W. S. Sykes, G2DJS, 287 Poplar Grove, Great Horton, Bradford.
- CATTERICK.** L/Cpl. B. G. Taylor, 2 Sqdn., 1st T.R., Royal Signals, Catterick Camp, Yorks.
- COVENTRY (G2ASF).** J. W. Swinnerton, G2YS, 118 Moor Street, Coventry.
- CRAY VALLEY.** G. Miles, G2CXO, Cotswold, Motttingham Lane, London, S.E.9.
- DERBY.** A. C. Steadman, 230 Chellaston Road, Shelton Lock, Derby.
- EAST SURREY.** L. Knight, G5LK, Radiohme, Madeira Walk, Reigate, Surrey.
- FARNBOROUGH.** R. J. Corps, B.Sc., Armament Dept., R.A.E., Farnborough, Hants.
- GIFFNOCK (Hi-Q Club).** J. D. Gillies, GM2FZT, 3 Berridale Avenue, Glasgow, S.4.
- GLOSSOP (G3DPX).** H. Buxton, G2AJP, 11 Walker Street, Hadfield, Nr. Manchester.
- GRIMSBY (G3CNX).** R. F. Borrill, G3TZ, 115 Garden Street, Grimsby.
- HARROW.** J. R. Pickett, 93 Whitmore Road, Harrow, Middx.
- HOUNSLOW.** A. H. Pottle, 11 Abinger Gardens, Isleworth, Middx.
- LEEDS.** F. Stork, 1 Brudewell View, Leeds.
- LONDON, S.W.** R. Lisney, 4 Ongar Road, London, S.W.6.
- LONDON (Transmitting Society).** H. E. Hardy, 4 Market Lane, Burnt Oak, Middx.
- MERSEYSIDE.** C. M. Johnstone, 6 Flawn Road, West Derby, Liverpool.
- READING.** L. Watts, G6WO, 817 Oxford Road, Reading.
- RETFORD.** H. White, G3BTU, 39 Trent Street, Retford.
- ROMFORD (G4KF/A).** R. C. E. Beardow, G3FT, 3 Geneva Gardens, Whalebone Lane North, Chadwell Heath, Essex.
- SOUTHEND (G5QK).** J. H. Barrance, M.B.E., G3BUJ, 49 Swanage Road, Southend-on-Sea, Essex.
- STOKE-ON-TRENT.** D. Poole (G3AQW), 13 Oldfield Avenue, Norton-le-Moors, Stoke-on-Trent, Staffs.
- STOURBRIDGE.** W. A. Higgins, G8GF, 35 John Street, Brierley Hill, Staffs.
- SUNDERLAND (G3CSR).** R. A. Sharp, G2HMI, 137 Coronation Street, Sunderland.
- SURREY (CROYDON).** L. C. Blanchard, 122 St. Andrews Road, Coulsdon, Surrey.
- SUTTON AND CHEAM.** R. G. Finch, 26 Sunnymede Avenue, Carshalton Beeches, Surrey.
- TEES-SIDE.** H. Walker, G3CBW, 9 Chester Street, Middlesbrough.
- THAMES VALLEY.** D. R. Spearing, G3JG, 99 High Street, Esher, Surrey.
- WANSTEAD (G3BRX).** R. J. C. Broadbent, G3AAJ, 24 St. Margarets Road, Wanstead Park, London, E.12.
- WIRRAL.** B. O'Brien, G2AMV, 26 Coombe Road, Irby, Heswall, Cheshire.
- WORCESTER.** J. Morris Casey, G8JC, Brookhill Farm, Ladywood, Droitwich, Worcs.
- WORTHING.** G. W. Morton, 42 Southfarm Road, Worthing, Sussex.

Hounslow & District Radio Society.—Meetings for the first quarter of the year were well supported, and the forthcoming programme caters for all tastes, with talks on varied subjects and practical nights. The May meetings are on the 5th and 19th.

Surrey Radio Contact Club (Croydon).—The seventh AGM of this Club was held in April, and all existing officers were re-elected. The membership is over 100, the financial position strong, and the future obviously full of good things.

Next meeting is on May 11—Blacksmiths Arms, Croydon at 7.30 p.m.

Thames Valley Amateur Radio Transmitters' Society.—Monthly meetings are held at the Carnarvon Castle Hotel, Hampton Court, on the first Wednesday of the month, and weekly schedules are held on the air—10.30 p.m. on the Top Band. At the April meeting Mr. N. C. Rogers kept members extremely interested with a lecture on Television. May 5 sees a lecture by Mr. Wigglesworth of the Mullard

Radio Valve Co. Ltd., and in June there is to be a social visit to the coast. A Club Field Day has been arranged for August.

Glossop & District Radio Society.—Reformed towards the end of 1947, activity is in full swing at the Community House, Market Street, Glossop, with the club station G3DFX on the air; seven members are fully licensed. Field day operation is planned and readers locally are invited to get in touch with the Secretary.

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If you want to exchange crystals, set out your offer in the form given here, headed "Xtal Xchange—Free Insertion". Exchange notices *only* can be accepted for this space, and all negotiations must be conducted direct.

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SWL. 12 Park Street, Brighton, Sussex.

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IDENTITY, PSE!

When corresponding with us on any matter, please quote your callsign, if you have one. It often helps us considerably if we know you have a call, apart from the fact that the tradition of Amateur Radio is that operators always sign their calls, by which they are frequently better known than by name—"D. F. Bloggs-Gough, G9BF," for instance. Who ever would have thought his name was that!

FRENCH QSL ADDRESS

We are officially informed that the Bureau address for all amateurs signing the "F" prefixes (and presumably the D5's) is "QSL Bureau de R.E.F., 6 Rue du Pont-de-Lodi, Paris, VI, France."

L.E.C.I.

In circuit on p. 124, April, the point marked "HT-" should go to "GB-300 v." These lil' errors will keep creeping about.

QSL BUREAU RULES

- (1) Use of the Bureau both ways is open only to readers who obtain either the *Short Wave Listener* or the *Short Wave Magazine* from us on direct subscription. Cards from overseas are, however, accepted without restriction for free delivery to any British amateur.
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- (3) Cards should be forwarded to us in fully stamped envelopes addressed BCM/QSL, London, W.C.1. This is a full and sufficient address from any part of the world.
- (4) When sending the first batch of cards, enclose three stamped self-addressed envelopes of a suitable size for return QSL's.
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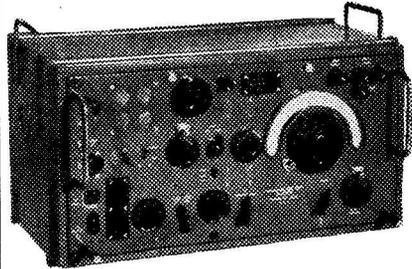
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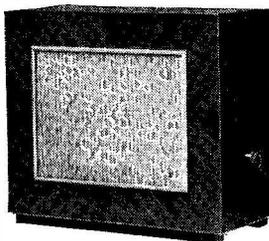
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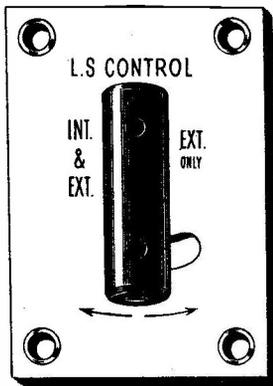
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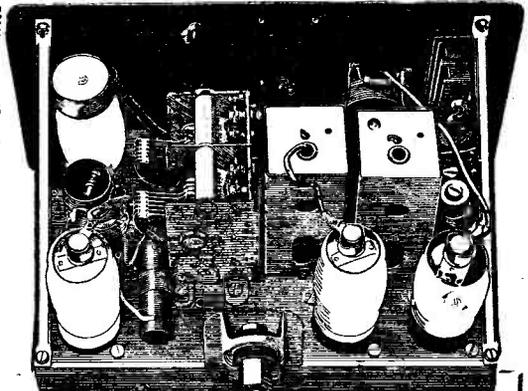
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0-5 megohms
0-10 megohms

A.C. Voltage
0-5 volts
0-25 volts
0-100 volts
0-250 volts
0-500 volts

D.C. Current
0-2.5 milliamps
0-5 milliamps
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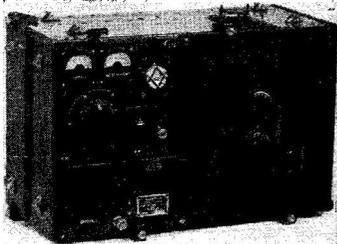
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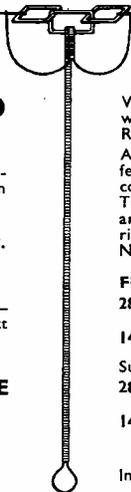
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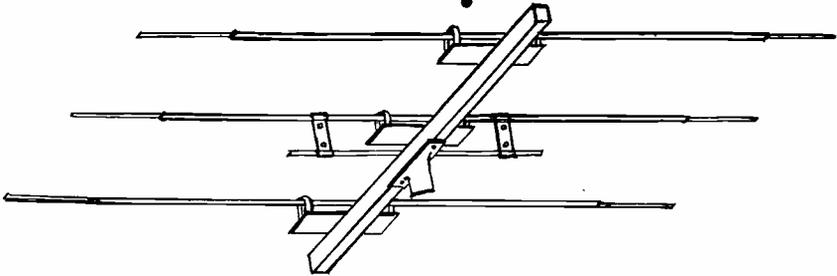
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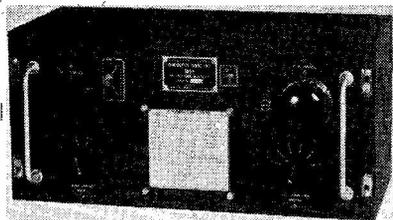
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1750-0-1750v, 350 mA with 6v bulb winding, for £6/10/-. Also, 0-700-1200v with 4v at 4 amps, 4v at 3 amps and two rect. bases on panel, £3. Also three 832's at 25s. each. Wanted, 700-0-700 at 500 mA with 6v fil.—Box 256.

R.109T 1-8-8-5 mc, 8-valve. Brand new, 7 gns. Rotary converter, 24v/230v 200w AC, 5 gns.—N. Vinson, Nestlestead Place, Wateringbury, Kent.

CRYSTAL Mike, D104 type, hardly used, £3. Brush crystal pick-up, 30/-. Acorn valves, 954, 955, 15/-.—Woolatt, Cedar House, Chobham, Surrey.

FOR sale. Commercially built transmitter-receiver with A.C. power supply. Transmitter 6V6 (C.O.), 829 P.A. C.W. Receiver. 6K8, 6SK7, 6SQ7, 6SC7. Coverage 2-8 mc/s. £25 complete with headphones.—Box 276.

SMALL ADVERTISEMENTS

READERS'—continued.

BC348N Manufactured R.C.A. Re-aligned, modified, separate AC power supply, standby switch, tuning indicator, sensitivity better than 1 microvolt. Complete service manual. £27/10/- or offer.—G3DUF, 11 Bisham Gardens, Highgate, N.6. *Mountview* 8419.

TRANSFORMERS, 6.3v 10 A. 25/-, 500-0-500v 150 mA, 40/-, 500-0-500v 250 mA, 50/-, Choke, 10 H 150 mA, 20/-, QCC/P5 1835 kc xtal, calibration certificate, 17/-, Valves, 6N7, 6L6, RK34, 50L6, etc., 7/6. List, S.A.E. Everything new. Frequency sub-standard, xtal-three valves—100 kc and 10 kc points. Perfect, £8. Wanted AR88D handbook.—Box 257.

EDDYSTONE 504 Receiver. Perfect condition. Offers.—Box 258.

MCR1 Rx, 100 kc-14 mc, 'phones, AC/DC power pack, circuit diagram, coils, matched output transformer for speaker, £6/10/-—Hobbs, 15 Vincent Road, Coulsdon, Surrey.

HRO SENIOR, 4 coils (1.6-30 mc), band-spread, per cond., £35. Two HRO power packs, 12v vibrapack, meters, etc.—68 Canterbury Road, North Harrow.

RADIO NEWS, July 1947 wanted urgently, loan or purchase. All pre-war issues (31) *Short Wave Magazine*, good condition, 15/-—G2BYN, 43 Pettits Lane, Romford, Essex.

TYPE TR9 battery-operated ex-RAF transmitter/receiver, 20/80 metres, 9 valves, all standard 2-volt types, £4, carriage paid.—Higginbotham, 12 Gower Road, Brinnington, Stockport, Cheshire.

807's, 10/-, EF50's in ceramic holders, 5/-, R1155, cream cellulose sprayed, chromium-plated pack, speaker, perfect, £20. One complete, unsprayed, £18. One minus pack, speaker, £15. RX packs gram. section, £6. R1132, £5. HRO S-meter, £3. HRO with six coils, £50. Aluminium sheets, 16½-in. × 8½-in., 1/-, 104-in. × 9-in., 9d. carriage extra. S.A.E. list.—Box 255.

1155 complete with power pack for 200-250v AC supply and 7-in. L.S. in cabinet, £18/10/- or nearest.—SWL/GM/1639, Mount Carron, Falkirk, Stirlingshire.

3-VALVE (EF50) receiver and mains unit for sale. Perfect condition, £12/12/-, S.A.E. for Tx and Rx components, valves, etc.—G. Rimmer, 35 Mayfield Gardens, London, W.7.

EDDYSTONE AW2 with coils, valves and 'phones, £5/10/-, 644 cabinet and chassis, 20/-, 639 diols, S.M., 9/-, 6C8G, 10/-, Steel chassis, 12-in. × 7-in. × 3-in., 5/-, *Short Wave Magazine*, March 1937 to September 1939. Offers.—Garner, 81 St. Paul's Road, Peterborough.

FOR sale, mounted crystals, 1730, 3720, 3750, 3755, 3780, 3539, at 10/- each; also 2 mc evacuated type, 30/-, Ex-AM compass, type P8, 20/-, B2 transmitter and receiver, new, £7/10/-, Marconi communications receiver, 12-2000 metres, BFO, AGC, RF and LF gains, 5 bands, 8 valves, £12. Morse key, ball-bearing mounted arm, 15/-; valves, new, HK24G, EL32, PEN4DD, PEN4VA, AC6/PEN, at 10/- each, excepting HK24G at £1.—G3WS, 558 Upper Brentwood Road, Gidea Park, Romford, Essex.

145VFO, with supply, perfect, £10. 500v 250 mA power supply and VHF Rx, 1 RL17, 7 EF50, rack mounted, £5. 1000v 500 mA transformer, associated choke, multi-filament transformer, 7.5, 6.3, 5, high amps, £5. *Short Wave Magazine*, March 1946 to March 1948, 36/-—3 Geneva Gardens, Chadwell Heath, Essex.

BC348N for sale, as new. Fitted with noise limiter, S-meter and aligned for ham bands by well-known firm, £35. Apply R. Edwards, Brown Loaf Farm, Race Hill, Brighton, 7, Sussex.

AR88 535 kc-32 mc communications receiver, in perfect condition, with two matched speakers, no cabinet. What offers?—Box 260.

4-VALVE 5-10 metre converter, internal power supply, professional job, £15. Pair 813's, £5. Pair U23 HV rectifiers, 30/-, Transformer, 1000-0-1000v 300 mA, 4v 8A, pri. 230v, £4/10/-, Condensers, 4 mF, 2000v working, 15/-, Choke 10 Hy, 300 mA, 30/-—G6VS, 11 Cortsway, Greasby, Wirral.

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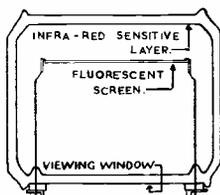
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PREMIER 15-watt modulator/amplifier, high-low gain and tone controls, employing 6F5, 6N7, 6F8, PP6V6's, 5Z4, Matchmaker output transformer, etc. £10 or offer.—G6BP, 35 Highfield Gardens, Aldershot.

COSSOR Model 339 double beam oscilloscope, £25 or best offer. Marconi B28 communications receiver, £25. Both guaranteed perfect condition, with instruction manuals.—G3BZD, 54 Chaddlewood Avenue, Lipson, Plymouth, Devon.

BC348 £15. BC221, £13/10/-. New HRO, £57. Wanted, HRO 14-28 mc coils.—G5KX, 1 Balmoral Drive, Southport.

HRO and power pack, both rack-mounting, EA50 noise-limiter fitted, eight coils (four band-spread), perfect, £45.—G5DM, 27 Beeston Fields Drive, Beeston, Notts.

EXCHANGE working R1116, mains power supply, 'phones, circuits, etc., for working R1155, or American communications receiver without valves.—Fryer, 46 Burstow Road, S.W.20.

FOR sale. R103A communications receiver, 230v AC and 6v DC operation, 1.6 to 7.5 mc, ideal for field day, complete with brand new set of valves, £9/10/-.—Box 263.

MARCONI CR100, in perfect condition, 60 kc to 30 mc, complete with S-meter and noise-limiter. Will exchange for Hallicrafters Panadaptor SP44, 230/250v AC. All enquiries answered.—Box 262.

WANTED. 20-40-80 Xmitter, complete, 25 watts. Nothing hay-wire, no fancy price.—Barnett, 65 Woodstock Gardens, Blackpool.

R1155 fully modified, built-in power pack, 6V6 output, 'phones and speaker jacks, £15, or offers.—G3BMM, 25 Syggeston Street, Burton-on-Trent.

G5CP offers BC348, modified 230v AC, £24.

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EXCHANGE or sale. B2 Tx/Rx, power pack, coils, complete. MCRI Rx with all coils and power pack. Five new 813's at £2 each, 4 805's at 30/-. Several 5 mc xtals for regrinding, 3/- each. Gold plated 28.2 mc, 28.4 mc, 35/- each. AR88, £50, or exchange.—Box 261.

STEEL boxes, 10½-in. x 6-in. x 3-in., screw lid, grey, ideal chassis, portables, monitors, 3/- post paid, grey, G2HCZ, 116 Rosebank Avenue, Elm Park, Essex.

RCA AR88E, recently aligned S-meter, hand-book, £45. Buyer collects, London. 37 Osc, brand new, £12, with instruction handbook.—Box 264.

SALE. Ham-built 1-V-1 battery Rx, elec. band-spread, 4 coils, 10 to 80 metres, full vision tuning, heavy aluminium cabinet, £7, carriage paid, or offers.—Lister, 13 Silver Royd Grove, Leeds, 12.

6C4'S. Five watts of RF from this button-base triode, surplus, unused (boxed), 15/- each.—Box 267.

WANTED, Book BC348, Xtal IN34; for sale, electric motor, 350v 50 cycle AC, single-phase, 2850 r.p.m. (Bullmotors), new, 0.4 h.p., £10/10/-, carriage paid. Receivers; valves; transformers; transmitters; BC348, brand new, £17/10/-, plus carriage. Amateur clearance. S.A.E. list.—Box 266.

CR100 communications receiver, excellent condition, with brand new spare valves. £37/10/-. T1360C transmitter, brand new, £5. TR1196 transmitter/receiver, brand new, £5. T1333B dinghy transmitter, brand new, £3. 8-in. cabinet speaker, £1. Two only 807's, new, £1. Intercomm. amplifier and speaker in cabinet, £2. Or £45 the lot.—Box 265.

FOR sale. Advance Components signal generator, I type B2, complete, excellent condition, cost £26. £20.—G3BFL, 125 Milborough Crescent, Lee, S.E.12.

SMALL ADVERTISEMENTS

READERS'—continued.

BRAND new Variac transformer, input 115v and 230v, output 0-270v, 5 amps. 21 copies of *Wireless World*, July 1941 to January 1945. Offers. Also 8-in. and 6½-in. permanent magnet speakers, 16/- each.—D. Leveridge, 88 Grange Avenue, Leeds, 7.

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RME69 £35. TBY8 Tx/Rx, 'phones, mike, key, etc., £15, 28-80 mc RX110, 5-10-20 metres, built-in speaker, AC or battery, £12. T53, what offers.—Kemp, Woodham Walter, Essex.

FOR sale. Radiovision 5 and 10 metre expander, £15.—Box No. 271.

SALE. German electric set tester (new), ohms, 5milliamps, DC volts, AC volts, watts, electrolytic condensers, paper condensers, AC-DC neon, buzzer through test, bridging of resistances and condensers, £18, or exchange for BC221. Frequency meter (new).—Box 268.

RCA AR88D, 14-tube, 6-band, 540 kc to 32 mc, 100 to 250 AC, matching speaker, manual, £55.—75 Edgell Road, Winton, Bournemouth.

HRO Senior Special, grey enamel, fitted into enclosed professional rack, sloping front with loud-speaker above and unused Tx control panel below, 230v pack, 4 spare valves, 6 coils, spare S-meter, any test, £45.—G5FH, 17 Knottall Lane, Langley, Birmingham.

BC221AJ Latest model with audio modulation, brand new, instruction manual, £16, 8 mF 1000v condensers, 10/-; type 37 Osc., as new, £10. Exchanges considered.—G3BXZ, 9 Cheltenham Road, Broadway, Worcs.

BRAND new BC348, fitted with 200/250v AC mains power pack, two RF and three IF stages. Nearest offer to £30 secures.—Box 270.

CLEARING my surplus gear cheap. Modulator and speech amplifier, 200 watts audio, 6S17-6C5-P/P2A3, P/P811, brand new valves, includes H. Duty modulation transformer, driver transformer and every part required to build, with circuit. First £12/10/- secures, all as new. Collins aerial relay, 15/-; Woden UM3 125 watt modulation transformer, brand new, £3/5/-; Transformer, 1750-0-1750v 350 mA (1500v choke input), new, £4/17/6. Two 500 mA chokes, £1/5/- each; 500v 200 mA power pack, complete, £4/17/6. New fil. transformer, 7-5v 8 amp, 22/6, 10v 8 amp (new), 27/6. Two new 813's, £2/10/- each. Several heavy duty relays, 5/- each. Lots of other useful gear; send for list; everything highest quality; must clear shack after rebuilding. WANTED, high-grade camera, send details.—G8UA, 406 Higher Brunshaw, Burnley, Lancs.

MIDGET receiver, 3-9 mc, complete with valves, 'phones and circuit, £2/10/-, New Ferranti 30-watt modulation transformer, Push-pull 807's to 807 PA, 18/6. Stamp for list of other gear.—G2DJA, 137 Randall Avenue, N.W.2.

SALE. 1154 Transmitter with 1000v power pack, 6v accumulator, carbon mike, key and all leads, £8/10/-. Extremely sensitive 11-valve continental communication Rx. 2 RF-3 IF-BFO stabilised oscillator, internal Xtal calibrator, turret coils, variable selectivity, variable-AVC with spare valves 1-10 mc in five wave-bands, needing 90 volts HT, 2v LT, £12. Delivered London. Elsewhere carriage extra. Dual power supply 230v AC 2000v and 500v both 250 mA rack mounting, spare valves, £6/10/-. 3000-4000 kc wavemeter, in battleship grey steel carrying case, internal crystal check, battery-operated, make superb VFO, £4/10/-. Rothermel crystal pick-up, 15/-. Type D key, 10/-. *Short Wave Magazines*, March 1947 to March 1948 inclusive, 7/6. P.A. Projection Horn, fit 8-in. speaker, £1.—Box 269.

FOR Sale.—Two walkie-talkies, complete with mikes, etc. and several spare batteries, good working order, £10 the lot. Or would exchange for Low Power Tx/Rx. Also circuit wanted for T1396.—Sibley, 11 Chessington Road, Ewell, Surrey.

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S-METERS. 2 in. bakelite, flush mounting. 0-250 mA backward reading Weston movement, scale marked S-meter, graduated 0-9 and plus, 17/6 each.—G3BK, 28 Regent Avenue, March, Cambs.

G6HP 250 watt Phone—CW transmitter, 813 plate-modulated final. Highly efficient at inputs 50-150 watts, complete in enclosed rack, absolutely brand new, List price, £150. Offered at £105 for quick sale. Sole reason for disposal, owner going abroad. Hallicrafters "Sky-Traveller" receiver, recent model, as new, £25. 1.7 mc crystals in holders; Salford, O.C.C., etc., 22/6 each.—Box 273.

HALLICRAFTERS SX24 excellent condition unmarked, service manual, first £30 secures.—GW2FKW, 98 Wern Street, Clydach Vale, Tonypany, Rhondda, Glam.

RCA AR77E communications receiver for sale, good condition, £35. Also Howard 438 8-valve communications receiver, Xtal gate, £15.—GM3BCL, 38 Aberfeldie Terrace, Aberdeen.

40-WATT Tx 20-40-80 metres, VFO by Westinghouse, fully metred, aerial coupler, Line-up 837-1625-807. As new, complete with power pack for 230v, ready to operate, easily modified for 150 watts. Offers, or would exchange for HRO or AR88.—Box 272.

SEVERAL T1154 Transit cases wanted (one's and two's O.K.). State price.—Roza, Reading Road, Hants. *Yately* 3257.

X-TALS working into 21 or 2.8 mc bands. Brand new, G.E.C. type ½ in. spacing (state which band), 10/- each, postage 3d.—GW3AAO, 82 Gower Road, Swansea.

FOR Sale. BC312N and power pack, and R1155N (20, 40, 80, 160) offers to:—9 Heywood Road, Alderley Edge, Cheshire.

FOR Sale. Eddystone Ham-band R109 8-valve communications receiver complete with vibrator pack and built-in loudspeaker, £6. R1155 modified and with separate power supply for AC mains, £15. Oscilloscope (I.F.F. rebuilt) 2½ in. tube, £15/15/-. All carriage paid.—G2NL, Stoneycroft, Canonstown, Hayle, Cornwall.

S29 HALLICRAFTERS communication receiver, mains and battery operated, ideal home or portable work, 10-550 metres in four bands with bandspread, late model, perfect condition, £30.—29 Silverston Way, Stanmore, Middlesex.

BC342 splendid condition, with 230/110v transformer and 14-page manual; £20, carriage paid.—Box 274.

EDDYSTONE 5 and 10 metre convertor, brand new condition, with valves and manual, £10.—Box 275.

SX16 550 kc-60 mc, 11 tubes, Xtal gate, perfect, £30. Oscillator type 145 (2-7.5 mc. 1½ watts RF) new, offers over £15. Stabilised power pack, 300v at 500 mA, £10. Magnificent quality Radiogram with speakers and two cabinets by Hartley-Turner, 100 gns.—G2BB, Roza, Reading Road, *Yately* 3257, Hants.

AR88 for sale. Fair condition, with speaker and handbook. No tools. Buyer collects. Offers to: Artus, Fullarton House, Norwich Road, Watton, Norfolk.

SALE. Mullard Master Test Set: 155 cards: offers. S Pair PT15's unused, 18/-. Ditto ML6, 15/-. Meter 0-3500v mc (E.T.E.I. Ltd) 25/-. Output transformer (807 P/P) 25/-. S.A.E. other gear. GW3BOG, The Nook, Llancarfan, Barry, Glam., S. Wales.

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AMERICAN Communication Receiver wanted. Any good make. Condition unimportant.—Box 277.

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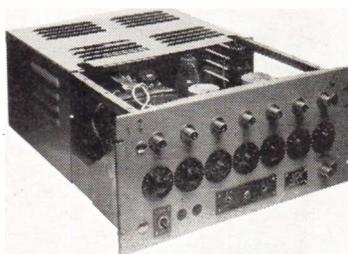
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