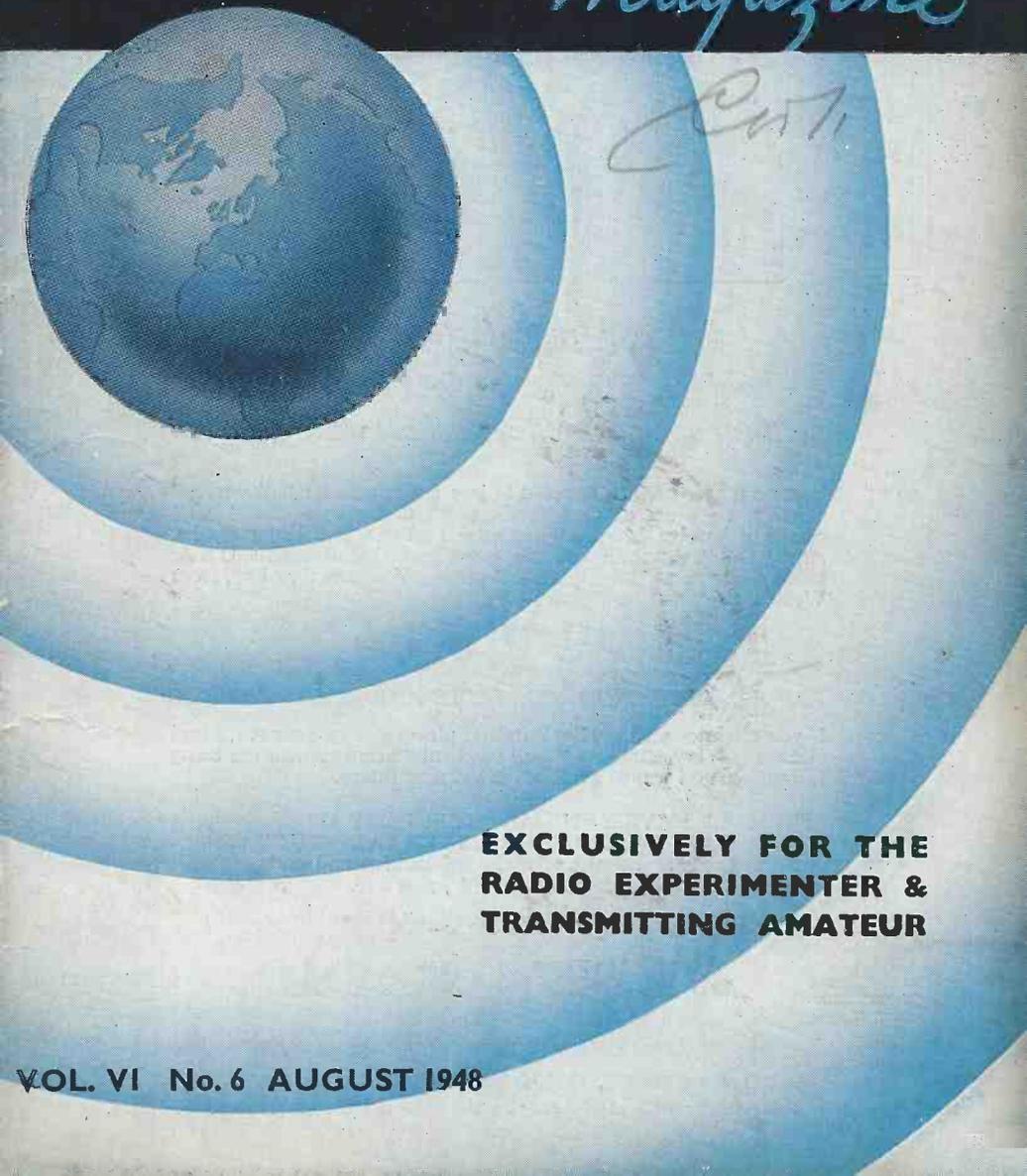


2/-

The
SHORTWAVE
Magazine



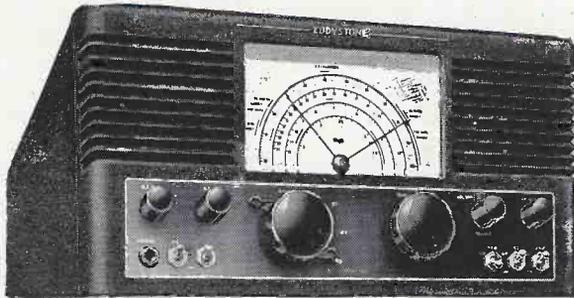
**EXCLUSIVELY FOR THE
RADIO EXPERIMENTER &
TRANSMITTING AMATEUR**

VOL. VI No. 6 AUGUST 1948

WEBB'S *Radio*

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EDDYSTONE '640'



The Eddystone manufacturers announce a
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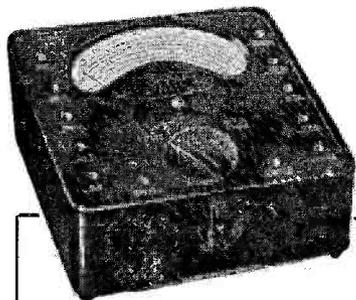
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Nett weight : 18 ozs.

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- 0-25 "
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- 0-500 "

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- 0-5 volts
- 0-25 "
- 0-100 "
- 0-250 "
- 0-500 "

D.C. CURRENT

- 0-2.5 milliamps
- 0-5 "
- 0-25 "
- 0-100 "
- 0-500 "

RESISTANCE

- 0-20,000 ohms
- 0-100,000 "
- 0-500,000 "
- 0-2 megohms
- 0-5 "
- 0-10 "

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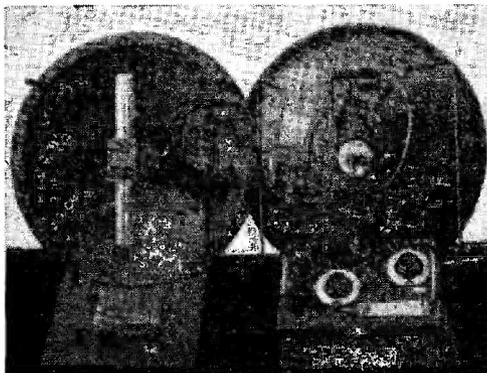
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0-120 "	
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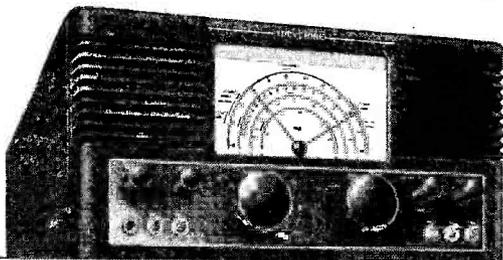
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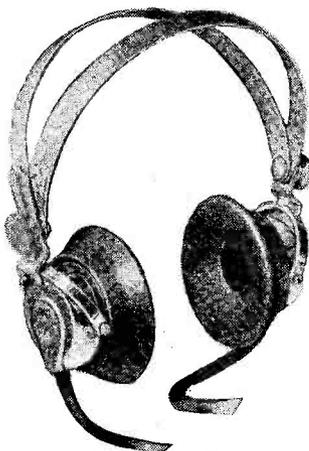
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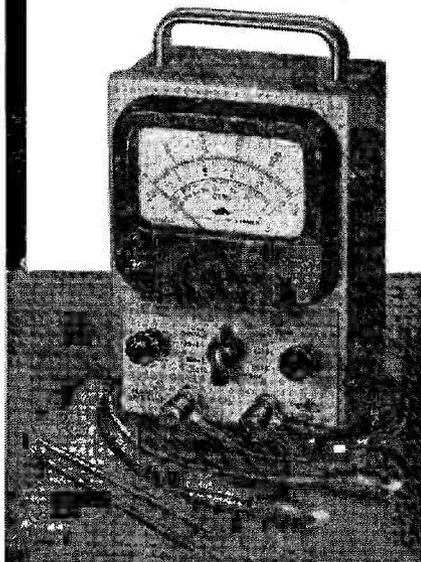
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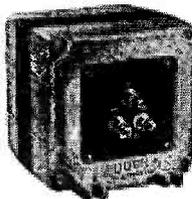


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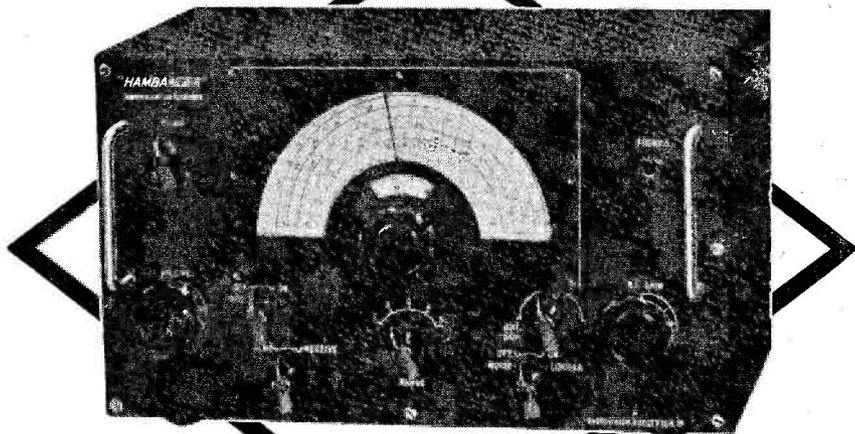
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Packing and carriage, 7/6.
Collins 7v Communication Rx (see page 280 June Mag.). All 6v and no-tube models sold. Few only 12v tube receivers left at £6/10/-, or with 12v Fil. Trans., £7/10/- (see also footnote about these).

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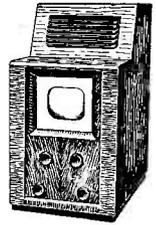
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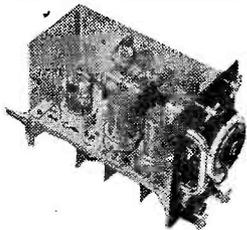
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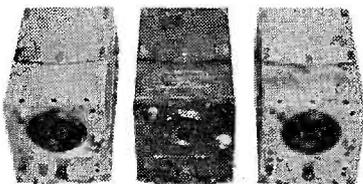
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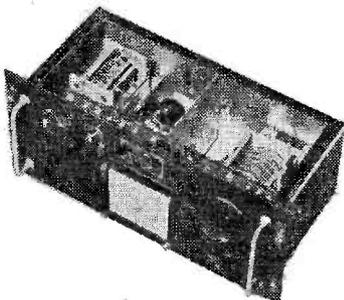
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INDEX TO ADVERTISERS

	<i>Page</i>
A.C.S. Radio	431
Amateur Radio Service	370
Automatic Coil Winder	369
Barnes Radio	438
Belling & Lee	427
Berry's Ltd.	441 <i>Cover</i>
Brighton Trade Services	439
Britain (Radio) Ltd.	432
Brit. Inst. of Eng. Technology	379
Brookes Crystals Ltd.	378
Brown, S. G.	371
Bulls, J.	440
Burnham Motors	438
Candler System	437
Celestion	429
Classic Elec.	439
Clydesdale Supply Co. Ltd.	380
Coulphone Radio	438
Dale International	430
Davis, Alec. Ltd.	375
Electradix Radios	433
General Sound & Vision Co.	433
H.A.C. Short-Wave Products	438
Henbest	434
Henleys	379
Hoile, A. C.	440
H.P. Radio Services Ltd.	428
Instrument Co.	432
Johnsons	436
Laskys	428
Lyons Radio	370
M.O.S.	437. <i>Cover</i> <i>iii</i>
Odeon Radio	371
Premier Radio	382
Pullin (M.L.)	373
Quartz Crystals	431
Radford, Arthur H.	429
Radio Clearances	430
Radio & Aerials	440
Radiocraft	435
Radio Exchange	378
Radiovision (Leicester) Ltd.	374
Rainbow Radio	434
Samsons Surplus Stores	431
Short Wave (Hull) Radio	435
Small Advertisements	434-440
Smith, H. L.	439
Tec, Herbert	376
Tele-Radio (1943) Ltd.	376
Torbay Elec.	430
Trading Post	433
U.E.I. Corp.	374
University Radio	439
Vallance & Davison Ltd.	377
W.B. Radio	379
W.D. Sales	378, 440
Webb's Radio	441 <i>Cover</i> <i>ii</i>
Whitaker, H.	372
Woden Transformers	373
Young	375

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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR & AMATEUR RADIO

Vol. VI

AUGUST 1948

No. 61

CONTENTS

	<i>Page</i>
Editorial	383
Aerial Design and Installation. Part I by I. E. Hill (G6HL)	384
Hartley-CO QRP Transmitter by W. Oliver (G3XT)	387
A 10/100 kc Check Oscillator by A. Bowman and J. W. Swinerton (G2YS)	391
Design for a VFO by B. H. Miles (G3AAL)	393
Designing the Buffer Stage by J. B. Roscoe, M.A. (G4QK)	396
DX Commentary by L. H. Thomas, M.B.E. (G6QB)	398
G Calls Heard Overseas	403
Mrs. Ham's Charter by The Wife of One	405
Converter Unit for 144 mc by W. J. Crawley (G2IQ)	406
The VHF Bands by E. J. Williams, B.Sc. (G2XC)	410
RF Power Amplifier for 144 mc by M. D. Mason (G6VX)	416
New QTH's	420
Here and There	421
Other Man's Station—G2MA	422
Month with the Clubs	From Reports 423

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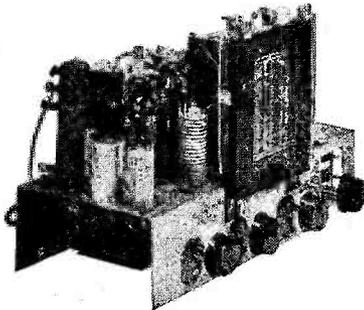
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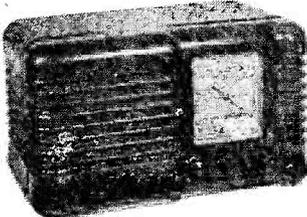
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25 a.	3 in.	Proj.	M.C. D.C.	7/6	
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20 v.	2 1/2 in.	Flush	M.C. D.C.	5/9	
15 v.	3 1/2 in.	Flush	M.I./A.C. D.C.	7/6	
160 m/a	2 1/2 in.	Flush	M. D.C.	6/-	
200 m/a	3 1/2 in.	Flush	M.C. D.C.	8/6	
5,000 v.	4 1/2 in.	Flush	Electrostatic	50/-	
1 m/a.	2 1/2 in.	Flush	M.C. D.C.	8/6	
50 m/a.	2 1/2 in.	Flush	M.C. D.C.	8/6	
30 m/a.	3 1/2 in.	Flush	M.C. D.C.	10/6	

COLLARO 3 MIXED RECORD AUTOCHANGERS, 12 in. Turntable with Magnetic Pick-up for 100-250v. A.C., £22/4/4.

COLLARO UNIT WITH CRYSTAL PICK-UP, Auto Stop on unit Plate, 12 in. Turntable, 100-250v. A.C., £11/2/2. With Magnetic Pick-up, £9/13/6.

COLLARO GRAMOPHONE MOTOR with 12 in. Turntable, 100-250v. A.C., £5/18/4.

CONRAD GRAMOPHONE MOTOR, 9 in. Turntable, Rim Driven, 200-250v. A.C., 57/6, to Clear.

LOUDSPEAKERS BY FAMOUS MAKER

5 in.	P.M.	2-3 ohms	..	..	10/11
6 in.	P.M.	2-3 ohms	..	..	16/8
8 in.	P.M.	2-3 ohms	..	..	17/6
10 in.	P.M.	2-3 ohms	..	..	23/6
12 in.	P.M.	15 ohms	..	..	85/-
10 in.	Energised,	2,000 ohm. field	..	..	25/-

EDITORIAL

Controversy

The old controversies of the world of Amateur Radio never seem to die. They are always revived by each succeeding generation of amateurs, and nearly always with the same result—things go on much as before !

Indeed, it is bound to be so, since argument and discussion on such subjects as “Phone or CW”, “High Power *versus* Low Power” and “Experiment or Communication” is largely a matter of opinion, with the majority sensible and broad-minded enough to realise that in such discussions, a good case can be made out for either side. Of these controversies, “Band Planning” is the only new one—and looks like going the same way as all the rest !

We do not propose to revive here any of these hardy annuals of debate, except to say that discussion on them, while being extremely amusing and instructive, is quite profitless so far as getting a decision is concerned.

Rather, it seems to us that every amateur should try to make the best possible use of his licence within the limitations of his own particular circumstances. Though amateurs generally are clannish to a degree and reach agreement fairly easily on matters of broad principle, as practitioners of the art of Amateur Radio they are highly individualistic beings. No two stations are the same, and in any given group of operators there are generally wide variations in ability and experience.

It is in the interests of all concerned and of the utmost benefit to the continuing development of Amateur Radio that eager protagonists of this or that point of view should be prepared to speak their minds and air their opinions, which to them at least are original lines of thought. It is by discussion and controversy that progress is made, and as individuals learn, so the art as a whole progresses.

Austin Forster G6FO.

Aerial Design and Installation

The Long-Wire, Yagi, Lazy-H and Sterba Curtain, with
Notes on Feeding and Matching

PART I

By I. E. HILL (G6HL)

WHEN selecting an aerial system for use on the higher frequencies the amateur must take local factors into greater consideration than need the professional. Often, structural considerations outweigh technical preference; the ultimate design is therefore a compromise and, perhaps far from ideal. The general initial tendency for higher-frequency working seems to be to adapt any existing aerial intended originally for lower-frequency operation. Alternatively or subsequently, if more regular usage is intended, a Yagi system of two-, three- or four-element rotary beam type is erected.

It is fairly safe to say that the majority of amateurs use aerials in one of these two categories. Perhaps the somewhat sketchy summary which follows will suggest an alternative approach to a part of the problem of converting transmitter RF output into DX receiver microvolts input.

The Long Wire

The long wire—usually a low-frequency aerial operated on its harmonics—concentrates horizontal radiation in four main lobes which more nearly approach the run of the aerial as the length in terms of half-waves is increased. If a near approach to all-round operation is desired an aerial comprising one half-wave and one full-wave or longer, fed in phase and colinear, is probably the most effective. The radiation

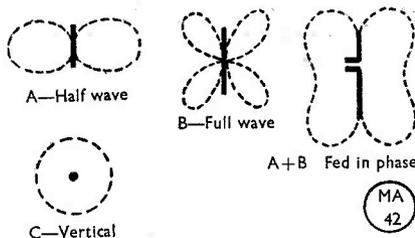


Fig. 1. Some horizontal radiation patterns.

This article, to appear in two parts, discusses the design and installation of several effective radiating systems, with particular reference to the radiation pattern in both vertical and horizontal planes. It will be of value and interest to all who have to decide how to make the best use of restricted space for the erection of an aerial system.—Ed.

pattern will combine that of a half-wave aerial, which is broadside, with that of the long wire as in the example of Fig. 1. Alternatively, a vertical dipole could be used which would give the horizontal pattern shown at C, Fig. 1.

But this is only the horizontal radiation picture and at high frequencies the vertical radiation pattern is equally important for DX communication. The only control over the vertical radiation pattern with a long wire or vertical dipole is height above effective earth. For DX working a relatively low vertical radiation angle is essential, and to achieve this the long wire must be at least half-wave above effective earth. This will give one broad major lobe at about 30° from the horizontal. Increasing the height will lower and narrow the lobe but also introduce additional lobes at higher vertical angles (see Fig. 2). Half-wave or full-wave above ground is probably the best compromise for general use, but as the aerial is intended also for lower frequency operation and a height of a full-wave even at 28 mc is about 30 ft.,

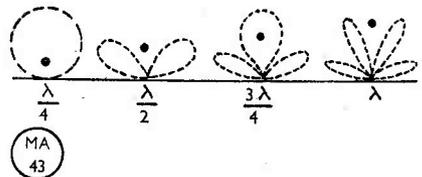


Fig. 2. Vertical radiation pattern for a horizontal wire at various heights above effective earth. The black spot indicates the elevation of the aerial.

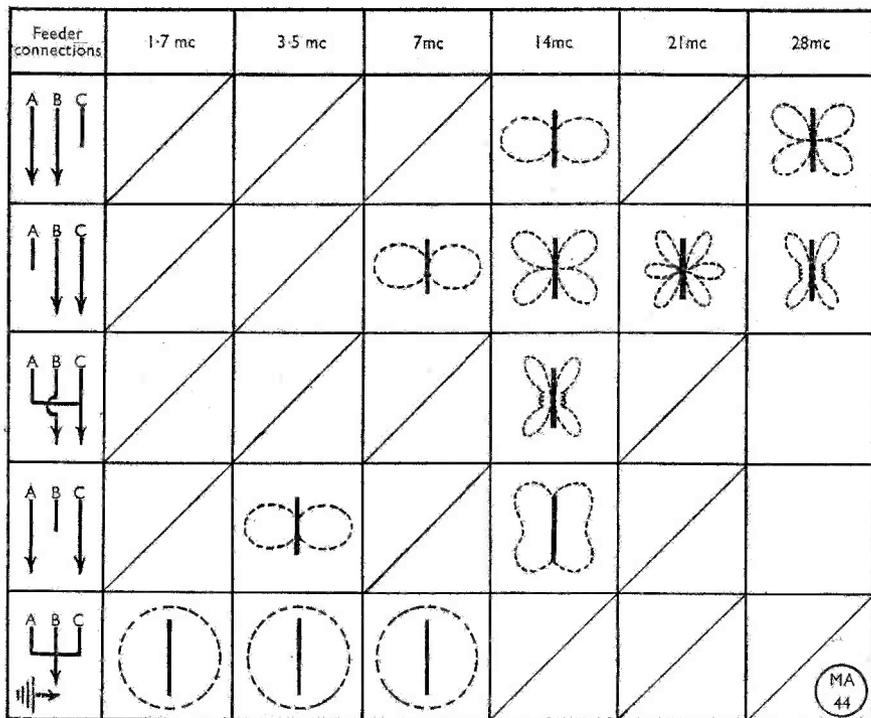


Fig. 3. (A) Radiation pattern in the horizontal plane for different feeder connections to the aerial shown at Fig. 3 (B)

the aerial is likely to be surrounded by buildings, trees or other obstacles providing screening. The usual procedure with a long wire is, therefore, to erect it as high as possible and accept the results obtained with good grace. These results will vary considerably with conditions and there will be marked blank areas—if the feeders are correctly adjusted—interspaced by areas of excellent coverage. However, as remarked earlier, the use of a long wire is usually dictated by a requirement for operation on a number of bands and the limitations are acceptable. The vertical aerial, for DX operation, can largely be ruled out owing to the difficulty of obtaining sufficient height above ground to attain anything approaching low angle radiation.

All-Band Compromise

An excellent compromise all-band aerial is that shown at Fig. 3 when erected well clear of surrounding obstacles. By the use of tuned feeders and provision of alterna-

tive connections to them, a number of combinations become possible and are listed. The example in Fig. 3 is based on 14 mc operation as the main requirement. The vertical radiation pattern will vary with the different frequencies and depend on the height selected. A satisfactory height for 14 mc will be 30/35 ft., but if this does not clear local obstacles the gain due to satisfactory vertical angle radiation may

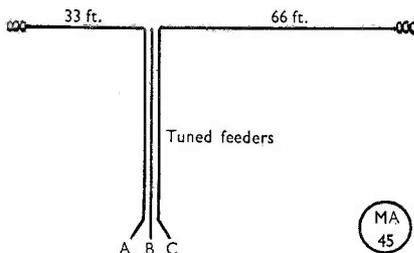


Fig. 3. (B) Dimensions for a suitable multi-band aerial, the design of which is discussed in the text.

well be offset by power absorption in the obstacles. The safest rule is, therefore, to erect the aerial clear of obstacles and see what happens. If results are not up to expectation try a different height, up or down, before discarding the aerial as N.B.G.

Yagi Rotary Beam

The newcomer, having got the transmitter working on the existing long wire, finds there are directions in which he cannot make contacts and in nine cases out of ten his thoughts turn to a rotary Yagi multi-element beam. In many ways this is the solution of his difficulties and for many locations in built-up areas it is the only solution. But it is not the only or necessarily the best technical answer.

To be worth while a rotary beam must be uni-directional and concentrate radiated power or received signal in a narrow horizontal arc. Both these requirements are advantageous once a QSO has been established but are not helpful in making initial contact. If the beam has not got these properties there is no point in making it rotatable. A well-known "ten metre" amateur was once heard to say that he put the beam towards the direction in which he expected to work and relied on hearing local stations calling for warning that signals were coming through from

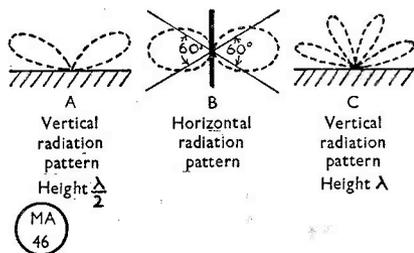


Fig. 4. Radiation patterns for a Lazy-H type of aerial.

other directions! It sounds a bit far fetched but does indicate that his aerial really was properly set up as a beam.

Amateur Communication Requirements

The amateur requirement is to put a signal into an area—usually at DX—and to do it with a minimum power input. Only a given amount of power is available for radiation and concentration in one direction must be at the expense of that in another. This is generally appreciated but is considered only in terms of the horizontal

plane. Most amateurs therefore concentrate on directivity in the horizontal plane, and vertical directivity happens accidentally. On the higher frequency DX bands—28, 21 and 14 mc—only that power radiated at low vertical angle is useful for communication purposes, being reflected by the various ionised layers of the upper atmosphere. The power radiated vertically or at high vertical angle does little, other than during short skip conditions, than bounce off passing aircraft and produce an interesting flutter on the signal. It is RF power wasted.

The requirement, therefore, for amateur communication is an aerial system which will give both horizontal and vertical directivity. The horizontal directivity required can be stated precisely, but the vertical angle is a variable dependent on conditions and must be fairly low (10° to 30°). The rotary Yagi at a suitable height does achieve this condition, but it is not the only way of attaining it and if space is available it is interesting to try alternatives which may also give some advantages.

The Lazy-H

A half-wave dipole is directional horizontally broadside to the run of the wire. If a number of half-wave dipoles are erected, suitably spaced, in the same plane

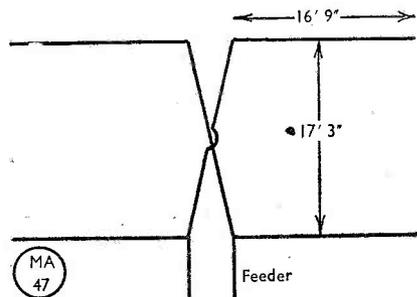


Fig. 5. Lazy-H design data for a frequency of 28,150 kc.

and all fed in phase the broadside directivity is increased. This property is utilised in the Lazy-H, which is perhaps the simplest form of stacked array and will give both horizontal and vertical directivity. By positioning a Lazy-H with the lower elements half-wave above effective earth the radiated power is concentrated in two opposite sectors of about 60° to 80° width in the horizontal plane and in

vertical lobes at about 20° to 25° from the horizontal, as shown in Fig. 4. Increasing the height to full-wave will only affect the vertical radiation pattern, making the main lobe lower but introducing a near-vertical one. For DX working the latter is largely wasted power and the main lobe may or may not be more advantageous for DX working than the lobe obtained at half-wave height. For 28 mc operation something between one-half and three-quarter wave above ground seems to give maximum power in the right general

vertical direction without wasting any in competition with the already harassed civil air lines. Dimensions for such an aerial are shown in Fig. 5. The feed can be either tuned line—which should not be greater than 50 ft. in length—or 600-ohm line with stub matching. Convenient feeder spacing, including the crossover section necessary to give in-phase feed, would be 4-in. using No. 14 copper wire as feeder.

(Part II of this article will appear next month)

Hartley-CO QRP Transmitter

Design and Construction of an Effective 3-5/7 mc Low-Power Rig

By W. OLIVER (G3XT)

THIS simple but versatile little transmitter offers a choice of two well-tried circuits—the CO and the Hartley—effectively combined in one neat, efficient and compact unit.

Each of these arrangements can be used, moreover, in two different ways: Either as a self-contained QRP transmitter, or as a driver unit to be followed by frequency-doubling or amplifying stages which can be run at higher power if desired.

The necessary switching is handled by two rotary wafer switches. One gives a choice of two or more wave-bands without coil-changing. The other offers an alternative of Hartley VFO or crystal control, with a further choice of different crystal frequencies if the operator happens to possess several crystals.

When using the Hartley, a ready means of frequency-checking is to tune in the crystal harmonic on a simple one valve oscillating monitor tuned to twice or three times the fundamental frequency. Then, without altering the tuning of the monitor, switch over to the Hartley alternative, and adjust the bandspread so that the harmonic from this VFO comes in at exactly the same spot as the crystal harmonic on the monitor dial.

If two crystals are available, one near each end of the wave-band, the band limits on the transmitter band-spread dial can be ascertained, and approximate intermediate frequencies easily plotted on a simple

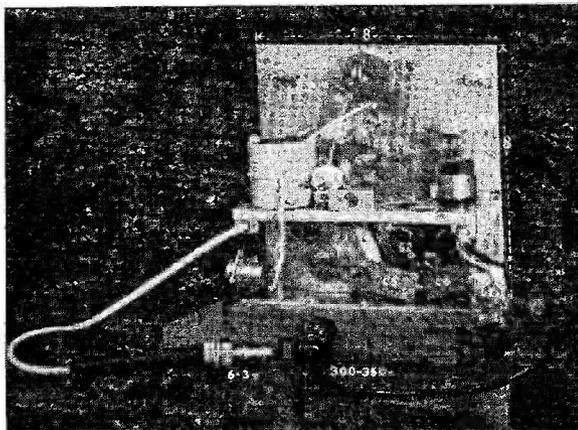
This little transmitter has several very ingenious design features which will appeal to those interested in QRP working. With 3 watts input, the author has had 450 CW contacts with 14 countries in three months.—Ed.

graph. But of course these methods should be regarded merely as a convenient adjunct to, and not a complete substitute for, the approved type of wavemeter stipulated by the GPO regulations.

“Band Expansion”

The transmitter has three variable tuning controls: A band-set, band-spread and one termed a “band-expander” which is a small capacity in series with the band-spread. The “expander” enables the whole or any part of a given amateur band to be “focused” exactly into the 180-degree scale of the band-spread dial. This simplifies tuning and facilitates fairly accurate calibration, though the latter should be checked against a standard frequency whenever the band-set or expander are altered.

Four of the variable controls are arranged symmetrically on the front panel as shown in the photograph. The remaining one—the band-expanding condenser—is mounted at the back of the set, as it requires less frequent handling and incidentally is not at earth potential as are the fixing bushes of all the other controls. The



Layout behind the panel, with components identified.

band-expander is a midget ceramic variable of straight-line capacity type, mounted so that it is insulated from the chassis. A finger points to it in the photograph, and the control knob has been removed from the spindle to show the component more clearly.

In the experimental model at G3XT, the crystal holder was plugged into sockets on the panel, but a much neater arrangement, especially if several crystals are available, would be to mount them out of sight behind the panel. There is a fair amount of space on the "double-decker" chassis. Short, direct connections can be made to the VFO/crystal switch contacts.

Novel Circuit Combination

Before going on to the rear-of-pane layout, a word about the circuit arrangement: Although the combination of ECO and CO in one transmitter is not uncommon, this is believed to be the first published circuit which combines the Hartley with the CO. Perhaps this is because the two circuits in their usual basic form appear to be superficially dissimilar. Anyway, some juggling had to be done with the circuit, and a lot of practical experimenting, before finally arriving at the very simple arrangement shown in the circuit diagram herewith.

The capacity feed to both ends of the tuning coil simplified layout, wiring and change-over switching. It also enables the transmitter to be made exceptionally safe and almost shockproof. In fact, the only component normally offering a risk of direct contact with HT positive is the RF

choke in the valve anode circuit. It should be an easy matter, however, to cover this in such a way that it cannot be accidentally touched when the set is in operation; it is tucked neatly away in a corner under the chassis anyway, and one is not likely to touch it accidentally.

One possible danger-point, however, is the fixed condenser feeding the tank coil from the anode of the valve. To minimise any possibility of an HT short through this condenser breaking down, two mica condensers are used in series.

Unlike those in the majority of transmitters (where a serious and even fatal shock could be collected), the exposed parts in this circuit are mainly at or near earth potential when the unit is connected up correctly, and this makes for an exceptional measure of safety.

Strictly speaking, the whole unit should be enclosed in a metal cabinet or screening case, effectively earthed. With most VFO's this is essential; but in the present instance it has not been found necessary for the stable working of the oscillator, provided that it is not placed too close to other metallic objects.

Disposition of Components

The position of all components can be seen very clearly from the photographs. The wave-change switch is mounted centrally near the top of the panel; immediately below it is the band-spread condenser, with the band-expander close to it. The keying jack is on the edge of the chassis but could be in any other convenient position—say on the front panel—if preferred. Below the chassis, the VFO/crystal switch and band-set condenser are mounted side by side. From the stator terminal of the band-setter, the two fixed feed condensers in series are connected to the valve anode. The RF choke in the anode circuit is placed in a corner near the valveholder.

The valve itself is near one end of the chassis top-deck, and holes for mounting crystal holders (instead of on the panel) are visible to the left of the valve in the photograph. A co-axial socket for the link coupling to the aerial circuit is mounted

below the coil at the left of the rear-view photographs, and to complete the whole transmitter there are two flexible leads terminating in plugs which connect to the HT and LT output sockets on the power pack.

Power Supply

A 350-volt power supply is used at G3XT for this little transmitter, and gave a measured input of exactly 3.1 watts. The valve in use at the time was the 6J5 triode oscillator. The RF was sufficient to burn out a flashlamp bulb in a tuning loop held near the coil, and to light a 12-volt car side-lamp bulb to fair brilliancy.

The power pack actually used at G3XT consisted of an ex-Government surplus Air Ministry Test Set No. 102, with valves and unwanted components removed (the 6J5 in this equipment was usefully transferred to the transmitter itself!) and the power pack left in its original form, except that two of the socket-connectors on the panel were adapted to form HT and LT output sockets.

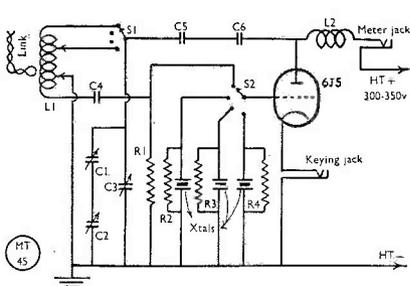
The shortness and directness of the wiring will be evident from a glance at the photographs. In fact, this is about the nearest approach to a literally "wireless" transmitter the writer has ever seen, except in Service VHF equipment.

The tuning coil calls for some comment, as it proved to be one of the most critical factors in the working of the circuit. Many hours were spent experimenting with different coils, some of a makeshift and seemingly inefficient type, others made with the latest and most efficient low-loss ceramic formers.

In this particular circuit, results did not seem to work out quite according to theory,



The "band-expander" condenser is shown in this view.



Circuit of G3XT's transmitter, discussed in detail in the text. Either CC or SE operation is possible, with a selection of crystal frequencies.

Table of Values

Hartley-CO QRP Transmitter

- C1 = 100 μ F ceramic midget variable ("band expander")
- C2 = 40 or 50 μ F (band-spread)
- C3 = 100-200 μ F (band-set)
- C4 = 60 μ F silver mica
- C5, C6 = .005 μ F mica
- R1, R2, R3, R4 = 10,000 to 25,000 ohms
- L1 = 27 turns, 2 1/2-in. dia., 28 SWG enam. tapped at 9 and 18 turns
- L2 = RF choke
- V = 6J5

Note: Optimum values for the grid leaks R1-R4, should be found by experiment in conjunction with adjustment of earth tapping on coil L1.

and after carefully comparing the performance of the different coils tried, it was found that the best all-round results were obtained with that shown in the photograph, despite its superficial appearance of inefficiency! It is thought, however, that there is some scope for further experiment in this direction.

The aim was to combine efficiency with convenience and simplicity in choosing this coil; but anyone who wants results regardless of these other considerations might do better to use separate coils for each waveband to be covered—and perhaps even separate coils for the alternative arrangements of VFO and crystal. But experience at G3XT has shown that very good all-round results can be obtained with the cheap and simple coil shown (it cost about 9d. to make!)

Using Surplus Components

All the components employed in the original model of this transmitter were either ex-Government surplus or odds and ends already to hand. No doubt a slight improvement could be effected by using more suitable components in one or two cases. Ceramic water switches, for

instance, would be better, and a more up-to-date slow-motion dial could be substituted for the pre-war one in the photograph, although it is still giving smooth, positive action after many years of use.

The adjustment of the link coupling between anode tank coil and aerial tuning coil is decidedly critical, and on its setting depends not only the strength of the radiated signals but also the quality of the note and freedom from chirp and drift. Another rather critical adjustment is that of the earth tapping on the coil. Moving this up from the grid and towards the anode end of the coil increases excitation and tends to decrease chirp.

It will be noticed that the tapping is about one-third of the way up the winding on 3.5 mc but nearly half-way up the 7 mc section. This is done deliberately, not merely for the sake of simplicity, but because it was found on experiment to give the best results. Nevertheless, it is advisable for anyone building a unit from this design to make the final experimental adjustments for himself, as stray capacities may cause considerable disparity between the original model and counterparts built by readers, with perhaps some modifications to suit their own ideas and requirements!

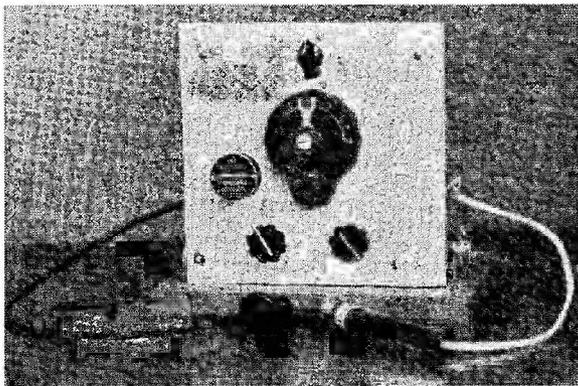
It will be seen that the portion of the coil between the grid feed condenser and earth is still within the field of the rest of the winding when the change-over switch is in the "crystal control" position, and is still connected to one side of the fixed condenser, although the other side of this condenser is disconnected from the grid when the switch is moved over to crystal.

This was not found in practice to detract appreciably from results; but if preferred one could entirely disconnect, or short out, this small portion of the winding by using a double-pole switch instead of the single-pole type shown in the circuit diagram.

If one happens to have a few different-coloured pilot lamps to spare, and a couple of extra wafers for the rotary switches, the latter can be ganged in such a way that a different coloured pilot light glows on the

panel for each position of the two switch controls.

A less spectacular but very useful plan would be to have, say, a green pilot lamp for the 3.5 mc coil winding and another green lamp for the 3.5 mc crystal; and then, say, a red pilot lamp for the 7 mc coil and a second red one for the corresponding 7 mc crystal. This arrangement serves as a reminder which will prevent any chance of trying to get the transmitter to work with a 7 mc coil and 3.5 mc crystal, or *vice versa*! The lights save the bother of having to stop and think when manipulating the switches, and even if they are a



Front view of G3XT's transmitter, described in the text.

luxury they are at least a fairly inexpensive one!

Results on Test

This transmitter has been tried out thoroughly on the 3.5 and 7 mc bands during the past three months, and in that time exactly 450 contacts have been made, with stations in 14 different countries, namely: D2, D5, EI, F, G, GC, GI, GM, GW, HB, LA, ON, PA, and SM. Five reports of RST 599 have been obtained and 159 reports of RST 589 or 579. The remaining reports were either RST 569 downwards, or among the few that reported the note T8, mostly due to chirp during the earlier stages of the experiments.

On a few occasions modulating the CO has been tried, and although this is generally deprecated as bad practice, results were quite satisfactory when suitable precautions were taken against the

troubles often experienced in attempting to modulate an oscillator. Transformer coupling, instead of the choke method, was used between the anode circuit of the modulator and the anode circuit of the oscillator. With a carbon microphone, one stage of speech amplification and a triode modulator, reports of signal-strengths ranging from S3 to S8 were received over considerable distances, using an input

about half a watt lower than on CW—*i.e.*, 2.6 watts QRP. (The CW input, it will be remembered, was 3.1 watts).

With telephony on this low power, intelligibility of speech depended very largely on finding a clear spot on the band free from QRM; but on CW the vast majority of the contacts were 100 per cent. solid even at times when conditions were poor and interference heavy.

A 10/100 kc Check Oscillator

Modification of the Calibrator Type 18

By A. BOWMAN and

J. W. SWINNERTON (G2YS)

THE R.A.F. Calibrator, Type 18, which is readily available on the surplus market, can be adapted to make a useful unit with a high degree of accuracy. The crystals in several of these units have been checked against WWV and found to be much better than .01 per cent. accurate. It must be pointed out, however, that it is not intended to be a frequency meter as such, and does not comply strictly with GPO requirements for frequency measurement on the LF bands.

Original Layout

The unit consists originally of a 100 kc crystal oscillator and an audio amplifier employing EF50's, contained in a small metal box. (See circuit diagram, Fig. 1.) The entire audio stage is removed, including transformer T1, and the HT supply to the oscillator is taken direct to the "cold" end of the tank. Transformers T1 and T2 are completely screened, and will make handy microphone transformers. The filaments of the EF50's are wired in series for 12-volt operation, and these must be rewired in parallel for 6.3-volt working.

The Multivibrator

In the space vacated by the audio stage is fitted a 10 kc multivibrator, employing a 6SN7 double-triode in the circuit given in Fig. 2. The spare wafers in the "Send/

Here is another very useful article on the modification of an ex-Service unit. The Type 18 Calibrator can be made to give 10 kc points by the addition of the simple multivibrator described in this note.—Ed.

Receive" switch on the original unit may be rewired according to individual requirements; in the writers' example these are:

- Pos. 1. Off.
- Pos. 2. 100 kc oscillator only.
- Pos. 3. 100 kc oscillator with 10 kc steps.

The 6SN7 acts as a "relaxation" oscillator and will be heard on a receiver, giving a rough note, at about 10 kc intervals. The coupling of the CO through C9 is sufficient to "lock" this and to produce T9 signals of the same order of accuracy as the crystal. The multivibrator frequency is changed by rotating the variable resistor R8, when it will be heard to slip through 8, 9, 10 kc frequencies, and so on. A setting of R8 must be found where nine "zero beats" are traced in a receiver between two much stronger beats from the 100 kc stage.

Construction

The octal valveholder for the 6SN7 should be mounted sufficiently below the valve platform to allow the cover of the equipment to be replaced with the valve in position. While no special layout is

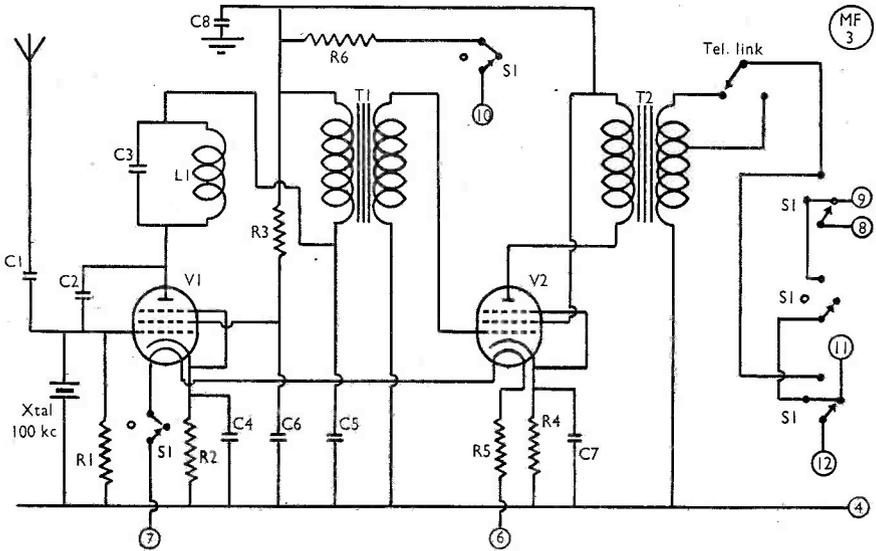


Fig. 1. Circuit of the Type 18, unmodified. The table of values applies to both Figs. 1 and 2.

necessary, it is advisable to make all connections to the valve-holder before it is fixed in position, and then to check that it will slip into place.

The variable resistor R8 is mounted on a square of paxolin in place of the multi-pin socket on the front of the unit.

All bolts are treated originally with a locking substance. It is advisable to dissolve this first with "Pyrene" fluid or to heat it sufficiently to allow the nut to be turned.

Operation

The unit will provide easily identifiable calibration points up to and possibly beyond 30 mc for any receiver with known calibration *plus* or *minus* 50 kc.

To effect calibration, inject the output of the unit into the receiver by means of a screened lead. This is important, as extraneous signals must not be picked up. Having found the desired marker point, switch the unit in and out as a check that its beat is in fact being received.

A power supply giving up to 300 volts and 6.3 volts 2 amps. is ample, as the current drain is very small. If desired the unit may be operated in conjunction with a VFO, and switched in on a common switch for "edge of band" checking or spot frequency operation.

Table of Values

Figs. 1 and 2. Type 18 Unit with Modification

C1 = 2 μ F	R1 = 1 megohm
C2 = 10 μ F	R2 = 18,000 ohms
C3 = 5 μ F	R3 = 10,000 ohms
C4, C6 = 0.1 μ F	R6 = 4,700 ohms
C5 = .01 μ F	R7, R8 = 15,000 ohms
C8 = 4 μ F	R9, R10 = 50,000 ohms
C9 = 10-50 μ F	R11 = 20,000 ohms
C10, C11 = .001 μ F	V1, V2 = EF50
	V3 = 6SN7GT

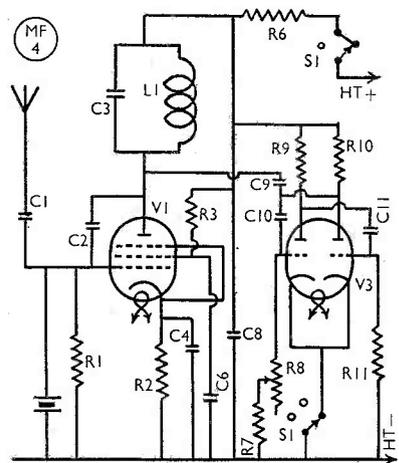
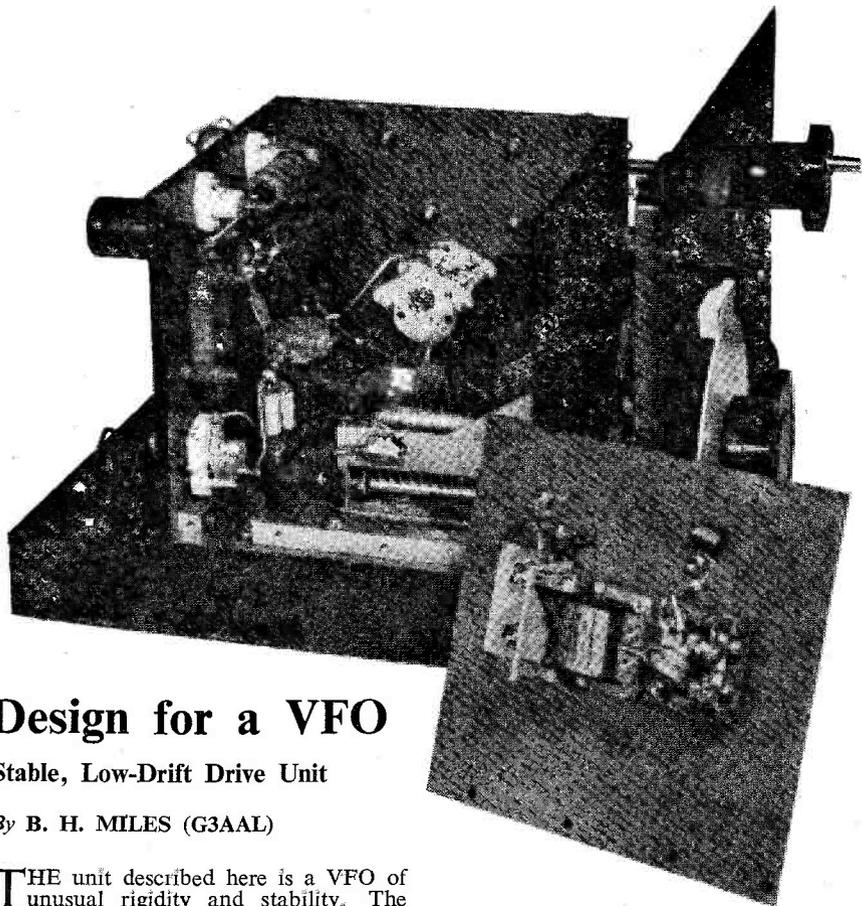


Fig. 2. The Type 18 with the audio amplifier replaced by a 6SN7 connected as a multivibrator to give the 10 kc check points.



Design for a VFO

Stable, Low-Drift Drive Unit

By B. H. MILES (G3AAL)

THE unit described here is a VFO of unusual rigidity and stability. The views shown in the accompanying illustrations give a good idea of the general layout.

The panel is constructed of 16 SWG steel and the chassis of $\frac{1}{4}$ -in. duralumin sheet, braced with two side strips of 1-in. right-angle steel. The panel is also braced by $\frac{3}{8}$ -in. square steel rod which in turn is bolted to the metal cabinet (not shown). The cabinet used was that of an ex-Government Type 2 Performance Meter.

The cube mounted to one side of the chassis is the ECO housing and this is also made of $\frac{1}{4}$ -in. duralumin sheet with all its faces bolted and separately bonded. The size of this cube is $5\frac{1}{2}$ in.

The main tuning dial (Muirhead) is coupled direct to the shaft of the main tuning condenser (C1) which is an ex-Govt. type with really solid double end bearings and polythylene insulation. The meter is fitted in the plate line of V3 and its main purpose is explained later in this

The essential feature of this particular design is its rigid construction. Combined with a sound electrical circuit, this results in an oscillator unit with exceptional characteristics as a stable T9 VFO.—Ed.

article. The window to the right of the panel shows a vernier scale, calibrated from plus 5 kc through zero to minus 5 kc in one kc steps.

General Design

As will be seen, this scale and drum are actuated by the geared drive on the right-hand wall of the cube, which in turn rotates the shunt condenser across the main tuning condenser (combination of C1 and C4). The shunted condenser is exactly half-mesh to effect this "plus or minus" arrangement.

A keying jack is fitted in the cathode circuit of V2 and has proved effective for

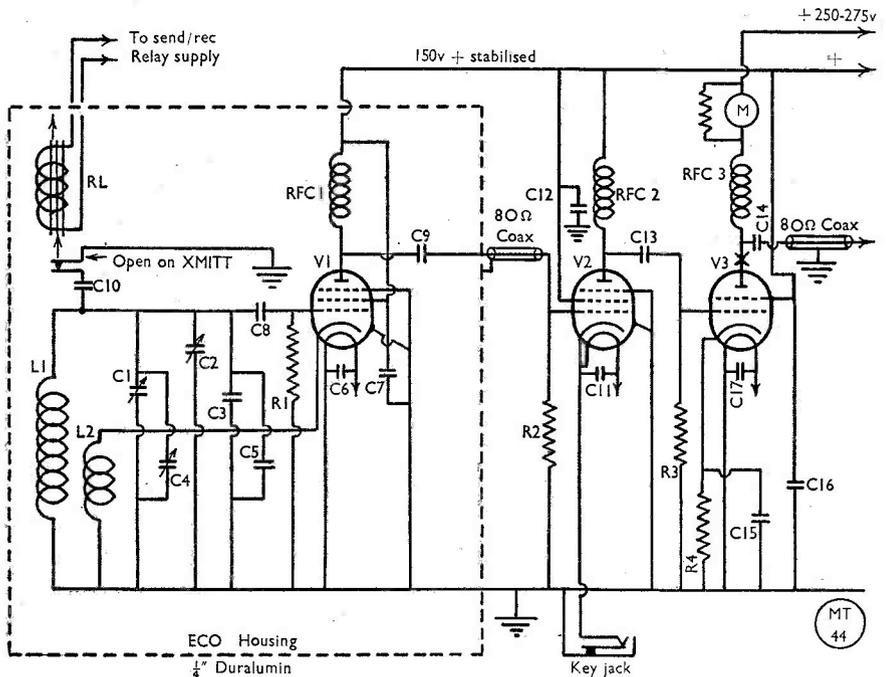
quiet keying ; for break-in operation the relay RL and C10 come into play. In the transmit position this relay opens and the ECO operates on its normal frequency, whilst in the receive position the additional capacity across the main tuned circuit allows the ECO to continue to oscillate,

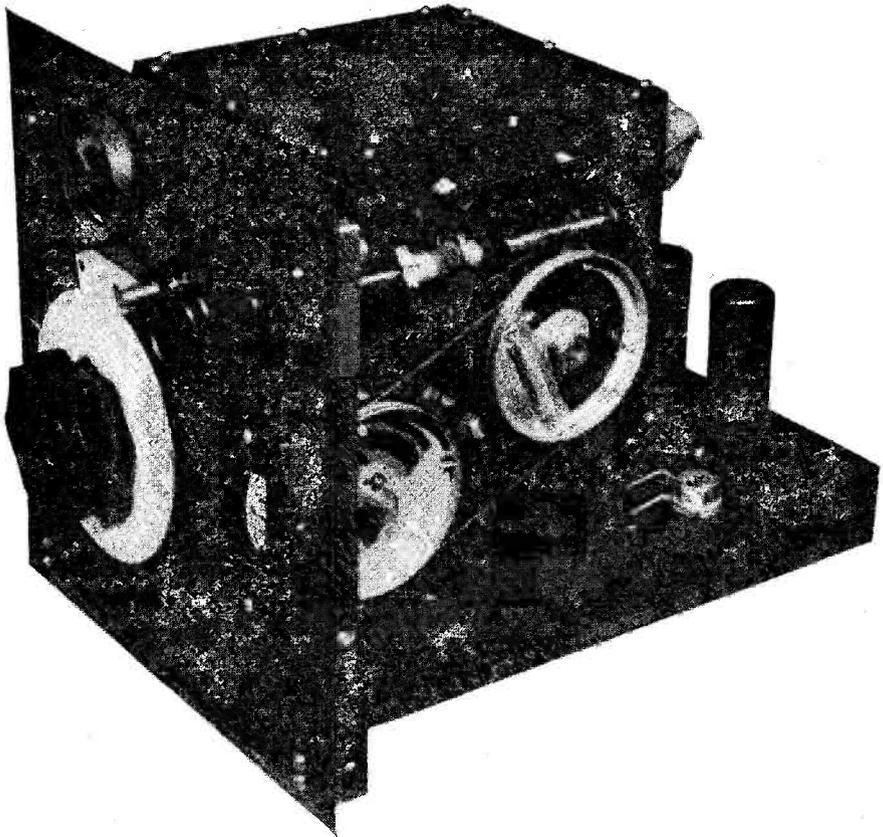
but just outside of the low frequency end of the band where it does not interfere with band searching. The relay in question is of the high speed Creed type with an infinitesimally small capacity across the points and therefore has no effect on frequency, even on ten metres.

Table of Values
The G3AAL VFO Unit

- C1 = Main tuning condenser 100 $\mu\mu\text{F}$
 - C2 = Band edge setting condenser 25 $\mu\mu\text{F}$ (air-spaced with locking device)
 - C3 = 3-100 $\mu\mu\text{F}$ zero temp/coeff. ceramic condensers in parallel
 - C4 = 5 $\mu\mu\text{F}$ var (ceramic insulation) for finetuning. (See text.)
 - C5 = 50 $\mu\mu\text{F}$ neg. temp/coeff. ceramic condenser
 - C6, 7, 11, 12, 16, 17 = .01 μF mica condensers
 - C8, 9, 13 = 100 $\mu\mu\text{F}$ ceramic cup condensers
 - C10, 14 = 150 $\mu\mu\text{F}$ ceramic cup condenser
 - C15 = .005 μF paper condenser
 - R1 = 47,000 ohms, $\frac{1}{2}$ -watt
 - R2 = 100,000 ohms, 1 watt
 - R3 = 15,000 ohms, 1-watt
 - R4 = 300 ohms, 3-watt
 - L1 = 17 turns 20 SWG enam., spaced wire diameter, wound on a one inch diameter polythylene former.
 - L2 = $3\frac{1}{2}$ turns 24 SWG single silk enam., wound over bottom end of L1. (After winding, give several coats of Dentsix cement)
 - RL = Creed relay (operates on approx. 6 volts DC)
 - RFC1 and 3 = 2.5 mH RF Chokes
 - RFC2 = 180 turns 32 SWG enam., close-wound on half-inch former
 - V1 = 6SK7
 - V2 = 6F6
 - V3 = 6V6
- (All metal valves).

Circuit of G3AAL's stable, low-drift driver unit. As the photographs show, it is of exceptional interest from the point of view of its mechanical design.





The drive mechanism for the frequency setting control on G3AAL's VFO. The instrument has been calibrated against a BC-221 and can be set up to any required frequency with a high degree of accuracy. Frequencies are read off the window scale to the right on the panel.

The frequency coverage is from 3500 to 3800 kc and there is no change whatever in the output level over the entire frequency range.

The second valve is an untuned buffer which takes both screen and plate feeds from the 150-volt stabilised supply. This 150-volt supply feeds all screens and plates with the exception of V3 plate.

Power supplies are built on a separate chassis and coupled by means of a five-way heavy screened cable and octal cable plugs and sockets. HT required is approximately 250 volts at 60 mA, smoothed extremely well, and a 6 volt 2 amp LT feed. This pack is quite standard.

The third valve is a 6V6 with normal cathode bias and acts as second buffer, the

output of which can be dead shorted with no effect on the ECO. The output from this stage is sufficient to drive fully an 807 under 35 watt conditions; for those who wish to increase the output without any additional controls, the following modification is suggested.

Increasing Output

At the point X in the plate circuit of V3 insert a coil as follows.

90 turns 28 SWG enamelled copper wire close-wound on a one inch former.

At the RF choke end fit a by-pass condenser of .002 μ F capacity to chassis.

Overwind 6 turns of 24 SWG enamelled wire at the cold end of this coil, after laying on the 90-turn coil a

few turns of insulating material to make up a thickness of approximately one sixteenth of an inch. The two ends of the six-turn winding may be taken to the coax feed in the normal way.

Fitting this coil makes V3 a broad-band amplifier and it will be found that the output will be considerably increased and will remain constant over the entire frequency range of 300 kc.

One notable feature is that there are no heat-producing components whatever in the ECO cube. Those components under the chassis capable of producing heat have ample ventilation *via* the louvres in the side of the cabinet.

The meter is also wired in the plate circuit of V3 and affords an indication that the unit is in operation and assists in

loading successive stages. The meter used is a midget 0/500 micro-amp, movement suitably shunted to read 50 mA F.S.D.

Stability Characteristics

The frequency stability is as follows :

After allowing 30 mins. warm-up period, the maximum drift over a further period of 2 hours' operation was measured and found to be not more than 2 or 3 cycles. The unit is so sturdily built that a good hard slap on the side of the cube produced no change *whatever* in the note. The drift on 7 mc was of the order of 10 cycles over the same test period. On 14 mc it was approximately 25 cycles, and on 28 mc 60 cycles. The note remains T9 on all these frequencies.

Designing the Buffer Stage

Notes on the Choice of Valve

By J. B. ROSCOE, M.A. (Oxon.), G4QK

FROM articles which are published from time to time, it appears that the function of a buffer stage in a transmitter is not always fully considered, and that choice of the valve is sometimes rather unfortunate. Some of the factors influencing this choice are mentioned here, and a table listing the suitability of various valve types for use as buffers is appended.

The function of a buffer stage is to provide either amplification or isolation ; but, more frequently, both amplification and isolation. Where amplification only is required, the valve selected is one with adequate *gm*, and sufficient anode dissipation; where isolation only is required, the choice is a valve with low anode-grid capacity, since this is responsible for the coupling between the input and the output circuits. Normally, however, the requirements are both amplification and isolation, and for this some compromise may be necessary.

Coupling and Loading

With the normal oscillator circuits a

This short article discusses the design factors affecting the buffer stage from the point of view of the choice of valve. Some useful new information is given in tabular form.—Ed.

low-gain buffer stage can be used, since the output is relatively large. If, however, a high-slope valve is employed in the buffer stage, the coupling to the oscillator can be decreased, with a corresponding decrease in the loading on the latter. It is generally appreciated that the oscillator should be followed by a Class-A buffer stage, to provide a constant load. But the simple experiment of shorting the output from the buffer stage of a VFO will show how inadequate a single 6V6G, for example, may prove for isolating the oscillator.

A certain degree of isolation can be provided in the normal types of oscillator circuits. In the Franklin, Transitron, and ECO circuits the output coupling is, in each case, provided by the capacity between the anode and the signal grid of a valve (or the anode-suppressor, in the case of the pentode Transitron), and this point should be borne in mind when designing these circuits. It is, after all, entirely useless to design a really stable VFO, perhaps with temperature compensation, if the frequency is not completely independent of the output loading. This would suggest, for instance that the 6A8 (.06 $\mu\mu\text{F}$) is preferable to the 6A8G and GT (0.26 $\mu\mu\text{F}$) for the Transitron, and that those who require considerable power from an ECO would be well

advised to use an 807 in preference to a 6L6G.

Buffer Design

In considering narrow-band amplifiers, a gain factor, being the *gm* divided by the anode-grid capacity, is often employed; this is a useful measure of the maximum stable amplification that can be obtained from the valve. It seems convenient to adopt this same factor when considering the design of the buffer stage. There is no question that low-slope valves are easier to handle, and with them the same results can usually be obtained, but only with a sacrifice of efficiency.

GAIN FACTOR OF VALVES USED IN BUFFER RF STAGES

Type	Gm mA/V	Ca-g μ F	Gain Factor	Wa
7W7	5.8	0.0025	2320	?
EF42	9.5	0.005	1900	2.5
6SH7	4.9	0.003	1630	3
6SG7	4.7	0.003	1570	3
8D3	7.5	0.005	1500	2.5
6AU6	5.2	0.0035	1486	3
SP61	8.5	0.006	1417	3
6BH6	4.6	0.0035	1314	3
6BA6	4.4	0.0035	1257	3
6SH7GT	4.9	0.004	1180	3
6B36	3.8	0.0035	1086	3
EF91	7.65	0.008	956	2.5
EF50	6.5	0.007	928	3
7AG7	4.2	0.005	840	?
6SK7	2.35	0.003	802	3
7H7	4.8	0.007	686	2.5
VR116	4.0	0.006	667	3
9D6	2.5	0.004	625	2.5
6AC7	9.0	0.015	600	3.02
6AK5	5.1	0.01	510	?
6SK7GT	2.35	0.005	470	3
EF54	7.7	0.02	385	3
6AB7	5.0	0.015	333	3.75
6K7	1.65	0.005	330	2.75
6K7GT	1.65	0.005	330	2.75
6S7J	1.65	0.005	330	2.5
6S37GT	1.65	0.005	330	2.5
6J7	1.225	0.005	245	0.75
6J7GT	1.225	0.005	245	0.75
6K6G	1.65	0.007	236	2.75
6AG5	5.1	0.025	204	2
6AG7	11.0	0.06	183	9
6J7G	1.225	0.007	175	0.75
EF55	12.0	0.15	80	10
KT8	6.0	0.12	50	25
807	6.0	0.2	30	30
6AQ5	4.1	0.17	24	8
6AK6	2.3	0.12	19	3.5
6L6	6.0	0.4	15	21
6V6	4.1	0.3	13.7	8
6F6	2.5	0.2	12.5	12.5
6BG6G	6.0	0.5	12	20
6Y6G	7.1	0.7	10	12.5
7C5	4.1	0.4	10	12
TT11	3.5	0.4	8.7	7.5
EL91	2.6	0.3	8.7	4.0
6L6G	6.0	0.9	6.7	21
KT61	10.5	1.6	6.6	10
EL32	2.85	0.5	5.7	7.5
KT66	6.3	1.1	5.7	21.5
6V6G>	4.1	0.7	5	8
6F6G	2.5	0.5	5	12.5

In the attached table the valves are listed in order of this gain factor. For the RF valves the anode-grid capacity is specified for a close-fitting shield connected to the cathode, except in the case of the metal valves. For the AF types no shield is specified, and some reduction in this capacity may be effected by fitting one. There is evidence that the figures quoted for this capacity for valves made in the U.S.A. are somewhat optimistic, but that the figures for the valves manufactured in this country, whether of British or American type, are adhered to more strictly.

I.C.A.S. ratings are quoted where applicable, and the upper frequency limit for the AF types at full rating may be taken as 10 mc. It is regretted that the table is far from complete; some British valve manufacturers seem a bit reticent about their products.

CARDS IN THE BOX

We are gradually catching up here, too. If your call appears below, card(s) await you at BCM/QSL, London, W.C.1. Please claim with a large stamped, self-addressed envelope, with your name and call sign. If you want your address published in "New QTH's," enclose a slip saying so, and it will appear as soon as space becomes available. All QTH's we print are also published automatically in the *Radio Amateur Call Book*.

G2BMP, 2CFS, 2DPA, 2HIA, 2JT, 2ND, 2SQ, 2UX, 2WL, 3AA, 3AHR, 3AWY, 3AXP, 3BSA, 3BSP, 3CME, 3CRJ, 3CST, 3CYC, 3DAU, 3DDN, 3DEY, 3DFI, 3DHE, 3DNJ, 3DOX, 3DSA, 3DSS, 3DTF, 3DVH, 3DWM, 3KR, 4TS, 5AA, 5PN, 6JF, 8OO, GM3BDA, 3CAP, GW6JW.

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DX COMMENTARY

ON CALLS HEARD, WORKED & QSL'd

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

The general tale for the past month seems to be one of great efforts rather than startling results. When we get a number of letters saying "Best DX of the month has been UM8KAA (or LX1AS)" it is a pretty sure sign that nothing very outstanding has been available. One section that has certainly been on the move, however, is the "1948 Marathon." Two stations, G2EC and G3AAE, have both managed to collect their 40 Zones this year—very fine work indeed. There is no doubt that they have both wielded their calls with outstanding success during 1948.

The Post-War listing has not made any remarkable progress, which goes to show that the work of this DX season consists of picking out the remaining countries still on the air rather than the accumulation of startling new ones. Lots of the DX types have, however, added a brand-new country with the arrival of UM8KAA on the 14 mc band. This one and only representative of UM8 closes the book of Russian districts for many of the DX-chasers. Strange to hear a station with a creepy T4 note so anxiously sought after—and a sure proof that the "D" in "DX" no longer stands for "distance." Our UM8 friend moves roughly 15 degrees on our HRO dial during a QSO—and not slowly, at that. (One thing—he would find it difficult to VFO on to anyone!) As one or two who have worked him suggest, an auto-tuner would help.

Some Funny Ones

The mysterious AC4AK has been around again, and G3ATU (Sunderland) has now added AC4HF to the collection. He, too, says QSL via AR8AB, who seems to be a busy chap! Then there has been quite a stir over XP1CQ, who is said to be in Nepal, although the prefix XP, in the new official allocations, belongs to Denmark! As for XX4X, YD5BS and CR1TPN—the less said the better. We are not even too sure of AR1WW, IS1AEW and IS1AHK, however, we take to be Italians, indicating that they are in Sardinia; whether it is official we don't know. Incidentally we find "DX" like these latter two and F8NE (Corsica) the most difficult of all to work, because they

are always calling CQ DX and if one happens to have a conscience. . . . G6BB (Streatham) found a very neat way of solving this problem, though; LX1TS called CQ DX, so 'BB called CQ LX and the LX immediately called him!

Hot-Under-Collar Section

You will doubtless remember that last month's collar-work concerned this very problem, particularly the rude reply from an Italian station to a G who called him. G2ATU (Prestwich) writes on the same subject. He says its high time we had plain speaking on the subject of some of these foreign amateurs who try to tell us how to run a station, when they operate from countries from which 90 per cent. of the foul noises emanate. 'ATU remarks, in particular, on continental 'phones, dirty notes, and stations calling CQ fifty times without signing. He suggests that even if some of our own species do run to T7 notes and poor operating now and then, we ought to blow our own trumpet for once and draw comparisons between the average G station and the average station from . . . well, you know where. Three or four European countries still appear to be well back in the dark ages with their equipment and methods.

WORLD-WIDE DX CONTEST

During the periods October 29-31 (CW) and November 5-7 ('Phone), CQ will be running a DX Contest open to the whole world. Full details will appear in our October issue, and in due course entry forms and log sheets for the Contest will be available from us.

G2ATU, by the way, finds that he is constantly being confused with G3ATU, to whom we have already alluded. They run a private QSL Bureau for sorting their cards out! This, of course, isn't their fault—it just means that some people are



G2LP and G3BNZ were recently in Holland, and on June 7 were asked to a VERON meeting. This assumed something of the character of an international gathering, for seated left to right in this picture are SM5TO, OZ2FX, G2LP, G3BNZ, OZ8T (chairman of the Danish amateur organisation), and ex-ES2CX. All the others in the photograph are Eindhoven PA's. Second from right in the front row is PAØVH, president of the Eindhoven group, which numbers no less than 45, twelve of whom are concentrated in an area of 1/3 of a square mile. PAØQJ, on PAØVH's right, sent us the picture and the story.

not too careful when it comes to remembering calls and making out cards.

While we're still perspiring, here is a line from G5YH (Chiswick) who is an Old-Timer and one-time member of the famous—or notorious—"South London Gang." 'YH has been doing a little listening for the first time in nine years, and is not, on the whole, impressed. He says there are far too many wobbly VFO's; and that though some of the chaps doubtless *think* they are sending Morse, much of the stuff doesn't sound like it to his poor old ears. Also, he remarks on the very poor listening technique, with everyone grinding out CQ's and failing to hear the DX in amongst them. With all of which we are reluctantly forced to agree—and that goes for Arabackle, too. (He claims to have discovered new gen for working DX—he listens until he hears someone in a country he hasn't worked, calls him, and finds then that he either (a) works him or (b) doesn't. In either case he goes off the air immediately afterwards! As a result of this, Arabackle's score has risen by some four points during the month, representing about two hours' work on the air.)

High-Power Note

From Edinburgh's *Radio Amateur News*, the lively publication of the Lothians Radio

Society, we quote the following: A "W" station using a kilowatt told GM6LS that he had had to give up using co-ax, as it welded itself together at half-wave intervals! Apart from being a handy idea for manufacturing ready-made stubs without calculation, this has no future.

News from Overseas

EK1DP (ex-G3ADP) tells us all about conditions in Tangier, where one doesn't have to *apply* for a licence; one just builds a rig (anything up to 1 kW) and allots oneself a callsign! He lists ten active stations out there, and hopes to be using some NBFM shortly on 14, 28 and 50 mc. 'DP tells us that the prime example of BCI is provided by EK1DI, whose 'phone fully modulates the sound-track at the local cinema whenever he comes on!

G3CEI (s.s. *Chrysanthemum*) writes from Matanzas, Cuba, where he has been feted by the local amateurs in spectacular fashion. He has had no luck raising G's, but has been working 7 mc 'phone from CO5AE. 'CEI tells us that the CM prefix is allotted to newly licensed amateurs for CW only; the CO prefix denotes the full licence. CO5AZ is an OT who was WAC in 1927; he has a fine collection of QSL's, as has CO5CX, another OT. CO5AZ's old rig is still going strong with a pair of

210's in the final—which takes us back a bit.

AP5B (Lahore) finds that it isn't all fun being a DX station, and he is already quite anxious to become G3HS again. He vainly tried to work an HB1 with shoals of W6's butting in and saying "Pse QSO OM—need u for DXCC" and so on. And when he called "CQ NFD" all the Russians parked on his frequency and called him for five minutes. AP5B (full QTH in list) is now the official QSL Bureau for Pakistan—please note.

Peter Sawyer of ZS5YF (ex-G3BYF) is probably back in England by now, and intends to resume operations as soon as his licence is reissued. While in ZS he worked 39Z and 107C; he thinks he has QSL'd 100 per cent., but if anyone is short of a card will they please write to him at London House, Guilford Street, W.C.1.

MD5AK is also on the move, and hopes to be settled in VQ4 shortly. He enjoyed the stay in MD5 to the tune of 38Z and 156C, never exceeding 50 watts. If he doesn't find mains where he is going, he is all prepared with a vibrator power supply and 6 or 7 watts.

Dan Lockyer of ZC1CL is still knocking them around, but he says that a recent QSO with VP6CDI was badly hashed up by many stations (including G's) calling continuously through the contact. The boys concerned are on the black list. It took 'CL and 'CDI three overs just to pass the RST each way. One for the "Queer Box"—ZC1CL heard a T3 effort signing FD1KP.

A very interesting letter from David Mitchell (ex-GW6AA) encloses lists of Calls Heard during his sea passage on the Great Circle Route from Cape Town to Australia. As he says, reports from these parts of the world are rarely, if ever, received by amateurs. If anyone appearing in the list wants a special card, write to David at the QTH given in these columns last month.

Ron Crowther (H.M.S. *Phoebe*) logged some of the NFD 5-watt portables while at Malta. From Trieste he heard VR6AB, and he is now transferring his attentions to 3.5 and 7 mc.

Geoff Scholey (ex-G3CDR), who has been gadding around the Far East, is another who is probably home by now. His call is being held for him, so we shall probably be seeing him on the air before long.

G3AWR (m.v. *Tornus*), writes from Singapore and encloses Calls Heard from various parts of the world; we are

publishing those for June, but most of the others date rather a long way back.

Peter Lovelock (ex-G2AIS) is now one of the regular operators at K2UN. He recently had a long contact with VP6CDI, who was his nearest neighbour at home in the G2CDI days. All-night sessions at K2UN are luxury affairs, with the cafeteria open. Look out for Peter when you hear K2UN—he is always on the watch for G's.

LA2LB (Oslo) writes to put us straight on the matter of the "LF" prefix. It is allotted to firms making radio equipment and is for use when making tests, but not for regular operation on the amateur bands.

VK5BS (Edwardstown, S.A.) has been hearing quite a lot of G's on 7 mc, even as recently as May and June. He tells us that the *Magazine* goes the rounds of 17 amateurs at his place of work! 'BS encloses some very useful New QTH's from VK5RX—most of them with a Pacific flavour.

A nice word from ON4MS (Malines) who with 75 watts of CW and 'phone on 14 and 28 mc, cathode modulated, has knocked up the excellent score of 130C worked, 115C confirmed, Arkansas and New Mexico only wanted for WAS 'phone (both these States have been worked on CW); and for Zones, 39 have been worked and 38 confirmed; ON4MS is

1948 MARATHON

(Starting Figure: 25 Z)

Station	Z.	C.	Station	Z.	C.
'Phone and CW			'Phone and CW		
G2EC	40	137	GSMR	30	41
G3AAE	40	108	G2WW	29	92
G8KP	39	131	G2BJY	29	88
G4CP	39	120	G2AO	29	73
G2AVP	39	100	GM3CSM	29	68
G3DO	38	114	G2HPF	29	48
G6QB	38	108	G2BXP	27	62
G5GK	38	84	G3BNE	26	62
G2AJ	37	100	G6XX	26	52
G3ATU	37	94	ZC1CL	25	66
G3BI	37	89	GM3AVO	25	55
G8IP	37	82	'Phone only		
G2VD	36	103	G3DO	34	93
G3AKU	34	109	G3DAH	31	77
G5FA	34	96	G3ZI	30	62
G8KU	34	85	G2BXP	27	61
G3DAH	33	91	G2VJ	26	56
G8PL	32	88	G6CB	25	54
G3TK	32	81			
G4AR	31	88			

also holder of the DXCC. Altogether, he is well up on the ladder of DX achievement.

From Bermuda, ex-VP9E will be home shortly but his site will be taken over by VP9CC, who will be particularly anxious to raise the GM's in the Selkirk and Aberdeen areas. GM5TT (Selkirk) amplifies this information somewhat by reporting that all VP9's have been re-issued with a two-letter suffix, stations known to be active being VP9CC, VP9DD, VP9PP and VP9VV.

Piracy Corner

G3BYY (London, E.9) asks us to state that anyone in QSO with G3BYY on any band but 5 metres is working a pirate. He has been receiving numerous reports alleging 3.5 mc and 7 mc operation. G6QB (Bexhill) had the unusual task of of convincing a station that he was real! Having denied a previous QSO with the said station on the top band, per QSL card, he did get up there and work him, so was naturally suspected. Query: How does one prove, *over the air*, that one is not a pirate?

The Month's DX

G6BB (Streatham) has received C6YZ's card, boldly stamped "Zone 23." 'BB now



When G3CEI was visiting Cuba, he met COSAE (standing, behind) and COSLU, seated.

ZONES WORKED LISTING

POST-WAR

(Starting Figure: 30 Z)

Station	Z.	C.	Station	Z.	C.
'Phone and CW			'Phone and CW		
G8KP	40	179	G5FA	35	104
G6OB	40	165	G6BB	35	97
G2WW	40	162	G3BTU	35	79
G2AJ	40	162			
G3DO	40	159	G5WC	33	108
ON4JW	40	154	G3DAH	33	93
G4CP	40	152	GM3AVO	33	85
G2AVP	40	138			
G5GK	40	128	G8PL	32	98
G3AAE	40	128	G5HH	32	88
G8IP	40	114			
			G3ACC	31	95
SV1RX	39	153	G2BJY	31	95
G2VD	39	146	G2HPF	31	90
ON4MS	39	130			
G4AR	39	128	GM3CSM	30	77
G3TK	39	126			
G3BI	39	117.	'Phone only		
G5MR	39	108	G3ZI	37	128
Z5SYF	39	107	G3DO	37	122
G6PJ	39	77	G8QX	34	113
G3ATU	38	121	G2BXP	32	80
G2AO	38	113	G3DAH	31	31
G8KU	38	109			
G6XX	36	99			
G3BDO	36	98			
G2BXP	36	94			

has all his cards for a WAS claim, and has worked TI2EXO, CM2BT, YV5ABX and VP5RS, which seems to suggest that his NW-SE dipole is performing as it should.

G2AO (Malvern) remarks that "given an atlas, anyone could say whether C6YZ was in Zone 23 or not." (On a map, he is; in CQ's list he isn't. The debate continues. . . .) 'AO remarks that if all the people receiving cards from UF6AA will study them closely, they will find them to be *reception* reports. Several others also make this point; but we know of some stations who have had these cards and have not been active on the DX bands at all. Reverting to G2AO, he has found 7 mc very good in the mornings for North, Central and South America, with 28 mc open for ZS and VK over the odd half-hour stretches. He went on 58 mc for a while, but the spivs drove him back to the DX bands!

G4AR (London, W.10) wants to know whether anyone is now active in Zone 26 (Burma, Siam and French Indo-China). Well, the XZ's certainly seem to have

DX QTH's

AP5A	J. Taylor, Police Radio Station (Tech.), Cantonments, Lahore, Pakistan.	
AP5B	D. T. Boffin, c/o Office of High Commission for U.K., 4 Racecourse Road, Lahore, Pakistan.	
C7TN	Box 52, Peiping, China.	
CR8AC	Box 4A, Panjim, Goa, Portuguese India.	
EK1AA EK1AR EK1DI EK1FP EK1MD EK1MT EK1SS EK1TF	RCA Communications, Box 57, Tangier.	
KA1FH		L. A. Fernandez, 1131 M.H. del Pilar, Manila, P.I.
PK6AX		Lt. E. A. Kygsman, R.N.N.R., c/o NNGPM, Morotai, Moluccas, Netherlands East Indies.
PK7VK		Radio Section, Biak Island, Dutch New Guinea.
VK4OS		C. A. Rowles, Port Moresby, Papua.
VP9CC		W. J. A. Anderson (<i>ex-GM3TD</i>), Box 20, Mangrove Bay, Bermuda.
VP9Q		B. S. Atkinson, Kenrose, Cavendish Heights, Pembroke, Bermuda.
VS1CN		via VS2BS, c/o GPO, Penang, Singapore.
VS4WL	R. Wellspring, RAF Detachment, Labuan, British N. Borneo.	
YA3B	Box 5, Kabul, Afghanistan.	
ZC6AL	Box 4150, Tel-Aviv, State of Israel.	
ZE2JG	E. M. Dishington, 3 Third Street, Umtali, Southern Rhodesia.	
ZS9D	Box 14, Francistown, Bechuanaland, South Africa.	

with more gadgets than we have ever seen on one chassis. XX4X says he is in Austria, and frankly admits that he uses the call "because it attracts DX."

One of last month's doubtfuls (TA3FAS) turns out to be genuine. He belongs to the U.S. Embassy at Ankara. G3AJP (Fritton) and G3BNE (London, N.W.3) have both worked him. In addition, 'AJP worked YI2GX, who said he couldn't QSL—but it was the good old "Baghdad Morse" all right. 'BNE adds XX4X, XP1AP (?) and ZC6AL in the State of Israel.

G8KP (Wakefield) keeps knocking his totals higher, but says he is still sorry that the gang, as a whole, don't prefer Confirmed Totals only. He thinks many of them are kidding themselves as to the real figure. 'KP has 130 confirmed.

G3ACC (London, S.E.22) is on the last lap for her century, in spite of using only one crystal in the CW part of 14 mc. She says she just gets on with some knitting with the receiver set on her crystal frequency, and some DX always turns up sooner or later. If only everyone would be so patient. . . . New ones for her include VS6AE, VS6BD, ZD1LQ, CR7AD, FE8AB and PZ1FM—which shows that the system works.

G3AAE (Bournemouth), one of the top-scorers in the Marathon, has added TI2KP, TI8EP, F8NE, OQ5LL, VP3TY, VP6SJ and HC1JW. He has also worked our friend AC4AK but isn't counting him. G8QX (Malvern) has topped up his score a bit with CT3MN, MD4JG, EK1MD and MD7QR. (This last reminds us that we have heard MD7QRQ, QRL and QRP—could anyone possibly allot worse call-signs?) Others from 'QX are C4RK, ST2CH and VQ5PBD on 28 mc and a bunch of VK's on 14 mc.

A long letter from GW3ZV (Rhigos) which he calls his "annual epistle," pleads for the listing of confirmed contacts only. He also is very keen on a separate listing and perhaps a special award for the 21 mc band, when this arrives. We shall certainly organise a 21 mc Marathon, with all G stations starting from scratch. 'ZV says it's nice to have a GW call—RV2/FO8 called him and asked for a QSL towards DXCC! If they would only give the Isle of Wight a special prefix, we would consider moving there!

G2BJY (West Bromwich) was very unlucky and had a fire in his shack—not caused by radio troubles. It destroyed many of his QSL cards, and he asks whether stations that have worked him would be so good as to send duplicate cards along if they read this. He is another

departed, but we heard someone calling F18XX t'other day so maybe there's hope.

G3AKU (St. Ives) reports for the first time, with UM8KAA and UF6AB. He wants a UP2 now, and suggests that those who worked that "UW5" may eventually get a card from a UA6 with a rocky fist. Others from 'AKU include C7OK, VS9GT, AR1WW, EP1B, CR7MB, CPIAP and still more nice ones.

G8OJ (Manchester) has been adding to the score, with VP4TAU, KL7QS, MD4TH, CR6AI, FE8AB, HL1AU and XSTP, a ship off the Philippines. G8PL (London, N.W.3) has also collected UM8KAA, plus ZA2AA and XON4AA. (These "AA" calls are popular.) XON4AA we know to be perfectly genuine; it is ON4AA sailing his own yacht *Santa Maria*. Your commentator has been aboard, and the display of radio gear is truly amazing; it includes an enormous German receiver

who has worked ZC6AL (State of Israel), and wonders whether he may have been the first—it was on June 30.

GM3CSM (Glasgow) says conditions up there have been very poor, but he produced a few new ones from the hat. These included LX1AS (on 28 mc short-skip!), UAIKEC (Franz Josef Land), C7AA, KV4AA, some KP4's and a TI. He also raised UAØKSB, and would very much like to know whether he is in Zone 18 or 19. Our bet, based on a certain system, is that he is in 18. Here is the "system," if you can call it that:— Of all the Zone 18 and 19 stations identified, those in 18 have a first letter of A, B, O, P, S, T, U or V—disregarding the "K," which signifies a Club. Those in Zone 19 have a first letter of F, G, L or Q. It may not work—don't blame us if it doesn't—but those calls seem to have some mysterious significance behind them. At all events UAØSF, ØSG and ØSI are all in Zone 18, so it rather looks as though ØKSB should be.

WAZ on 25 watts?

G3AAQ (Kidderminster) remarks that all the top-scoring stations look and sound like 150-watters to him, and enquires whether anyone has yet collected 40 Zones on 25 watts. 'AAQ uses a long wire and likes it very much; he has recently raised UAIKEC and F8NE (Corsica) and asks if they count as

separate countries. They certainly do—and the list in the *DX Operating Manual* makes them clear.

G5FA (London, N.11) has gone back on 7 mc for a while—he just can't leave it alone. But on 14 mc he has raised EP3H for a new country, as well as VQ2HC, AP4A, VP9E, VS9GT, VS2CH, VS6AC, VS7KR and others. VS2CH told him he was sitting with a gun fully loaded, but whether it was for marauding Chinese or 14 mc spivs remains a mystery.

G3CSE (Hull) gets along with 15 watts and two crystals, which he wields to some effect, having worked all districts USA, KH6IJ, OX3UG, VO2AT, FT4AN and all the rest such as VK, ZS, LU and so on—which is a very good show. 'CSE says there is still too much inter-G working on the DX bands while the DX is coming through.

G5WC (London, S.E.19) has picked up such DX as has been going, but has found things dull during the month. He votes on the side of "Confirmed Only" for listing the honours, and says "Making a large score if you've no proof is like saying your car does 75 m.p.h. when you have no petrol to prove it." (But probably your car *does* do 75—so what?) Personally we like to trust people; but if everyone is dying to show Confirmed Totals only, then we are quite prepared to change our opinion. The feeling at the moment is that

G CALLS HEARD OVERSEAS

14 mc

D. M. Ferguson (G3DBJ), RAF Salalah, British Forces in Aden.

'Phone: EI1J, G2DPZ, 2FYO, 3AUH, 3BUU, 3BWA/A, 3RT, 6OL, 6RH, 6UX.

'CW: G2IO, 2LK, 3IB, 3LI, 5IW, 5VN, 8TD, G15UR.

G3AWR, on board M.V. 'Tornus,' c/o Anglo Saxon (Eastern) Petroleum Co., Ltd., Box 148, Singapore.

Position: Off Sumatra.

G2FK (35), 5LI (46), 6DX (348). (June 6, 0600-0630.)

Position: 12° South 107° East.

G6YQ (35). (June 9, 0600-0630 GMT.)

Position: 19° South 109° East.

G2HKU (45), 3BTA (56), 3SR (46), 5BZ (57), 5MS (57), 5TL (57), 8KP (56), 8LG (57), 8RQ (57), G16TK (577), 5UR (458), GM3AQX (56), GW2AVV (468). (June 11, 0600-0630 GMT.)

Position: 21° South 110° East.

G3AES (35), 3LP (45), 3VP (36), 5LI (58), 8KP (57). (June 12, 0600-0630 GMT.)

David Mitchell (GW6AA) on board S.S. Athenic on voyage to New Zealand via Great Circle Route from Cape of Good Hope to Australia.

Between Cape of Good Hope (ZS1), and a position 1,300 miles S.E. of Madagascar (FB8).

'CW: EI9N, G2AIG, 2AHP, 2BKF, 2BQC, 2CLL, 2CUI, 2EC, 2FGX, 2FO, 2HBM, 2SO, 2UX, 2VD, 3AAE, 3AAG, 3AAN, 3AGF, 3AJP, 3AOG, 3AQQ, 3ATU, 3BNE, 3BNU, 3BUN, 3BUX, 3CFW, 3CJM, 3DMG, 3PR, 3PU, 3QQ, 3WL, 4CI, 4MU, 5BZ, 5DR, 5GK, 5HU, 5OB, 5VN, 6CL, 6DX, 6FW, 6IC, 6KS, 6KU, 6LD, 6LH, 6OB, 6UT, 6ZO, 8BR, 8FF, 8GB, 8KP, 8LT, 8OA, 8OI, 8VH, G13AXI, 5UR, 6YW, GM2FXN, 3AHQ, 3AWW, 3BST, GW3ALV. (June 15-19.)

Between a position 1,000 miles South of Mauritius (VQ8) and New Amsterdam Island (77° East 37° South).

'CW: EI4B, 6Q, G2AAS, 2ASY, 2AVP, 2CLL, 2DHR, 2DZ, 2FGX, 2FO, 2FRL, 2HHT, 2MD, 2OS, 3AAE, 3AAG, 3AMM, 3ANE, 3AWD, 3AZ, 3BDS, 3BKF, 3BNU, 3BUF, 3CFW, 3CGY, 3CJM, 3FS, 3PR, 3PU, 3WL, 4JB, 5CG, 5CR, 6DX, 6IC, 6KS, 6LD, 6LH, 6TC, 6TI, 6WP, 8IL, 8OJ, 8PP, 8PX, 8RQ, 8UK, GC3DVC, GD2DF, G13AXI, 5HU, 5UR, GM3AWW, 3AJY, 3BST, 3RL, 4ON, GW3AAA 5TW. (June 20-23.)

28 mc

Position: 1,000 miles South of Mauritius (VQ8).

'CW and 'Phone: G2AKQ, 2DOW, 2EC, 3AH, 3BMF, 3BKD, 3BZM, 3DDN, 3ZF, 4NC, 5RQ, 5TL, 6HL, 8SY, GW5SL. (June 20.)

it would make everyone spend so much time writing out third and fourth cards, begging-letters and air mail hasteners that they wouldn't have time to work any more DX. But that's a thought—it might leave a little more room round the band! G5WC asks where "HL" is—he probably knows by now that it is the prefix for Korea.

G6VC (Northfleet) says it is rather puzzling to read that PIIL was the call of the Dutch Weather Ship, because he has a 7 mc QSL from PIIL, giving the QTH as Communication Dept., Netherlands Aeronautical Service.

Stop Press

G2AVP (Stradishall) writes to say he is off to MD2, MD5 and ZB1 again, but not for long. He has collected his 39th Zone for 1948, and has made his WAS on CW. G8IP (Hampton) has claimed his 40th Zone (Post-War) with OA4Q, and so enters the ranks of top-scorers—nice work!

While we are actually writing this, a beautiful new one is coming in on about

14080—W4DGW/KJ6. We sat on him for nearly two hours, during which time he apparently collected his WAS! Some lucky one over here will penetrate that thickly stacked mass of W's calling him, no doubt, but it won't be us—we have work to do.

Small prize to anyone who can tune through the 14 mc band without hearing UB5KBA—now there's a really active club for you!

G3DBJ (Aden) sends along a short list of G Calls Heard—reproduced with the others at the end of this section. He doesn't state the frequency but we assume it to be 14 mc, because he says 28 mc conditions have been very poor.

And that brings us to the close, so we will look forward to hearing from you again next month. Deadline is rather early, and we must have everything by first post on August 12, please. Separate out those WAZ and Marathon claims from the main body of talk, and you will be doing us a good turn. Until next time, 73 and Good Hunting.

THE "FB" CHASSIS UNITS

Very well-designed and constructed chassis units in a variety of sizes are available from stock—or to special order in a few days—from FB Products, 41 Carlisle Street, Bradford, Yorks. These chassis are with a stiffening bar, and the standard depth is 2½ in. The firm also undertakes the construction and punching out of chassis to customer's own specification.

XTAL XCHANGE

Here are this month's offerings—please negotiate direct.

G3CCB, 62 Cheddar Avenue, Blackpool, Lancs
Has 3534 kc crystal, QCC P5 type, mounted
Wants frequency between 1800 and 1900 kc.

G3DMP, 38 Glover Street, Leeds, 7.
Has certified QCC Type P5 crystal 7132 kc.
mounted. Wants frequency between 7010 and
7050 kc.

G3DVW, 17 Lingfield Road, Broadgreen, Liverpool,
14.
Has 7010 kc crystal in standard holder. Wants
100 kc.

G6CB, 7 Caxton Road, Wimbledon, London,
S.W.17.
Has 7010 kc crystal in small holder. Wants
frequency between 7325 and 7360 kc approxi-
mately.

DX OPERATING MANUAL

Have you had your copy of our new 40 pp. handbook on the art and practice of DX working? Seven chapters, each complete in itself on one phase of the subject, with comprehensive lists by Countries, Prefixes and Zones and Prefixes, Countries and Zones. Well written and beautifully produced, the *DX Operating Manual* is obtainable, price 2s. 8d. post free, of the Circulation Manager, Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1.

PURCHASE TAX ON GIFT IMPORTS

If someone in America should send you a nice present of, say, transmitting valves, Customs and Excise will charge you purchase tax, import duty and a collection fee. The P.T. part of this total can be reclaimed—but not by arguing with the postman. Pay him, and then claim your refund from Customs and Excise at the port of entry. In a particular case, 16s. was charged on a free-gift HK257B, and of this sum 10s. 6d. was returned on application through the proper channels.

Mrs. Ham's Charter

By the Wife of an Active One

(1) The Household Broadcast Receiver is *MINE*—thou shalt not interfere with it in any way, neither shalt thou cause it to emit clicks, thumps, whistles nor the sound of thy voice. Neither shalt thou lay thy thieving fingers on the valves without my express permission. And if I *do* lend a valve, and later ask for its return, thou shalt replace it with good grace and a word of thanks, not hand it to me with a scowl.

(2) Thou shalt not drop solder on the carpet.

(3) Thou shalt not wake me at 3 a.m. to discourse on the night's activity in thy quest of DX.

(4) If it be thy desire to erect an aerial mast, thou shalt not put it in the middle of the lawn, but shall endeavour to fit it into my plans for the garden. Neither shalt thou steal my clothes-line for a halyard, nor erect a counterpoise where I or the children can get hurt by it.

(5) Thou shalt not have more than one radio periodical on the newsagent's bill each month, but shall take them on subscription (as an annual birthday present perchance).

(6) Thou shalt not pull up the floorboards without prior arrangement. Especially shalt thou not do this just after I have finished cleaning a room, nor when I am expecting a visitor.

(7) Not more than once in any month shalt thou come home hours late for a meal, bringing a friend without warning, else thou canst get thy food thyself—and wash up afterwards.

(8) If a ham comes to tea, and I and the children are at the table, thou shalt encourage polite conversation, and not huddle at one end discussing that which I

wot not of until such time as I and the children have left you to it.

(9) If thou leavest valuable gear where the children can get it, the results be on thine own head, and thou shalt not try to dock the house-keeping or the children's pocket money to replace breakages.

(10) Should it so happen that a spiv steals the contact that thou didst desire, thou shalt not swear or curse at me, not abuse me, nor beat me, but thou shalt take the dog for a walk and return in better humour.

And in return for all this will I put up with thee and be a good and faithful spouse and lavish on thee my care and attention. And thou shalt be free to attend club nights and field days without hindrance, and thou canst stay up half the night chasing DX so long as thou dost not wake the family. And that part of our home which thou callest *shack* shall be sacred to thee and I will do my best to keep the children out and shall refrain from cleaning up in thy absence.

Thus shall we live happily ever after.



"... I have decided to give you some white mice, Henry..."

NEON INDICATOR LAMPS

A very useful range of miniature neon indicator lamps, for direct operation off the mains, is now available, suitable for all kinds of instrument panels and switchboards. These lamps are supplied in an insulated mounting for $\frac{1}{2}$ -in. hole fitting,

with coloured covers to give natural neon-red, dark amber, dark green or dark red shade. The price, complete with shade required, of the 26C model for 200-250 volt mains is 3s. 9d. Acru Electric Tool Manufacturing Co., Ltd., 123 Hyde Road, Ardwick, Manchester, 12.

Converter Unit for 144 mc

The "Broadbander" Two-Metre Receiver

By W. J. CRAWLEY (G2IQ)

AS was the case with 58 mc, amateurs are finding the design of the receiver for 144 mc to be a thornier problem than that of the transmitter.

There appear to be three approaches to the question of what to use, and it is proposed to discuss briefly the *pros* and *cons* of each. They are :

- (1) A complete new receiver from tip to tail.
- (2) A converter to work into an existing receiver.
- (3) A converted ex-Government surplus receiver.

The third solution is the one to be recommended the least—in fact, one cannot recommend it at all, for the following reasons. Most of the surplus receivers that could be adapted for use on 144 mc cover a comparatively wide frequency range, usually around 30-40 mc, and the 2 mc of our proposed new band would occupy but a fraction of the available dial space. This could, of course, be altered but not in the majority of cases without major modification. Many of these receivers also have a wide IF pass-band and use a very high IF, and whilst knife-edge selectivity is not expected to be necessary on 144, better selectivity than that offered in the average surplus receiver will be required.

Although the writer has not had the experience of testing many surplus receivers, an examination of the circuit diagrams, valve line-up and so on leads to the conclusion that the majority of these sets were designed for reliability, robustness and length of service rather than for sensitivity. The amateur must have something better than average performance; he wants to squeeze the last ounce of sensitivity from the designs he uses to enable him to wrinkle out of the mush the weak signal that cannot be heard on the ordinary receiver. Just that little extra may make the difference between hearing G5BY in the Orkneys and not hearing him! It is for this reason that starting from scratch is to be recommended on this 144 mc receiver problem.

Here is a practical answer to the immediate receiver problem on 144 mc, without undue complication and with no more expense than is called for in providing a converter for any other band. The article describes how either the signal frequency circuit of the converter itself or the main receiver, considered as an IF amplifier, with which it is used can be tuned to cover the 144 mc band.—Ed.

Solution No. 1 is the right one for the amateur who has plenty of spare time and gear. The writer has neither of these, but nevertheless he decided to make a clean break-away for 144 mc with separate transmitter and receiver. Those super stations with complete equipment for each band are always envied, and it was decided to increase the pleasure of 144 mc operation by making the gear quite independent of the rest of the station. It is hoped to describe the receiver in these pages in due course, but in the meantime let us look at solution No. 2.

Converters for 144 mc

There are two types of converter that can be used on the new band, although their principle of operation is the same. For want of better terms they can be called broad-band and narrow-band converters. Both make use of the double-superhet principle; in the former the tuning is done in the second oscillator and in the latter it is done in the first oscillator. In the broad-band converter, broadly tuned circuits are used in the RF and mixer stages so that the second IF may be varied over a fairly wide range without loss of sensitivity. The better known narrow-band job, whilst offering improved sensitivity per valve, has the disadvantage that the RF and mixer stages must be kept in step with the oscillator as its frequency is varied. On the lower frequencies this was fairly easily achieved, but the problem of spreading 144-146 mc over the major portion of the dial whilst keeping the RF and mixer circuits in line, *plus* the question of stability, leads the writer to favour the broad-band converter for 144 mc—at any rate as a start.

The advantages are the inherent simplicity of the system, for the converter need not be touched once it has been correctly adjusted. The tuning may be done either on the main receiver or on the converter itself. If done on a main receiver which already has a slow-motion tuning device, calibration and tuning on 144 mc become no more difficult than on one of the LF bands. Or you may,

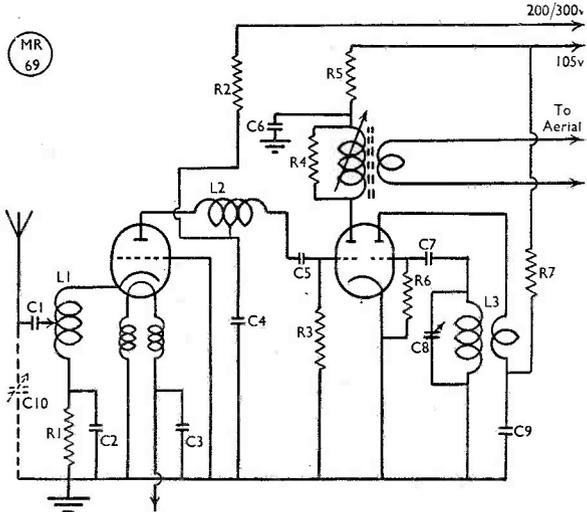
if you prefer or if you have a fixed IF/AF amplifier, tune the converter itself, using a small band-spread condenser and slow motion dial. The only disadvantage of system is that it is prone to spurious responses. Thorough screening of the converter is necessary to minimise break-through of the first IF. Harmonics from the local oscillator of the main receiver may be reduced by proper screening, although they cannot be entirely avoided, but as these are usually not numerous they can be tolerated.

Line-Up of the "Broadbender."

The converter to be described has been made as simple as possible without sacrificing sensitivity. A low noise factor has been obtained by the use of triode valves throughout. On another occasion ("Approach to 144 mc," *Short Wave Magazine*, April 1948) the writer explained his reasons for preferring triode valves at these frequencies and it is only necessary to repeat that their use results in improved signal-noise ratio. One difficulty, that of achieving the band-pass effect necessary in this type of circuit, was solved by a suggestion in an article in *QST* for March, 1948.

The RF stage presents no difficulty and the broad-band characteristic is obtained by using an earthed-grid triode. Broadening of the mixer circuits is achieved by employing high Q and over-coupling. This method is preferable to the conventional way of loading the inductance with a low value of resistance where appreciable loss is introduced by the shunting. Coupling closer than "critical coupling" results in a double-peak response and increases the band-width, which is what we require. To improve the Q, the maximum amount of inductance has been used, the only capacitance being that of the valves and that distributed around the coils.

To reduce the size of the unit and to simplify it still further, a combined mixer-oscillator valve is employed—the 6J6 double triode, a stable oscillator at these high frequencies.



Circuit of the "Broadbender," which incorporates a GGT stage ahead of the mixer.

Table of Values

- The "Broadbender" 144 mc Converter
- C1, C7 = 25 μ F silvered mica
 - C2, C3, C4, C9 = 500 μ F mica
 - C5 = 50 μ F silvered mica
 - C6 = .01 μ F mica
 - C10 = 30 μ F air-trimmer
 - R1 = 150 ohms, 1/2-watt
 - R2, R5 = 2,200 ohms, 1/2-watt
 - R3 = 100,000 ohms, 1/2-watt
 - R4 = 10,000 ohms, 1/2-watt
 - R6 = 33,000 ohms, 1/2-watt
 - R7 = 1,000 ohms, 1/2-watt
 - L1 = 2 1/2 turns, 18 SWG, 3/8-in. diameter, centre-tapped
 - L2 = 10 turns, wound as L1
 - L3 = 2 turns, 24 SWG, 3/8-in. diameter
 - L4 = 1 1/2 turns, close to cold end L3
 - V1 = EC54 (CV66, RL37)
 - V2 = 6J6

Construction

The construction of this unit is simplicity itself and may be completed in a few hours. The chassis used by the writer measures 5 1/2 in. x 3 1/2 in. x 2 in., but a larger one may be adopted if desired, provided that the RF leads are kept as short as possible. All the parts are under the chassis with the exception of the IF coil. This is mounted at the anode side of the 6J6, consists of 44 turns of 36 enamelled wire close wound on a 3/8 in. slug-tuned former with 5-turn link coil, and tunes to approximately 8 mc. The leads are taken through holes in the chassis and the coil is completely enclosed in a screen, which in the writer's case

consists of the can of a dead and dismembered EF50.

The socket for the EC54 (CV66) is mounted at the other end of the chassis with its heater pins facing the input. The anode pins then face the 6J6 and a screen of 18-gauge aluminium is mounted across the valveholder (after the wiring to this stage is completed) to screen the plate circuit from the input.

The filament chokes consist of two twenty-inch lengths of 22 SWG enamelled and silk covered wire wound together on a paxolin rod about 2 in. long and $\frac{3}{8}$ in. diameter. The size of this rod is not critical.

The cathode coil has one end supported by being soldered to the cathode pin of the EC54 and the other end to the cathode resistor. Short leads will make this quite rigid. The EC54 plate and the mixer grid coils are wound in one length, 8 turns, $\frac{3}{8}$ -in. diameter of 18-gauge enamelled copper, the turns spaced the diameter of the wire. The coil is opened about $\frac{1}{2}$ -in. at the fourth turn (centre),

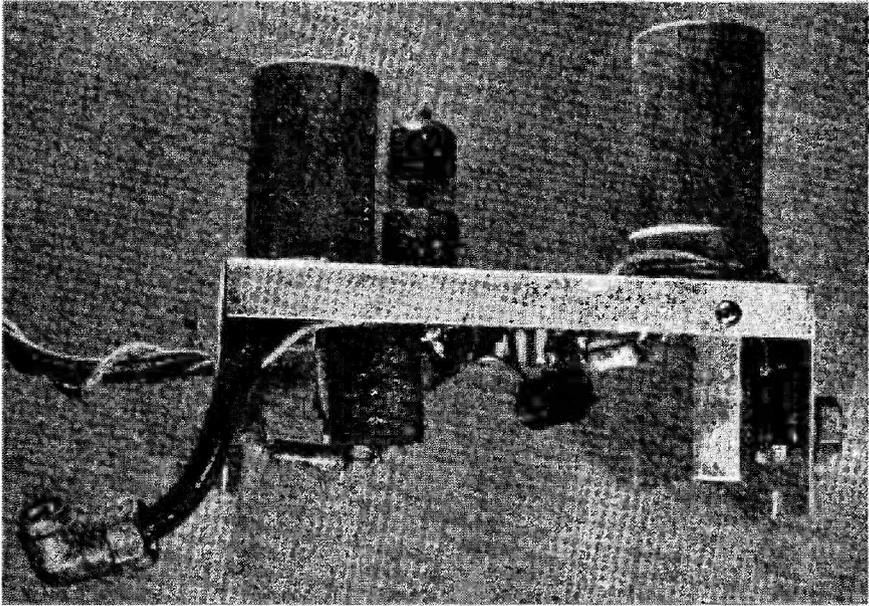
the enamel scraped off and a short length of wire soldered at the centre before assembling. The coil is then placed diagonally across the chassis so that its ends are near the plate of the EC54 and the grid of the mixer respectively. An upturned Denco 4-pin coil holder is useful here, but any strip of polystyrene with three tags one inch apart will do to support the coil. The oscillator coil is mounted at the side of the 6J6 socket together with its Philips 30 $\mu\mu\text{F}$ trimmer. For those who wish to tune this first oscillator a 5 $\mu\mu\text{F}$ band-spread condenser and a slow-motion drive will also be required.

Operation

The total consumption of the unit is approximately 6.3 volts at 1 amp LT and 20 mA HT. In the writer's case a separate power pack is used, but this is optional depending upon the capacity of the main receiver supply. Stabilised voltage of 105 volts is required for the 6J6 and a VR 105/30 is suitable.



General impression of G21Q's 144-mc converter, using a GGT RF stage, and fully discussed in the text.



Underneath the 144-mc Rx unit—the screen on the right is the shield across the EC54 socket.

The link from the mixer plate coil should be taken *via* coaxial cable or screened flex to the aerial and earth terminals of the main receiver.

In the absence of any official signals in the band, advice regarding the aligning process is rather difficult. The most important thing is to get the oscillator running on 136 mc and some method of measuring the frequency of the oscillator is required, such as a calibrated absorption wavemeter. A calibrated grid-dip oscillator has been found useful in resonating the coils, but in fact the only critical adjustment is that of the oscillator trimmer. The inductance of the RF and mixer coils is varied by opening or closing the turns, but owing to the broad pass-band (about 6 mc) this is not too critical.

The oscillator tunes to 136 mc with the trimmer about two-thirds out. As the oscillator trimmer is varied two points of increased hiss will be found with a point of self-oscillation between them, the frequency at which the oscillator and mixer coincide. The point of hiss with the oscillator at its *higher* capacity is the desired frequency and the RF and mixer inductances should now be varied until this point of hiss coincides with an oscillator frequency of 136 mc.

The recommended 6J6 valves are scarce (at a reasonable price), and there is no reason why two 6C4's or similar midget types should not be used. In this case it is suggested that injection be obtained by single turns of wire around the cold ends of the mixer and oscillator coils with link coupling between them.

WEBB'S NEW CATALOGUE

A very well-produced catalogue, running to 26 large pages with colour cover, has recently been issued to cover all the standard lines carried by one of the oldest and best-known Amateur Radio supply houses in the business. The price is 6d., and the catalogue is available at Webb's Radio, 14 Soho Street, London, W.1.

MULLARD VHF VALVE

When looking round for a good valve for the VHF's, remember the Mullard QV07-40, a double-tetrode RF power amplifier, which can be taken up to 200 mc at full ratings. These are: 750 plate volts, 20 watts dissipation per plate, and CW power output 87 watts. The Q407-40 can be run at reduced ratings up to 250 mc.

THE VHF BANDS

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

THE most noticeable feature of this month's mail has been the quantity we have received from GC, GI, GM and GW, and we know that on this occasion our G readers will wish us to start these notes with some extracts from their very welcome letters.

Northern Ireland

To begin with, we must record what we believe is the first contact on five between G and GI. This was between G3BW and G15SJ/P on June 27. The distance is around 100 miles. G6BH (Blackburn) was somewhat unlucky as he heard G15SJ/P on June 26 calling G5JU on schedule, and gave G15SJ/P a call. The GI heard him at RST 569, but was unable to reply due to a technical difficulty. G5TH was also heard by G15SJ calling G6VX at 2206 GMT. However, congratulations to both G3BW and G15SJ/P for blazing a new trail, and providing a new county. (Yes, GI counties do count; see *Short Wave Magazine*, April 1947, p.105). GI2HML (Belfast) also worked G3BW on July 5, and has been heard by G6BH. For his portable operation G15SJ was at Killiachy, Co. Down, about 17 miles S.E. of Belfast, only 50 ft. above the level of Strangford Lough. The aerial was less than 16 ft. high, and the gear was untried except for a short QSO with GI6VU (6 miles). The transmitter was run at 25 watts, and the PA an 807 on 59.02 mc. The aerial consisted of a 3-element close-spaced beam fed with 300-ohm cable. For receiver, G15SJ used a much-modified Type 27 unit into a BC348, while an alternative converter using 6AK5-6AK5-9002 was available, output being on 3.5 mc.

On the same date as what is certainly the first post-war G/GI contact, G15SJ/P worked OK3DG at 1845 GMT, for what is thought to be the first GI/OK and GI6YW/P worked IIDA at 1915 for the first GI/I QSO. If anyone has prior claims we should be glad to have them.

G15SJ recalls that he was second operator when GI6YWP (on Mourne Mountains) worked GW6OKP (on Snowdon) back in 1937. 'Phone was used to a TNT oscillator and the receiver was a "rush box". Yes, we do progress!

Northern Activity—

More EDX Working—

Fair GDX Conditions—

New Stations Active

Another GI who has been in on the DX is GI6VU, who worked F9KB at 1835 on July 3. (First GI/F?) Encouraged by this G6VU worked overnight on his Tx and had a straight PA instead of a power doubler operating in time for the big spor-E opening on July 4. Due to a gale, his beam refused to point at Europe; so an indoor beam had to be employed, but even so he says, "If I had been told that signals could be so loud on 5 metres I would not have believed it."

GI2HML has been using a Type 37 oscillator driving an 832 at 20 to 25 watts, and a Type 26 convertor, or a home-made job, into an AR88LF. Separate beams are used for Tx and Rx, the former being 3-element wide-spaced at '33 ft., and the

FIVE-METRE COUNTRIES WORKED LIST Starting Figure, 3

Worked	Station
15	G5BY (D, F, FA, G, GW, HB, I, LA, OE, OK, OZ, PA, SM, ZBI, ZB2)
14	G6LK (D, F, FA, G, GW, HB, I, LA, OE, OK, ON, PA, SM, ZBI)
13	G5YV (D, F, FA, G, GM, GW, HB, I, OE, OK, OZ, PA, SM)
12	G5BD
11	G2XC, G3KX/A, G5WP, G6XM
10	G2ADZ, G3BW, G5GX, G5MA
9	G2AJ, G2NH, G3IS, G5BM, G5CP
8	GI2HML, G2MR, G3COJ, G3YH, G5MQ, G6CW, G6DH, G8GX, G8UZ
7	G2ADR, G3APY, G5VB, G6LC, G8SM
6	G2CIW, G3ABA, G4AP, G4RO, G6MN, G6TF, G8KL
5	G2BDQ, G2KF, G3BXE, G4IG, G4LX, G5BJ, G5IG, G5PY, G16VU, G8LY, G8UR, G8WV
4	G2AOK/A, G2DBF, G2RI, GM3AXO, GM3BDA, GM3NH, GM3OL, G3TF, G3WW, G4LU, G5MR, G6OH
3	G3CWW, G3CYY, GM5VG, G8WC

latter 3-element close-spaced at 18 ft. We believe GI2HML can claim the first GI/HB on July 3. It is most pleasing to note how the honours for first contacts have been distributed amongst the active GI's. They are all hoping to work more G and GM stations and are willing to arrange schedules. And for the information of county collectors, according to our map Belfast is in Antrim.

Scotland

Stations reported active North of the Border this month are as follows :

GM2DI	Glasgow	GM3OL	Dumfries
GM2DRD	Forfar	GM4AN	Kirkcaldy
GM3AXO	Markinch	GM4HR	Dundee
GM3BBW	Edinburgh	GM4JO	
GM3BDA	Airdrie	GM5VG	Glasgow
GM3BEB	Cupar	GM6JH	Linlithgow
GM3CFT	Forfar	GM6KH	Hamilton
GM3DAU	Forfar (?)	GM6RI	Forfar
GM3NH	Dundee	GM6XI	Edinburgh
	GM8AH	Glasgow	

In addition, activity is promised from GM2HIK (Forfar), and GM2YA and GM2CAS (Aberdeen).

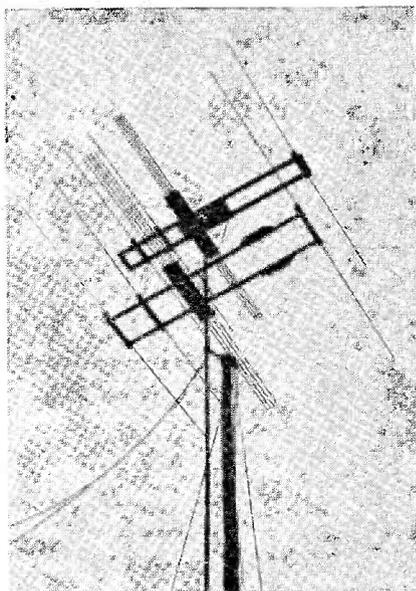
Many of the GM's have been enjoying the spor-E season, and once or twice seem to have had even better conditions than the G's, and many of them have been out portable.

GM2DRD is using a 4-element c.s. delta-matched beam, and gave it a first try-out at a portable QTH, 800 ft. a.s.l., with gratifying results, his signals being heard in Newcastle. The Tx has an 807 PA with up to 25 watts input. The Rx converter is 6AC7 RF, 6K8 mixer/osc. into a BC348.

GM3AXO, urged on by a local SWL (to whom many thanks!), got going on July 4. An 832 PA was driven from a quadrupling 807, and fed a 3-element wide-spaced beam, via 72-ohm coax. Five minutes after erecting the beam the first contact was made, and by the end of the day 11 stations had been worked in 4 countries!

GM3NH started 5-metre operations on June 20, with a 3-element indoor beam fed from a modified Type 37 VFO. The Rx side consists of a 27 unit, with iron-cored coils, and a stabiliser which he guarantees makes T7 sound like T9x! He has had some success and appears in the "Countries" table.

We are grateful to SWL Miller for news of activity in and around Glasgow. Most of the regulars in that area have 4-element close-spaced beams, and have been there to enjoy the EDX. In addition, some good



G4IG, London, S.E.26, has a composite beam array, the lower section of which was used for 50 mc operation. The 58 mc beam has directors spaced .05λ and reflector 0.2λ spaced. The driven section consists of four folded dipoles, fed through 100-ohm line, and the array gives a measured front-to-back ratio of 20 dB and front-to-side of 35 dB. The design of the 6-metre beam is identical.

local and semi-local contacts have been made. GM5VG has worked GM3OL through a 2,000-ft. hill (or should it be mountain?) on 'phone at good strength. GM3BDA has heard some GDX, including G5BM and G5TH, and has worked G2BDQ. GM6WL is at present inactive as he has been posted temporarily to Bletchley, Bucks., where he hopes to get going on five before long. He has already logged over 150 stations at his new QTH.

Wales

GW3AHN (Cardiff) is listening on the band, so may we hope for a Tx there before long! In addition, GW5SA is active in Glamorgan and has been worked by a number of G's recently.

Channel Islands

GC2AWT and GC5OU continue active, but so far do not appear to have made that first G/GC contact. The former is awaiting some duralumin for a 4-element beam, which he intends to place on top of a 50-ft. yacht spar, and 500-ft. a.s.l. G5MR has been over there to spur them on.

Sporadic-E

Before dealing with the activities of individual G stations, a few comments on conditions may be of interest. The opening on June 27 was noteworthy in that there was widespread evidence of a form of "scatterback", a number of GDX stations well off the line-of-sight of the beam being received with notes of T7 character. Several operators comment on this. G3COJ, G5BY and G8DL have noticed it on several occasions and we have experienced the same thing at G2XC.

The late-night opening of June 23, to SM, occurring after many G's had switched off for the night, was one of the surprises of the month. On June 27, YR5VV logged G5BY and G6XM, the former at RST 569 and the distance about 1,500 miles.

An interesting report comes from SWL Forbes in Wick, Caithness, who logged

G8DL on June 28, and G3AVF and G8FA on July 4, under spor-E conditions, indicating very short skip—all three stations are on the South Coast.

At the time of writing, there has been a lull in spor-E manifestations for over a week, but we anticipate there will be a further burst of good conditions before the end of the month. Amongst the new countries worked are D, LA, and OE. We regret that it was left to an unlicensed DA to make the first contacts from Germany. It is a great pity, as some G's object to working such stations, and are therefore somewhat penalised in the "countries" race. So far as we know OEICD is genuine, and we are accepting all these for our Countries Worked table.

GDX

One or two good GDX evenings in the

SUMMARY OF EUROPEAN ACTIVITY AND RESULTS

June 16 to July 15

All times are GMT. All stations on 58.5-60 mc unless otherwise stated

June 22

G6LK worked OK2MV, 3ID (1250-1305). I1DA heard FA8IH. HB9BZ heard FA8IH.

June 23

HB9BZ heard FA8IH, OK3ID, SM5UU. G2CIW heard F8OL, L1XW (1100-1230). G5BD worked SM5ABC, 5AI, 5VL and heard SM5SO, 5SI, OK2NB, 2QF (all 2200-0200 GMT). G2AJ worked FA8IH (1248), F8GH (1443), I1SM (1500). Ex-D4MAC heard I, OK (1525-1620 and 2045-2110). G2ADZ heard OK (1815-1915) and worked F9BG (2100). G2XC worked OK2EL, 2MV, 3ID (1825-1900). G8KL heard OK (1900-1930), worked SM5VL and heard other SM (2300-2359), G2XC worked SM5AI (2300), G6LK and G3WW worked SM5VL (2300), G3COJ heard OH2NB (56 mc, "CQ 5 and 10," 2315) and I and SM. G3CWW worked I1UE, G6TF heard OK, I1DA heard or worked SM5ABC, 5AI, 5GQ, 5SI, 5VL. G3IS logged I1UE, OK2MV, OK3ID.

June 24

G3COJ worked FA8IH (0905), OK2MV (1445) and F, I. G2ADZ worked I1UE, 1AV (1800-2000). G6TF heard I, G3CWW heard I, OK. G8GX worked OK3ID, G8KL worked I1ABU, heard F, OK (1900-2100). I1DA worked or heard G8KL, OK1AA. G3IS logged F9BG, I1ABR, 1AV, OK1Q. G5BD worked F9BG, I1UE, OK2MV. HB9BZ heard G's (1700-1715).

June 25

G5CP worked F9OM (0641). G3COJ worked F9BG (1005). G2CIW worked FA8IH (1108). G5MP heard OK. I1DA heard G3COJ, 4KG. G3IS heard F8UW. G5BD worked FA8IH.

June 26

G2ADZ worked F8KS, 9AQ, 9BG, 9BQ, I1AY (1700-1830). G3CWW heard F. G3COJ worked F9BG, 9BQ, heard I. G5CP worked F8KS, 9BG. G5BM heard OK, I. G5BD worked F3QJ, 9BQ.

G6LK worked I1UE (1730). G8KL worked F8KS I1UE. I1DA heard or worked G3BD, 3KX, 6KL 6YO, 8UZ, GM5VG, 2DI. G3IS logged F8.KS I1AY, 1LQ.

June 27

G2ADZ worked I1AV, 1ABU, 1LQ and heard OK (1745-1915). G2AJ worked OK2MV, 3ID (1650-1950). G2XC worked OK2MV (1635-1830). G3BW worked I1ANJ, 1NQ. G3COJ worked OK2MV, 3DG, 3JL, heard F, I, PA. G3CWW worked OK2MV. G5BY worked OK1LD, 2HX, 2QK, 3IS, SM7CT, heard F, I. G5CP worked F3DN, 8UW, 11JG, 1XW, OK3ID. G5MP heard I, OK. G3IS logged F3DN, HB9BZ, LA8Y and four I's. G6LK worked OK3DG, 3JL. G6MN heard OK. G6OH worked OK3ID. HB9BZ worked OK3ID for first HB/OK QSO; SM, LA, G, OZ also worked. G5BD worked F3JB and five OK's. G6XM worked OK2MV (1800). G8KL worked I1LQ 1XW, OK2HX, 2MV, 3ID, 3JL, heard F. GC5OU heard F, OK, PA. G15J/P worked OK3DG (1845). G16VU heard I, G16YW/P worked I1DA (1915). GM5VG worked I1UE, 1XW, F9BQ (1715-1940). GM3NH heard F, I. Ex-D4MAC heard F, I, OK (1823-2030). I1DA heard G2AQA, 3A0O, G16YW/P, SM5ABC, 5SO, 5VL, F9BN. OK3RR heard G2OI, 2XC, 3CUJ, 5CP, 5MP, 6XM, F and PA. YR5AA heard F, I, OK, ON, PA and G5BY, G6XM (1700-1800).

June 28

G2ADZ worked SM7BE, heard OZ (1800-1900). G2AJ worked SM5ABC, 5AI, 5FI (2000-2025). G3COJ worked OZ7EU, heard OK, SM. G5CP worked OZ2FR, 7EU, SM7BE. G5MA worked SM5ZO (1900). G6LK worked SM5AI, 5FI, 5GQ, 5RT, 5UG, 5ZO, heard DA, PA (1810-1948). G6MN worked SM5FI, 5GQ (1715-1800). G6TF worked SM7BE heard OZ. G6XM worked SM5FI, 5GQ (1715-1800). G8DL (Christchurch, Hants) heard by SWL in Wick. GM3NH worked SM5VL. G3IS logged SM5AI, 5MN, 5VL.

latter half of June were followed by sub-normal conditions in July, although on several occasions lack of activity was more to blame than tropospheric conditions. This notably so on July 15 and 17, when the one or two Midland and Northern stations active were received at good strength on the South Coast—but they were only the one or two who were on. Dorset has been represented by G3TN and G800, Herefordshire by G3PZ/P, and Rutland by G2HDU who will very soon be supported by G3ALC. MAWE No. 5 proved to be good on the Saturday but very poor on Sunday.

The North

G3BW (Whitehaven), in addition to his GI contacts, has worked considerable EDX and has reached a stations-worked score of 75, a feat which seemed im-

possible a month or two ago. He is searching for the Newcastle and Manchester stations to bring him within sight of his century. He suggests a contest with bonus points for working GI, GD, GM and EI!! G6WR is also active in Whitehaven.

In Lancashire, G6BH (Blackburn), located 950 ft. a.s.l., is using an 832 PA and a modified R1132. GM3OL is no trouble to work, and he has heard GM3BDA and G4LX, in addition to GI2HML, G15SJ/P and G16YW/P. From the same county, G6LC (Warrington) has worked G8JO of South Shields, and asks if it is the first Lancs/Durham contact. G5CP of Sale found MAWE No. 5 disappointing; he is anxious to work G5BY, G6DH and GM3OL. G5CP is on nightly at 2200 GMT on 58-65 mc.

G2IQ, G6PJ and G6TF all report from

June 29

G2ADZ worked OK1RY, heard D, I (1830). G2CIW heard DA2RA (1720). G8KL worked I1NL. G3IS heard I1JG and SM7BE.

June 30

I1DA heard LA1F. G5BD worked F9BQ. G6CW heard four OK's, two I's, three SM's, F9BQ, FA8BG, 8IH, all 1830-1915.

July 1

G6MN worked, and G6CW heard, FA8BG. HB9BZ heard FA8IH.

July 2

G2ADZ worked F9BQ, OE1CD, OK1RY, 1VW, 3DG, 3JL, heard HB, L (1650-1900). G2CIW heard F, OK. G2XC worked I1ALE, 1NC, heard OE. G3COJ worked OK1FF, 1RY, 1VW, I1AY, heard F, FA, HB, OE. G3KX/A worked OE1CD (1750). G5BM worked D7RB, F9BQ, I1ALP. G5BY worked OE1CD and eight OK's, heard HB. G5CP worked F9BQ, 9BN, I1AY, OK1AW, 3DG, 3JL. G6LK worked OE1CD, SM5VL (1815), OK1FF (2015). G5BD worked OE1CD and five OK's. G6MN worked F3JQ, heard OE, OK, PA. G6TF worked OK1AW, 2MV, 3ID. G6XM worked OK1UQ, heard OE, SM (1815-1910). Ex-D4MAC heard HB, F, I and YRSZ (1925-2225). GI2HML worked F, I and OK. G16VU worked OK1FF (1735) heard F, I, HB. GM3NH worked OK1FF (1810), F3JQ (1857). OK1AW worked G3AVF, 3WS, 5BY, 5CP, 5MQ, 5YV, 6TF, 8DL, EI8G, heard G5GX, OK3RR heard G2ADZ, 2HLF, 2KI, 3APY, 3AVF, 3CU, 3KX, 3WS, 5BY, 5MP, 5PP, 6LK, 6OS, 6UH, 8DL, 8WV, EI8G, F and SM. I1DA heard or worked G2ADR, 2IQ, 2OI, 3APY, 3AVF, 3ATZ, 8KL, GM4JO, 3BDA, EI8G, LA, PA and SM. HB9BZ heard GI and GW for first time; LA and OZ2FR also heard. SWL OE-359 (Graz, Austria) logged 40 different G's between 1720-1940. G6CW worked OK3ID (1835).

July 3

G2ADZ worked SM5AI, I1AY. G2XC worked F8GH (tropo contact). G3COJ heard F, SM. G3CWW heard F, ON, SM. G6LK worked F8GH, 8NW (tropospheric). G8KL heard SM (1700-1800). GI2HML worked HB9CB, I1ABU, 1ANJ, 1DA, 1XQ (1815-1855). G16VU worked F9KB, heard I (1830-1930). F8OL heard LA7Y. G5BD heard SM5VL, G6CW heard SM5VL (1720).

July 4

G2ADZ worked DA2RA, FA8IH, OK1FF, 2HX, 2SL, heard OE, PA (1000-2100). G3BW worked F8DI, 8NS, 8OL, 9KB, 9KV, HB9AT, OE1CD. G3COJ worked OE1CD, heard DA, FA, OK. G3CWW heard OK. G3WV worked FA8IH. G5BM heard D, FA, OK, PA. G5BY worked D7RB, LA7Y, DA5FF and OK, OZ, PA, SM. G5CP worked DA2RA, OE1CD. G5MP worked or heard OK2HX, 2MV, 3DG, 3ID, 3JL. G3IS logged D7RB, OE1CD, PAØBN and three OK's. G5RP worked FA8IH and three OK's, heard D, F, OE. G6LK worked FA8IH, OK3ID (1230). G6MN worked F9MZ, 1IXW, heard FA. G6OH heard OK. G6TF worked OK2HX, 3ID, heard OE1CD. G6XM heard OK. G8KL heard FA8IH (1000), worked OK1AW, 1FF, 3DG, heard OE (1630-1900). GI2HML worked D7AA, F8CT, 8KV, 8OL, 8QL, 9CO, 9KB, HB9AT, OK1AW, 1FF, 2MV, 2SL, PAØHA, ØWL (1620-2020). G5BD worked OE1CD and OK2HX, heard DA2RA. G15SJ/P worked DA2RA, F9BI, HB9AT, I1AS, 1AY, OK1FF, 2HX, 2MV, PAØHA (1532-2000). G16VU worked D7AA, F8BY, 8JR, 8NS, 9CO, I1AT, OZ7EU (1600-1930). GM2CAS heard F, I (1800-1900). GM2DRD/P worked F8DI, 8LO, I1AS, 1AY, heard HB. GM3AXO/P worked F9NJ, HB9AT, I1AS, 1CV, 1IG, 1PO I1DA heard or worked GM3AXO, 3GH, 3GN, 3NH, 4JO/P, 4HR, 6KH, 8AH, LA, OZ and SM. G6CW worked OK2MV, 3DG and heard six SM's, three OK's, three PA's and DA2RA. OE1CD, all 1645-1920. OK1AW worked G3KX, 5HP, 6DH, 8KL, GI2HML, GW2AVV, 4LU/P, and heard G2B7X, 2HX, 2KG, 3YH, 5MQ, G15SJ/P, GW6OK, PAØIN. OK3JD worked LA7Y. Ex-D4MAC heard G2AUS, 2BJS, 5BY, 5CM, 6WJ, 8DL, 8LY, 8WY, and F, I, OK (1717-2001). SWL OE-359 logged 35 different G's between 1510-1830.

July 5

HB9BZ worked GI2HML, bad QSB. G2ADZ worked F3JO, 8DI, 9BQ, FA8BG, 11NQ (1720-1900). G3COJ worked F8JD, 8XT, heard FA, I. G3WV worked I1NO. G5BY worked DA2RA, FA8BG, I1ABR. G6LK worked F8AA, FA8BG, 11NQ, 1PO (1900). G8KL worked F3JO, 11NQ. G5BD worked FA8BG and I1ABR. GI2HML worked F3JO, HB9BZ, 11XJ (1550-1800). G16VU worked F3JO (1720). G3IS heard I1RI.

July 7

G8KL heard FA8IH (1940), G5BD worked OK3ID.

**FIVE-METRE
COUNTIES WORKED LIST**

Starting Figure, 14

From Fixed QTH only

Worked	Station
36	G3APY (186), G5BD (195)
35	G3BLP (195)
34	G2ADZ, G5WP, G6VX
33	G2RI (142), G3ABA (140), G5BM, G5BY, G5GX (147), G5MA, G6OS (150), G6XM (260), G8UZ
32	G3IS (141), G5BJ (114), G6CW (129)
31	G2AJ (274), G2CIW (172), G2MR, G3BXE (126), G5RP (161), G6LK (271)
30	G2NH (251), G5YV (152)
29	G2IQ, G2OI (106), G2XC (297), G5JU (144), G5FP (101), G5PY (231), G5VB (163), G6MN/A (127), G8WV
28	G3PZ, G4LU, G5MQ, G6OH (195), G8KL (123)
27	G4IG
26	G6YU (126), G8SM (157)
25	G3WW, G4AP, G4RX
24	G6HD (135)
23	G3BOB, G3DA (104)
22	G2ATK, G4RO (136), G5IG, G8GX (174)
21	G2AOK/A, G2KF (121) G3BBA, G6KB (109), G6NF (140), G8KZ
20	G2BMZ, G2KI (114), G2YL, G3BW, G3KX/A, G5LQ (168), G8AL, G8PX
19	G2NM, G3BUR/A, G6VC (104), G6ZQ
18	G2ADR, G3BK, G5HN G5MR
17	G2HLF (117), G3WS, G5LC
16	G2HDY (108), G3CUA, G3DCV, G6TF
15	G2AUA, G3BOB, G3CWW (147), G5CP, G6VD, G8UR, G8VN, G8WC
14	G3CGQ, G3COJ, G5UM (114), G6UW

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

Sheffield. G2IQ is using a 19-valve triple superhet, with triodes in the important stages, and claims a noise factor of 4 dB for it. G6PJ, who promises to QSL 100 per cent. by return of post, is using VFO between 58.5 and 59 mc, and a 3-element c.s. indoor beam. G6TF has a 30-ft. steel

lattice mast, on which he intends to mount a 4-element w.s. beam, motor driven, with indicator. An HRO is being converted to a double superhet. He remarks that he and others in his district frequently hear Southern stations, but cannot raise them in spite of persistent calls, as the Southerners work locals instead. Well, after calling Northerners in vain for two hours last night we thought the boot was on the other foot!

G2ADR (York) has noticed during the recent heavy rain periods that occasionally an isolated GDX station will show up and persist for about half-an-hour. He asks is this a selective type of ducting? Or is it just due to lack of activity elsewhere? Or what? G2DRA (Harrogate) has one QSL towards his VHF CC after two months on the band. His beam is a copper-tube dipole in the roof, fed with twin rubber flex. The Rx is an Eddystone 5/10 converter into a BC312. He hopes to get some 7193 triodes to work on 144 mc, but in the meantime his efforts are directed towards a less noisy Rx set-up. G5YV (Leeds) sends an excellent list of EDX and GDX.

In and Around the Midlands

G2ADZ (Oswestry) and G8KL (Wolverhampton) were among the lucky ones to work GW5SA (Neath). G2ADZ found June 23, 25, July 1, 3 and 6 the best days for GDX, with good contacts in the 150/200-mile range. His contacts with GW5SA and G5UO/P were through solid mountain. G4LU/P on Llechrydau Hill, Denbigh, also worked GW5UO/P, again through solid rock. He regrets he didn't manage to work all the stations from his /P QTH. These included G2AJ/P, G2FKZ/P, G3ALY/P, G3BLP, G3GK, G5WP and G6VX.

In Rutland, G2HDU (Oakham) is using an 807 PD, driven through 5 FD's from a VFO. The Rx is a Type 27 converter into HRO, and an indoor dipole is in use for aerial. He is active weekends only up to 1930 on Sundays.

G6MN (Workop) still wants Berks and Middlesex and asks G5RP and G2AJ to help. G2RI (Leicester) had a visit from G2CIW, who confirmed his opinion that 5 metres is nowhere near as lively a band in the Midlands as in London and the South. G2RI is all ready for 144 mc.

G3WW (Wimlington) has at last had a contact outside G. He is working around 59 to 59.1 mc, and can arrange 5-metre schedules via 80 metres (3694 kc).

Two reports come from Northants.

G2HDJ (Thrapston) has a remote control system for his beam under way. His Tx is driven from a Franklin VFO on 1.8 mc, and he gets consistent T9 reports. He hopes to send QSL's to all stations worked in the near future.

G3BBA (Towcester) suggests using 3.5 mc as a "telephone" link during the initial days on 144 mc to help isolated stations.

G3TP (Tamworth) is using an RK34 p.p. doubler and 8 watts to a 2-element w.s. beam. On the Rx side, he has a Type 26 into a Howard 430. G5BM (Cheltenham) has had a report from GM3BDA at 296 miles—so we look like having another tricky GDX distance to sort out soon! By the way, a correction consequent upon the location of GM3OL's exact QTH amends the figures given last month to 295.99 miles for the new GDX record, with G3BLP beating G6VX by 192 yards. This hair's-breadth business is beginning to worry us!

South

On the South Coast, G8LY (Lee-on-Solent) asks us to point out that she is a new station for VHF CC purposes (change of QTH) and she will QSL 100 per cent.

THE FIVE BAND CLUB

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

FOURTH LIST OF MEMBERS

G3APY	J. Spragg (Kirkby)
G6XM	W. James (Farnborough)
G3CWW	A. Timme (Hendon)
G6OH	G. S. Samways (Ascot)
G2DRA	E. P. Inman (Harrogate)
G6LC	S. Ince (Warrington)
G6LK	E. Laker (Cranleigh)
G6CB	R. L. Castle (Wimbledon)
G3BOB	G. Ward (Bromley)
G4AJ	L. J. Ralli (Osaka, Japan)
Total : 68 Members	

We are glad to welcome her to the Countries Worked table. G2BMZ (Torquay) bemoans that while he was listening to the PAØWL end of our own record tropospheric contact (see last month, p. 336), he missed PAØZQ calling him! This reception of PAØWL at 480 miles or more is certainly good going for tropospheric propagation.

At the other end of the South Coast G5MP (Hythe) has been taking advantage of the good EDX and has also worked across the Channel to northern F.

G3BOB (Bromley) now has a Telefunken P35 in his PA, and after retuning his beam has been getting results. It is an all-metal 3-element w.s. job. He offers to supply information on the RL12P35 valves on request. G6VC (Northfleet) has difficulty in hearing signals to the south-west although he has climbed the Counties Table quite a bit. G6OH (Ascot) is busy getting an SCR-522 ready for 144. G5LC (East Molesey) worked his first 14 coun-

VHF CENTURY CLUB

NEW FULL MEMBERS

G5MA	N. R. Munday (Ashstead)
G3APY	J. Spragg (Kirkby)
G6XM	W. James (Farnborough)

(G2AJ now has 150 and G2XC 200 cards)
 ADDITIONAL ASSOCIATE MEMBERS
 (Pending receipt of 100 QSL cards)

G2CIW	J. F. Moseley (Brentwood)
G8KL	W. Sturmer (Wolverhampton)
G2KI	G. A. Spencer (Walton-on-Thames)
G3CWW	A. Timme (Hendon)

ties using a frequency of 59.44 mc just to prove it can be done. In fact, he worked over 50 different stations, but he is now on 58.92 mc. G5AS (Kingston) confirms our comments on the Type 27, which is liable to make all notes at least T7. However, we are assured by other operators that it is possible to get T9 with these convertors. Can someone give us the answer?

G5RP (Abingdon) has made a start on 144 mc gear. He has EF50 tritet, EF50 doubler, QV04-7 tripler, QVO4-7 doubler, and 829 PA, the crystal being in the 6 mc region. Probable Rx line-up will be CV66, CV66, 9002 mixer, 6J6 CC doubler, feeding into HRO on 28-30 mc. A "flop-over" beam is under way. G6CB (Wimbledon), an old-timer, but a newcomer to five, has a stabilised Type 26 working into an AR88. For Tx, there is a TZ40 doubler running at 24 watts into a 4-element c.s. beam.

Late Quickies

Reports under this head got round to us just as the copy was going in, so can only be covered in brief, though all relevant details in them have been brought into the European Summary and the various Panels. We are pedalling pretty furiously by the time the story has to be ready for printing, so it is hoped that nothing has been missed—but deadlines are deadlines, so please hit the closing date, otherwise we get disorganised.

G6CW (Nottingham) writes after a long

silence (nice to hear from you again, John) and having put on a spurt since July 1, climbs high in Counties Worked and also brings in eight European countries HB9BZ (Uster) gained two new "firsts" during the month, HB/OH and HB/OK, and has also worked GI2HML and GW2AVV; he heard a total of 29 G's, 8 SM's, 4 OZ's, 4 OK's and OH2NY (on 50 mc) during the period June 15-July 5 G4LX (Newcastle) puts in a report covering the activities of himself, G2BDQ and G3CYY; they have started climbing Countries Worked and found conditions during the month much better for EDX than G working, though GDX heard includes G2ADZ, G2OI, GM2DRD/P, G5JU, G6LC, G6VX and G8BN. . . . G3APY (Kirkby-in-Ashfield), at the top of Counties with G5BD, has GM3BDA lined up on a schedule; they have heard one another. G3APY now has an outdoor 3-element 30-ft. high to replace the trusty indoor job . . . A very welcome report from SWL OE-359 of Graz, Austria, who, on July 2 and 4, logged no less than 67 different G's, using a 3-stage converter and a 25-ft. vertical aerial; we hope to hear from you again, OM. . . . G5UM (Knebworth) remarks that he also has succeeded in working 14C and 100S

on an indoor dipole—and the Rx was a TRF. . . . From West Cornwall, G2JL reports G2BJS and G8NV active in Redruth, G2BHW and G3AGA in Falmouth, and himself and G6BC in Penzance; they can work as far up as Torquay without difficulty, but anything beyond that becomes GDX owing to the relatively low level of activity between Torquay and Portsmouth; much EDX has been heard or worked, but GDX is still the objective G3AGA (Falmouth) shows a total of 17S worked and 15S heard, with G2AJ as the best DX received. . . . G2BRR (London, E.18) logged 22 different Europeans in the period June 23-July 4, using a Type 26 into an S2OR.

In Conclusion

Once again, thanks for the large volume of mail and all the encouraging and cheering remarks in it. Sorry if we have only been able to pick out points here and there. Perhaps next month we may get some Calls Heard in again. The latest date for the next issue is August 13, and the address E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. CU on September 1, by which time we *may* have had some definite news about 144 and 420 mc!

RF Power Amplifier for 144 mc

An 829 PA for 100-Watt Operation

By M. D. MASON (G6VX)

(In our July issue, G6VX described an exciter unit, using miniature valves, to give output on 144 mc from crystals of the usual frequencies. Here is the PA to operate with this exciter. The complete 144 mc transmitter that can be built from these two designs is a fine example of modern Amateur Radio VHF technique and is probably one of the best 2-metre Tx equipments yet to be described in print.—Ed.)

THIS amplifier has been designed as a suitable companion to follow the miniature-valve transmitter described in the July *Short Wave Magazine*. The idea behind this compact layout is to mount the RF amplifier immediately *above* the driver section; therefore, the chassis size is 8 in. by 4 in. by $\frac{3}{8}$ in. deep, material being 22 gauge brass.

There is nothing very unusual in the design, but a few useful circuit techniques have been combined in one amplifier to make up a very reliable stage for 144 mc.

The output circuit uses shortened quarter-wave lines, tuned by a low capacity split-stator condenser, placed as near to the anode end of the line as is practicable. The efficiency of the quarter-wave line is good and is well worth while. The HT feed point is absolutely dead at RF, and there is no need to use RF chokes. It is very easy to couple any transmission line by means of a single turn loop.

Applying the Drive

Various methods of grid feed have been

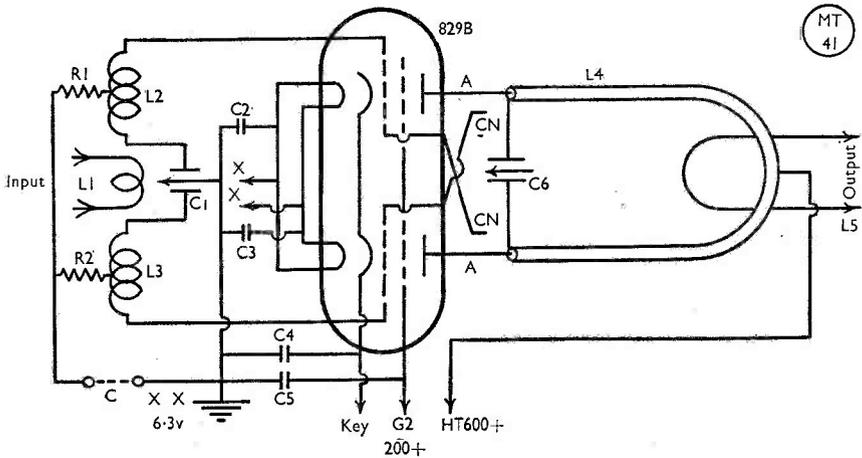


Fig. 1. Circuit of 6G6VX's 829 PA for 144 mc operation. When driven by the exciter unit described in our July issue it can be loaded to 120 watts input at 600 volts on the plates, and lights a 100-watt lamp to full brilliancy.

tried. The one finally chosen has several advantages, such as fairly large inductances, and is therefore very simple to construct and adjust. Another important point is the ease in which the grid drive to each section of the 829 can be correctly balanced. The grid coils may be compared to a pair of half-wave lines tuned at one end by the grid input capacity and at the other by a small condenser roughly equal to the input capacity. The two lines are wound in the form of one continuous coil split in the middle and separated by $\frac{3}{8}$ in. High voltages will appear at the grids and across the tuning capacity. This will, of course, put the RF cold section of the coils somewhere near the centre of each coil. This is the place to connect the separate bias resistors. When the coils were mounted up for the most convenient layout, it was necessary for one section to have about three and three-quarter turns and the other section to have four turns. The total coil can be balanced by using closer spacing between turns in the smaller of the two coils. This will balance the inductance. The single turn coupling coil is mounted in the centre of the two coils. The drive to each grid may now be balanced by moving the coupling coil towards the side showing the lower grid current. The energy transfer is very efficient and coupling may be quite loose. The grid tuning condenser was made from two Cyldon type 184/30 midgets mounted back to back. Any split stator condenser of small dimensions having a capacity range of 5 to 15 $\mu\mu\text{F}$ per section will do quite well.

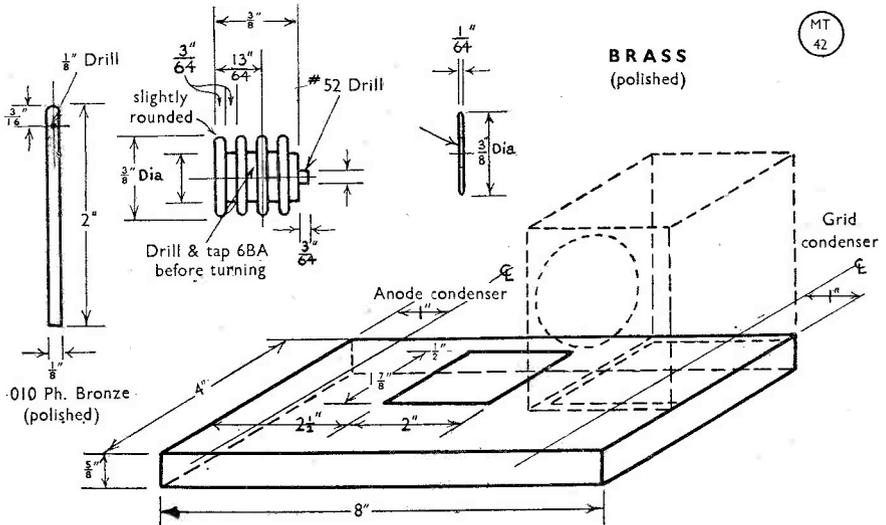
Table of Values

Fig. 1. The 829 144 mc RF Amplifier

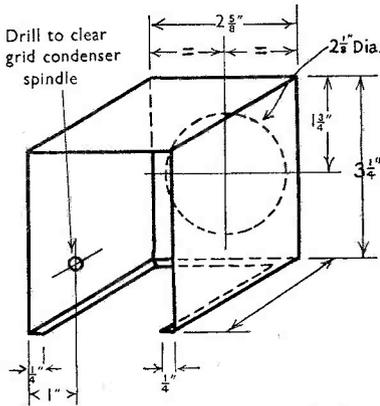
- C1 = 25-25 $\mu\mu\text{F}$
- C2, C3 = 500 $\mu\mu\text{F}$
- C4, C5 = .001 μF
- C6 = 2-6 $\mu\mu\text{F}$ per section, .07-in. spacing
(see text)
- R1, R2 = 7,000 ohms, 1 watt
- CN = 16 SWG enam, $\frac{1}{2}$ -1 in. exposed to anode
- A = $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. wide .01-in. thick copper connecting strip
- L1 = 1 turn 16 SWG enam, $\frac{1}{4}$ -in. dia.
- L2, L3 = 4 turns each 16 SWG enam, inside edges coils spaced $\frac{3}{8}$ in. apart, $\frac{1}{4}$ -in. inside dia winding
- L4 = 15 in. of $\frac{1}{4}$ -in. silver-plated copper tubing, folded, set $\frac{3}{8}$ in. centre-to-centre
- L5 = 14 SWG insulated wire, 8 in. long, folded, set $\frac{3}{8}$ in. centre-to-centre

The filaments of the 829 have been wired for 6-volt operation and the heater leads by-passed right at the valve socket. The heater supply has been left floating so that cathode keying could be used.

Neutralising has been arranged by feeding two No. 16 gauge wires, one from each grid, out through the screening box and placing them alongside the correct plates for a distance of 1 in. Two feed-through bushes were made to fit the normal mounting holes on one side of the 829 socket. This arrangement brought the neutralising leads out at a point about $\frac{1}{4}$ in. away from the glass envelope. The correct adjustment can now be made by moving the wires closer or farther away from the anode. The 829 socket was mounted from the two fixing holes nearest to the cathode end of the tube, and a small clip bracket made to clamp the top of the socket to the screening box.



Chassis construction detail for the 144 mc 829 PA. Material is 22 SWG hard brass.



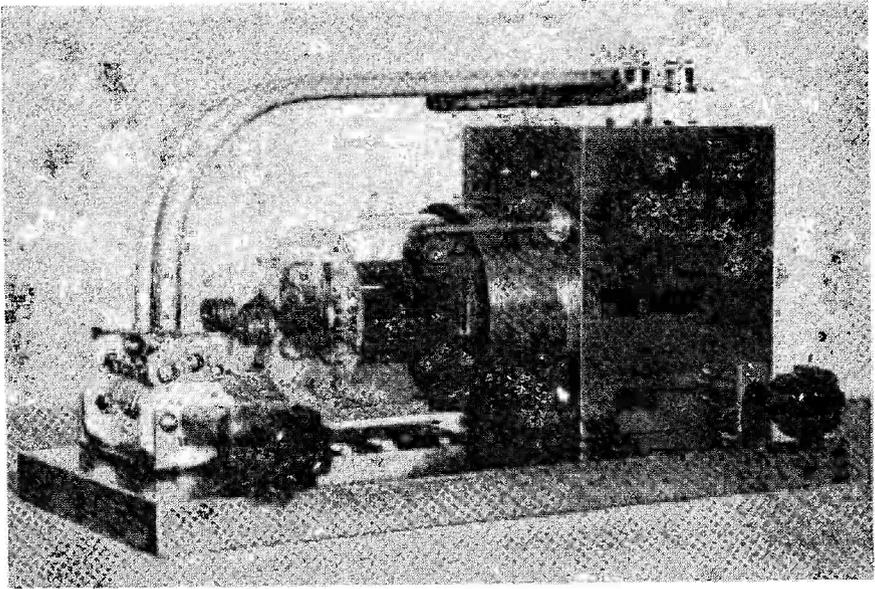
The screening box for the grid circuit is made of 22 gauge brass and measures $3\frac{1}{2}$ in. high, $2\frac{3}{4}$ in. wide and $2\frac{3}{8}$ in. long. It is open at the base, which is screwed to the chassis, and can be open or have a back at the opposite end to the valve mounting. At a distance of $1\frac{3}{8}$ in. from the base a $1\frac{3}{8}$ -in. round hole is cut. This hole just clears the rivets that hold the base clips, and therefore allows the socket to be mounted right against the metal box. A ring of brass 1 in. deep and $2\frac{1}{8}$ in. inside diameter is sweated symmetrically around the cut-out hole. This ring helps to complete the grid and anode screening. Three Frequentite insulated bushes (R.50650) are mounted on top of the box. One supports the folded end of the output line and at the same time acts as a

feed-through for the HT lead. The other two bushes have small terminals sweated to them to act as supports for the aerial coupling loop and aerial feeder.

Output Side

The anode connectors are made from a piece of $\frac{3}{8}$ -in. round brass rod, on which a copper strip can be riveted, to act as a flexible coupling between the anode and the ridged plate lines. Ordinary solder is no use to secure the copper strip, because it will melt in no time at all.

The output tank condenser was made from two small Wingrove & Rogers trimmers (type C803). Six rotor and four stator plates are required. A new rotor shaft must be made from a piece of $\frac{5}{16}$ -in. brass rod 3 in. long. The rotor plates are then sweated on to this shaft with a spacing of $\frac{3}{16}$ in. between each plate. Leave a piece of shaft each end so that a coupling can be fitted. The two ceramic end plates from the midget condensers are mounted back-to-back with $1\frac{1}{8}$ in. between the nearest edges. The stator plates are mounted on four pieces of $\frac{1}{32}$ -in. wire, which is soldered into the normal stator mounting eyelets. The stator plates are mounted symmetrically with one rotor each side of a stator. There is no stator between the centre two rotors. This assembly will make a condenser with approximately .07-in. spacing and a capacity range of 2 to 4 $\mu\mu\text{F}$ per section.



The 144 mc PA using an 829B, designed and constructed by G6VX. One neutralising wire can be seen protruding from the screening box for the input end of the amplifier. This is an RF stage which can be pushed to 120 watts on 2 metres by the exciter unit already described.

The tuning range will be from 143 to 150 mc, when the lines have the correct length and spacing. The spacing of the lines is quite critical with this small capacity swing. However, it is a simple matter to vary the line spacing, and therefore the tuning range, to correct for any capacity difference.

All the power connections are brought out along the back edge of the chassis by mounting Clix sockets on a piece of $\frac{1}{8}$ -in. strip bakelite. The strip is mounted on the inside of the chassis and $\frac{1}{8}$ -in. clearing holes are drilled in the brass so that there is no chance of a short or flash-over.

The components used in this amplifier have been selected so that the 829 may be operated at any input up to the recommended maximum ratings for the valve.

The tank condenser with .07-in. spacing will stand 600 volt HT plate modulated, or 750 volt HT in CW operation. The screen grid can be supplied from the main HT through a 12,500-ohm, 20-watt resistor, or from the 300-volt exciter supply. In the latter case, a 3,000-ohm, 5-watt resistor in series with a 10 Hy. 30 mA choke is a useful method. The choke is incorporated when plate modulation of the 829 is used. This system gives "self screen modulation" and is not as wasteful of HT power as when the screen is fed from the 600-volt

supply—and incidentally is easier on the screen by-pass condenser.

The power amplifier may be keyed directly in the cathode lead, or, alternatively, sufficient fixed bias for cut-off may be added and the driver stage is keyed.

For good stability in the 829 amplifier, it pays to use sufficient drive for maximum grid current operation. The lower the grid impedance the better.

Voltage/Current Readings and Output

The amplifier was checked under the following conditions :

- Plate, 600 volts HT at 200 mA.
- Screen, 200 volts at 30 mA.
- Grid current, total 15 mA.
- Fixed Bias, $-22\frac{1}{2}$ volts.
- Total Bias, -75 volts.

A 100-watt lamp clipped on to the output lines looked very pretty when the 829 was loaded to 120 watts input.

This set-up has been used with one HT supply of 300 volts to drive a pair of 15E's arranged as a tripler to 440 mc (see p. 337, July issue). The output on 440 mc from the 15E's with bias of 400 volts and HT of 600 gives around 15 watts RF out for 47 watts input. Incidentally, this tripler works very nicely using a lumped circuit for the grid side and $\frac{1}{4}$ -wave lines in the output.

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 allowance. Please write clearly and address on a separate slip to QTH Section.

- | | | | |
|--------|--|---------|---|
| E19U | T. M. O'Connor, Radio Section, Shannon Airport, Eire. | G3DQU | N. Ashton, 65 Ridgeway Road, Timperley, Altrincham, Cheshire. |
| G2AIM | C. E. Clarke, 8 Eastcote View, Pinner, Middx. | GM3DSD | A. Trayler, 52 Albert Avenue, Glasgow, S.2. |
| G2ATF | W. A. Fisher, 44 Nab Hill Avenue, Leek, Staffs. | G3DSR | C. N. Whittingham, 8 Oxford Street, Spondon, Derby. |
| G2AUU | F. H. Wring, 24 Arley Hill, Cotham, Bristol. | G3DTN | W. Mole, 38 Christchurch Road, London, S.W.2. |
| GM2BGH | A. Marcus Cutt, 4 Auchentrae Crescent, Ayr. | G3DTX | I. A. Duck, 97 Belgrave Road, Ilford, Essex. |
| G2DBA | F/L P. M. S. Hedgeland, M.B.E., 8 Hayle Road, Maldstone, Kent. | G3DUQ | T. R. Stevens, West Walks House, Dorchester, Dorset. |
| G2DXH | R. H. Hespley, 11 Ranelagh Road, Blakenhall, Wolverhampton, Staffs. | GW3DVG | R. I. Jenkins, 46 Barn Street, Haverfordwest, Pembs. |
| G2FHM | I. A. Sadler, 17 Wilbert Road, Arwold, Notts. | G3DVH | J. R. Mason, 240 West Street, Dunstable, Beds. |
| G2FL | A. Young, 64 Bath Road, Keynsham, Bristol. | G3DVL | F. Harrop, 12 Park Street, Kemp Town, Brighton, Sussex. |
| G2HDJ | C. W. Touch, Market Place, Thrapston, Northants. | G3DVQ | R. H. Pounder, Fair Wind, Hartley Hill, Purley, Surrey. |
| G2HDZ | A. E. Breese, 22 Highfield Avenue, Pinner, Middx. | G3DVV | J. O. Brown (ex-MD11), Knutsford, Danceshill, Woking, Surrey. |
| G2HKI | D. F. Chatt, 12 Front Street, Littleton, Co. Durham. | G3DVW | W. Gordon Andrews, 17 Lingfield Road, Broadgreen, Liverpool, 14. |
| G3AB | H. Larter, 582 Fairview, Britannia, Bacup, Lancs. | G3DWQ | G. Lancefield, 54 Brixton Road, Frenchwood, Preston, Lancs. |
| G3AKJ | D. W. E. Wheele, 57 Arnhem Drive, Alma Park, Grantham, Lincs. | G3DXC | F/O D. A. Lloyd, Greenmantle, 130 Priory Lane, London, S.W.15. |
| G3BVN | L. P. Tucker, 175 Egguckland Road, Higher Compton, Plymouth, Devon. | G3OU | J. H. Parkin, 29 Gregghouse Crescent, Sheffield 5, Yorks. |
| GM3BVO | G. Watson, 10 Gowanbrae, Fauldhouse, West Lothian. | GM3SA | T. Grierson, Clarkly Hill, Burghead, Morayshire. |
| G3BWJ | D. L. Watson, 59 New River Crescent, London, N.13. | G3SZ | A. Chilvers, 14 Mill Houses, Salters Road, Kings Lynn, Norfolk. |
| GI3BWV | O. H. Moorhouse, 20 Hillsborough Parade, Belfast. | G3TP | J. Soten, Wistaria, Potters Lane, Polesworth, Tamworth, Staffs. |
| G3CCD | G. H. Cox, B.Sc., A.R.C.S., 4 Brief Street, Myatts Park, London, S.E.5. | G4MW | M. T. O'Dwyer, 196 Chesterton Road, Cambridge. |
| G3CFE | W. Hewitt, 12 Belvoir Road, West Bridgford, Nottingham. | G8UJ | J. W. Elliott, 58 Deyncourt Road, Upminster, Essex. |
| G3CIE | R. King (ex-XZ2RK), 61 Elsenham Street, London, S.W.18. | | CHANGE OF ADDRESS |
| G3CMH | Yeovil Amateur Radio Club : (Hon. Sec. : D. L. McLean, 9 Cedar Grove, Yeovil, Som. | G2ABB | H. F. Nell, The Retreat, Patterham, Staffs. |
| G3COZ | S. Kelly, 10 London Road, Cheltenham, Glos. | G2COU | C. Page, 100 Graham Gardens, Luton, Beds. |
| G3CTR | R. Whorwell, 29 Aspinden Road, London, S.E.16. | G2COU/A | C. Page, The Manse, Desborough, near Kettering, Northants. |
| G3CTT | E. C. Sills, 53 Highbury Grove, Clapham, Beds. | G2CZM | A. G. Pruden, 12 Grove Wood Close, Chorleywood, Herts. |
| G3CUL | J. D. Crispin, Suncrest Hotel, Barton, Torquay, S. Devon. | G2DRM | G. R. Marsh, Horners, Merstham, Surrey. |
| GM3CVJ | J. W. Sime, 43 Colinton Mains Green, Oxcgangs, Edinburgh. | G2DWV | W. T. Larbey, 16 Belton Road, Tottenham, London, N.17. (Tel. : TOT 1238.) |
| G3CWT | F. W. Vale, 62 Main Street, Stapenhill, Burton-on-Trent, Staffs. | G2DWV/A | W. T. Larbey, 9 Falmer Road, Tottenham, London, N.15. (Tel. : STA 4461.) |
| GM3CYN | W. Leitch, 51 Holytown Road, Mossend, Billshill, Lanark. | G2FFN | S. C. Fisher, Thame View, Hillside Road, Billericay, Essex. |
| G3CZY | P. B. West, 17 St. Augustines, Warrington Street, London, N.W.1. | G2GM | F. D. Cawley, 58 Thurlow Road, Torquay, S. Devon. |
| G3DDG | G. Cowey, 2 Front Street, Haswell, Durham. | G3BSC | B. G. Dodd, GEC Hostel, Castle Bromwich Hall, Castle Bromwich, near Birmingham. |
| G3DDK | E. J. Hartley, 1 Boyscott Lane, Bungay, Suffolk. | G3CCC | H. Barnes, 22 Knowsley Crescent, Thornton, Blackpool, Lancs. |
| G3DDM | H. H. Messam, 29 Mill Lane, Sheet, Petersfield, Hants. | G3DGC | S/L H. G. H. Copeland, 22 Dallaway Gardens, East Grinstead, Sussex. |
| GW3DDS | F. Bergelin, R. Sigs. Hutments, Llanederyn Road, Cardiff. | G3DGC/A | S/L H.G.H. Copeland, RAF Amporn, near Andover, Hants. |
| G3DJL | B. Shortland, 412 Aspley Lane, Aspley, Nottingham. | G3DIR | F. V. W. Buckland, 21 The Leas, Baldock, Herts. |
| G3DMW | J. Heenan, 245 Norwood Road, London, S.E.24. | G3PT | R. J. Murray, Flat 6D, 6 Grosvenor Terrace, Princes Park, Liverpool, 8. |
| | | G6PY | L. W. Parry, 50 Goddington Lane, Orpington, Kent. |

Here and There

Eddystone "640"—Price Down

Stratton & Co. are determined to maintain the interest in, and the undoubted popularity of, their famous "640" Amateur Band Receiver, in spite of the competitive pressure of the "disposals" propositions.

Accordingly, the price of the "640" has now been reduced to £27 10s. net, free of purchase tax, and in addition, exceptionally generous hire-purchase terms are being made available through Eddystone dealers.

There cannot be the slightest doubt that at this price the Eddystone "640," designed as it is specifically for amateur-band operation, is one of the most attractive investments offered the amateur to-day.

French Hospitality

G3AZL, Croydon, recently in France on a visit, pays tribute to the friendly hospitality with which he, a complete stranger, was received by F's in Nice, Cavillion, Avignon and Paris, where he attended an interesting R.E.F. meeting. In the course of his trip, G3AZL made personal contact with some 15 French amateurs, and was everywhere received with open arms. All this is in keeping with the real spirit and tradition of Amateur Radio, and any G travelling abroad is sure of the same experience.

G3AZL also mentions that F3MA of Avignon (incidentally, one of the loveliest towns in the South of France) is anxious to arrange exchange visits with a G for 1949.

Errors Crep' In

We still dream of the issue which will not have even the smallest mistake. So far, we have only been able to console ourselves with the comforting reflection that he who never made a mistake never made anything. Anyway, some explanations are called for on the last issue (July), and one or two boos must be put right.

First, G3VG's article on S.C. operation ought to have been titled "Practical Suppressed Carrier Working"—though this particular contribution is one in the series we shall be running on the applica-

tion of single-sideband technique to Amateur Radio.

In the article on "Parasite Oscillation," the capacity values on p. 346 should have read .002, .001 and .0005 μ F, respectively; this then makes the time-constant correct as given. In the circuit diagram on p. 333 of G6VX's article, the HT side of RFC2 should not, of course, be joined to V3 plate.

Verily, we cannot all be humming birds . . . though that is no excuse.

Rotarians and Amateur Radio

G5ZN, a member of the Burnley Rotary Club, wonders how many other G's are Rotarians; he works all bands, CW and Phone, and would be very glad to meet them over the air.

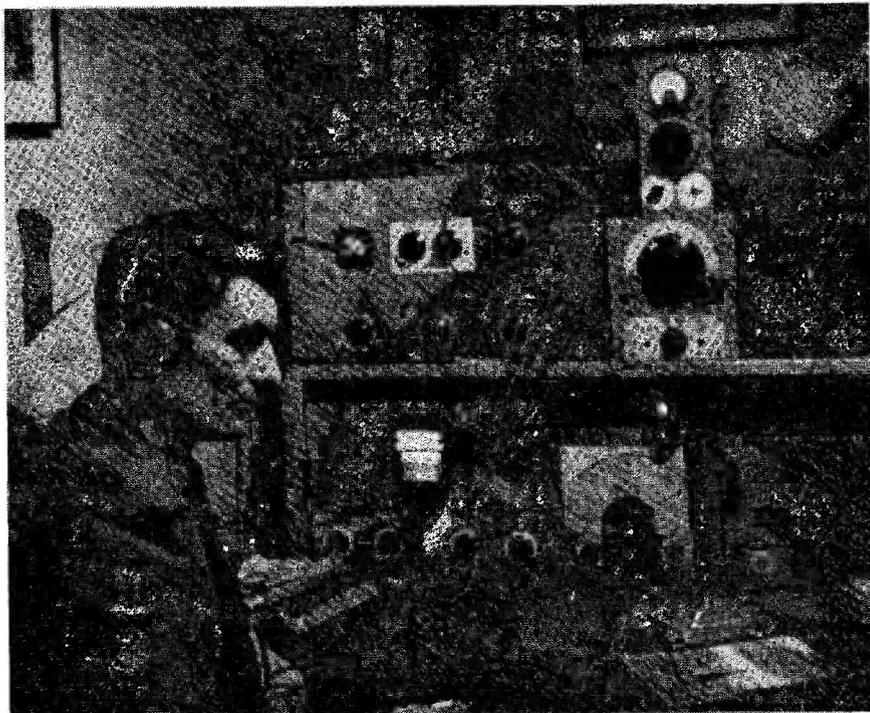
Royal Observatory—GMT

How many readers know of the standard frequency transmissions now being radiated by the Royal Observatory, Greenwich? The full schedule is: Week-days only, 1000-1015, carrier frequency 2 mc nominal; 1015-1025, carrier modulated by nominal 1 kc tone; 1027, Voice announcement giving estimated corrections to these RF and audio frequencies.

Times are GMT—curiously enough, so is the call sign—and reception is very good over a wide area. When we took these transmissions the other morning, the announced correction was "Two parts in one hundred million low," which is near enough for us!

Gift Subscriptions

If you have a contact abroad to whom you would like to make a useful present, why not buy him a year's subscription to the *Short Wave Magazine*? The cost is 22s., post paid for twelve issues, despatched on publication day. Things like the *DX Operating Manual* (2s. 8d.) and our new five-colour Zone Map (6s.) are also welcomed by overseas amateurs, though the value of the Zone Map for determining bearing and distance gets progressively less the further one is from the U.K., since it is a great circle chart centred on London.



The other man's station G2MA

First impressions of the excellent layout of the station of David Marshall, G2MA—Moorlands, Hall Road, Rotherham, Yorks—are that this is just another of those professionally made rigs, so business-like is the layout. In point of fact, everything is home-constructed, even to the variable condensers cut out by hand with metal shears. Whether this is due to Scottish thrift, or to his liking for expending infinite patience in everything that he does, is a matter for conjecture. Howbeit, the station is one that does credit to the amateur fraternity.

Since 1928, G2MA has worked at one time or another on all available bands; present activities seem to be directed to shooting a colossal 14 mc 'phone signal into the U.S.A. To this end, many and varied have been the arrays that have adorned the garden and astonished the neighbours. The latest addition is a home-constructed wooden mast, according to the erectors, weighing at least a ton! It is

planned that 14 mc and 144 mc beams shall in the near future rest atop this structure—and like the rest of the gear at G2MA it is made to last.

Whilst his present interest lies in 'phone operation, G2MA is by no means 'phone-only, as those who have had the pleasure of hearing him operate his home-made bug key will testify.

Another interest (rather prevalent in the Sheffield area) is the design and construction of receivers. The latest job is a triple-super with a pass-band of 300 cycles using a band-pass crystal filter and a third IF of 80 kc; whilst speech is rather difficult to decipher, the designer demonstrates with justifiable pride its undoubted "single signal" qualities on CW.

One comes away from the station feeling that it would be all to the good if some of the newcomers to Amateur Radio would be willing to model their stations and operating on the example of Old Timers like G2MA.

THE MONTH WITH THE CLUBS

FROM REPORTS

Reports this month from 35 Clubs indicate that most of them still produce a sufficiently varied programme to hold members together during the so-called summer weather. Field Days and D-F Tests are popular, but in many cases the normal routine of meetings and interesting lectures has proved sufficient.

We have been particularly pleased to receive some interesting photographs from Club Secretaries, which will be reproduced in this Section as opportunity offers. Please note that we are very glad to see such material, which will always be used to illustrate this feature.

It is hoped to give advance details of the *Short Wave Magazine* Third Annual 1·7 mc Club Transmitting Contest in this space next month; as before, all Clubs on our Active Register will receive copies of the Rules direct from us. So make sure your organisation is on that Register! Name of club and secretary's QTH are all that is necessary.

Next month's date for reports falls rather early, owing to the fact that the first Wednesday in September—our publication date—is the 1st. Therefore, we want all reports from Clubs by *first post on August 12*. Please address them, as usual, to Club Secretary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. And now for the news.

Basingstoke District Amateur Radio Society.—On July 4, the Club visited the airfield of Airways Training Ltd., at Aldermaston, where members inspected Link Trainers, the control tower, GCA, and the radio school in which numerous types of modern aircraft radio installations were seen. At the meeting on July 23, Mr. C. C. Jones lectured to the club on Frequency Modulation.

Burnham and Highbridge Amateur Radio Society.—This club continues to flourish, and recent lectures have covered a wide field, from radio's early days to radar. A workshop has been organised and the club hopes to be on the air shortly with the call G3BPV/P. Amateurs visiting the district on holiday will be cordially welcomed.

Lothians Radio Society.—Regular meetings will recommence in September, at the Chamber of Commerce Rooms, Charlotte Square, Edinburgh, on the last Thursday of each month. There will also be a social evening on

the second Thursday of the month, at "Scotts," Rose Street, Edinburgh. The club's own publication, *Radio Amateur News*, continues throughout the summer and circulates to the tune of some 90 copies. The May/June issue contains just about the best article we have ever read on "Learning the Code."

Reading Radio Society.—Dr. Lemon, the President, talked at a recent meeting about R/C Bridges, Oscilloscopes, Grid-Dip Meters and other items of test equipment. On June 26, a number of semi-technical films were shown, and there was a talk on 5-metre receivers, aerials and methods of operation for the 5-metre D-F contests to be held later in the year.

Liverpool & District Short Wave Club.—Recent lectures have covered the use of the Solariscope, the conversion of RF Units 24, 25, 26 and 27, and the super-regenerative receiver. Visits to GLV and to Seacombe Radar Station have been planned. All meetings have been well attended and

the membership is distinctly alive.

Stourbridge & District Amateur Radio Society.—At the July meeting the secretary gave a resumé of club activities during June, which included NFD, a visit to Droitwich, and a Joint Committee Meeting of all the West Midland societies. This was followed by a talk on CRO's, which was not concluded and will be continued at the next meeting, on August 10 at 7.45 p.m.

Oswestry & District Radio Society.—The regular fortnightly meetings at the Technical Institute continue. A recent outstanding talk was on 144 mc work, and was given by G5JU. It is now hoped to obtain the use of a permanent club room.

Wirral Amateur Radio Society.—The bi-monthly meetings of this club continue to be very well attended. NFD activity was supported so enthusiastically that it has been suggested that a similar event might be organised later in the season. Next meetings are on August 4 and 18, at the usual venue—YMCA, Birkenhead.

Merseyside Radio Society.—Saturday meetings will not be held until August 21, but Wednesday, Thursday and Friday activities continue as usual. Attendance is good, and newcomers will be welcomed. Several members are now the proud possessors of new calls, and a local "Call-Book" is being compiled!

Yeovil Amateur Radio Club.—The first public exhibition of members' gear was held very successfully in July, at a fete in aid of local YMCA funds. A great attraction was the showing of some 500 QSL's selected from members' collections. A new transmitter has been built for 3·5, 7 and 14 mc—it has band-switching and can be used for CW on any three frequencies in those bands. It operates every



The construction group at work at a recent Grafton meeting.

Wednesday from 7.30 until 10 p.m., during the regular weekly meetings. Note the new Secretary's QTH; a welcome is extended to holiday-makers or members of the Forces in the Yeovil district.

Warrington & District Radio Society.—Meetings are held in the Sea Cadet Headquarters on alternate Mondays (lectures and films) and on Thursdays and the remaining Mondays (informal get-togethers). The club transmitter, G2CKR, is used on these latter occasions on 3.5 mc, and slow Morse transmissions emanate from G3AAB every evening at 8.15 on the top band. The club were very sorry to lose the services of G3AWC, Founder Member and Hon. Sec. The new Secretary's QTH is given in the panel.

Rhigos & District Radio Club.—Welcome to another newcomer, formed in June. Meetings are held in the R.F.E. Canteen, Trading Estate, Hirwaun, Aberdare. The first lecture, on July 15, was by Mr. Rush of R.F.E., and covered the introduction of the receiver, and power pack design. A series of follow-ups will cover the design of a high quality short-wave bandspread receiver. Future meetings are booked for August 28 and September 11.

Coventry Amateur Radio Society.—Membership has now passed the 100 mark—fine work for Coventry! Members and their families took part in a local Field Day on July 18, when the club transmitter "went /P," as the saying is. The club exchanges radio publications with the Frankford Radio Club (U.S.A.) thus surmounting import difficulties.

Southport Radio Society.—Welcome to this newcomer, whose inaugural meeting was held on July 7. Twenty members were enrolled, officers elected and a programme drawn up. Meetings are to be held on the first and third Wednesdays of the month at the Club Room, 38a Forest Road. Prospective members are asked to contact the Hon. Sec., whose QTH will be found in the usual place.

West Middlesex Amateur Radio Club.—Despite the "summer" the meetings are well attended and plans have been laid for the autumn and winter. A lecture on FM was given at the last meeting. Future gatherings will be on the second and fourth Wednesdays, 7.30 p.m., at the Labour Hall, Uxbridge Road, Southall.

Southampton Radio Club.—Club officials were elected, and future policy discussed at the third A.G.M. in July. An interesting step is being taken—

that of giving popular lectures to which the public will be invited. It is also proposed to build up a reference library, starting with books given by club members and adding to them as funds allow.

West Bromwich & District Wireless Society.—Meetings continue on alternate Mondays (7.30 p.m. at Charlemont Schools). The club now offers really full facilities—classroom, workshop accommodation, and an active transmitter. New members wishing to make use of these facilities will be welcomed by the secretary.

Bovingdon Airport Club.—In July this club staged a demonstration of Amateur Radio at a local Arts and Crafts Exhibition. A top-band 'phone rig was operating all the time and making contacts with amateurs in the surrounding district. This show was a great success, and it is interesting to note that the GPO co-operated by issuing a two-day licence for the temporary set-up.

Nottingham Short Wave Club.—A very successful Rx Field Day was held recently, teams being organised, and each team using a receiver of the same type. The winner received 713 stations in 80 countries during the 24 hours of operation—good going for two-valve sets, six-volt car batteries and standard HTB's. The club is now seeking new accommodation and is running a technical course for next year's RAE.

Worcester & District Amateur Radio Club.—Meetings continue to be well attended, and we hear that the lecture on "Valves," advertised for the June meeting, will now take place in September. The club recently suffered a sad loss in the sudden death of Mr. F. Goulden, one of its most faithful members.

Solihull Amateur Radio Society—This Club's Field Day is now arranged for August 8. Recent lectures have been on the subjects of Field Days and Map-Reading (by G2ATK and G5TU). A visit to Droitwich BBC station is also being arranged for the near future.

Edgware & District Radio Society.—Two recent talks were on Single Side-Band Technique and on a new VHF Trans-receiver weighing only 22 lb—the latter by Mr. Jones of Standard Telephones & Cables. The new meeting place is St. Michael's School, 41 Flower Lane, Mill Hill, which has several advantages over the old *venue*. Wednesdays at 8 p.m.

Grafton Radio Society.—This club has now closed for a summer break, after holding meetings three evenings a week throughout the year. This step has been taken to overcome the possibility of an avalanche of divorce actions! Twelve more members have been successfully coached for the RAE, and have their licences. Grafton reopens on September 13 with its third A.G.M.

Surrey Radio Contact Club (Croydon).—At the July meeting G2KU and G5BT spoke on the subject of aerial systems and the methods of feeding them. The next meeting will be held on August 10—7.30 p.m., Blacksmiths Arms, South Croydon.

Slade Radio Society.—Next regular meetings will be on August 20, September 3 and 17. In addition, there are D-F Tests on August 22, and September 19—the latter being a midnight affair!

Sutton & Cheam Radio Society.—300 feet of 16-mm film were used on NFD to record the erection and dismantling of the beam and the operation of the stations. Any other club interested in borrowing this film is asked to get in touch with Sutton's Hon. Sec. on the subject.

Midland Amateur Radio Society.—At a recent meeting a variety of questions were answered and discussed by a Brains Trust formed jointly by MARS and Coventry ARS, the nearest neighbours. MARS meetings are held on the third Tuesday (except during August) at the Imperial Hotel, Birmingham, 6.45 p.m.



Photograph by Marshall, Camberley

The Farnham and Farnborough group had a station in action during the RSGB's NFD week-end in June. In this picture, taken in rain and wind, are (left to right) G5NF, SWL Dearlove and junior, G6AJ (behind), SWL G2ZC (centre, bareheaded, with pipe), G2DX (cap and pipe), G8TS and G8DV. G5NF, G2ZC and G8DV are F.O.C. members, and there is some VHF talent represented in this picture, too.

Spenn Valley Radio & Television Society.—An interesting visit was recently paid to the Bradford City Police Radio Headquarters, when the VHF equipment was demonstrated by G3CQF, a sergeant member of the force. Lectures on Power Transformers and on Radar and Anti-aircraft have been well attended.

Wolverhampton Amateur Radio Society.—Membership here has nearly reached the century mark, and members generally are showing increasing interest in the higher frequencies. Recent activities have included a well-attended exhibition, a visit to the BBC's Droitwich Station, and the Club's Annual Dinner.

West Somerset Radio Society.—The July meeting was unusual for a talk on electronic musical instruments and a demonstration of the Hammond Organ, which is such an instrument.

Thames Valley Amateur Radio Transmitters Society.—They are holding a 3.5 mc field day on August 29, for which various prizes are offered, including the Cooper Challenge Cup. This event, to be called the "Thames Valley CQ Contest," will be limited to T.V.A.R.T.S. members, using not more than 5 watts input

on CW or 'phone, and will run from 1100 to 1900 on the day. The July meeting, when the lecture was "Micro-Wave Technique" by L. Mawby of Sargrove Electronics, Ltd., was an outstanding success, 3 cm equipment being demonstrated. The August meeting is on the 4th, and will be informal.

WOOLWICH PLUMSTEAD AND ABBEY WOOD

It is hoped that it may be possible to organise a Club in this area. All interested are asked to communicate with R. Halls, 48 Raglan Road, Plumstead, S.E.18.

Tel.: Woolwich 2915

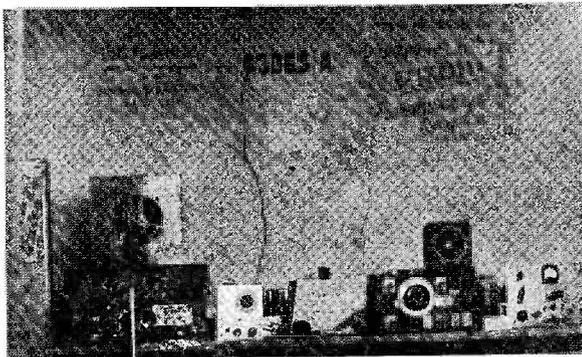
Worthing & District Radio Club.—Informal meetings are held each Sunday afternoon at the Club Room at West Hill, High Salvington. Formal meetings will be resumed in September, the first of which will be the actual inauguration of W.D.R.C.; membership is to be open to anyone, and the secretary would be very glad to hear from prospectives—see Club Secretaries' panel in these pages.

St. Pancras Radio Society.—After a most instructive and interesting session, they have now closed for the summer recess. Main activities have

centred round designing and building TV receivers from ex-Service gear, and several of these sets were demonstrated in public at the Open Meeting held in July. The new session opens in September.

West Cornwall Radio Club.—Due to petrol difficulties and the scattered nature of the membership groups, meetings are held separately in Penzance, Falmouth and Redruth, under the leadership of G2JL, G2FQD and G2BJS respectively; special efforts are made to cater for the R.A.E., and a small local magazine to cover members' activities and interests is being started.

Wanstead and Woodford Radio Society.—As from July 13, they are operating from a new club room, with which workshop facilities have been provided; it is expected that this



The Bovingdon A.R.C. staged this show, with G3DGS/A in full operation, at a recent exhibition in the locality.

will lead to much increased activity and interest. Members are again looking forward to the Fete on Woodford Green,

when they will have a portable rig in operation and a D-F contest as one of the attractions.

Names and addresses of the Hon. Secretaries of the Clubs whose reports appear in this issue are in the panel below. They will be pleased to help prospective members in any way.

BASINGSTOKE. L. S. Adams, 16 Brambllys Drive, Basingstoke, Hants.
BOVINGDON (G3DGS). J. D. Lord, Police Station, Bovingdon, Hemel Hempstead, Herts.
BURNHAM AND HIGHBRIDGE. T. N. Carter, G2BPV, PO Radio Station, Highbridge, Som.
COVENTRY (G2ASF). J. W. Swinnerton, G2YS, 118 Moor Street, Coventry.
EDGWARE (G2ASR). R. H. Newland, G3VW, 3 Albany Court, Montrose Avenue, Edgware, Middx.
GRAFTON (G3AFT). W. H. C. Jennings, G2AHB, Grafton LCC School, Eburne Road, London, N.7.
LIVERPOOL (G3AHD). W. G. Andrews, G3DVW, 17 Lingfield Road, Liverpool, 14.
LOTHIANS. J. W. Sime, GMC3VJ, c/o Miller, Etrick Grove, Edinburgh, 10.
MERSEYSIDE (G3DPZ). C. M. Johnstone, 6 Flawn Road, West Derby, Liverpool.
MIDLAND. W. J. Vincent, G4OI, 342 Warwick Road, Solihull, B'ham.
NOTTINGHAM. J. Rowbottom, 9 Mansfield Street, Sherwood, Notts.
OSWESTRY. G. H. Banner, G3AHX, 6 Coppice Drive, Oswestry, Salop.
READING. L. Watts, G6WO, 817 Oxford Toad, Reading.
RHIGOS. F. Hamer, GW8BW, 7 Neath Road Bungalows, Aberdare, Glam.
ST. PANCRAS. H. Brown, 84 Bienheim Gardens, Willesden Green, N.W.2.
SLADE. C. N. Smart, 110 Woolmore Road, Erdington, Birmingham, 23.
SOLIHULL. T. O. G. Talboys, G2ATK, 6 Bramley Croft, Shirley, B'ham.
SOUTHAMPTON. J. H. Silence, 30 The Drove, Cuxford, Southampton.
SOUTHPORT. F. H. F. Cawson, G2ART, 113 Waterloo Road, Southport.
SPEN VALLEY. W. C. Longman, G2DYY, 16 Victoria Terrace, Cleckheaton.
STOURBRIDGE. W. A. Higgins, G8GF, 35 John Street, Brierley Hill, Staffs.
SURREY (CROYDON). L. C. Blanchard, 122 St. Andrew's Road, Coudsdon, Surrey.
SUTTON AND CHEAM. B. J. Blount, 5 Priory Crescent, Cheam, Surrey.
THAMES VALLEY. A. Mears, G8SM, Broadfields, West Molesey, Surrey.
WANSTEAD & WOODFORD (G3BRK). R. J. C. Broadbent, G3AAJ, c/o Wanstead House, The Green, London, E.11.
WARRINGTON (G3CKR). W. R. Murray, G3CUB, 56 Crow Wood Lane, Widnes.
WEST BROMWICH (G3BWW). W. G. Johnson, G2BJY, 22 Lynton Avenue, West Bromwich.
WEST CORNWALL. R. V. Allbright, G2JL, Greenacre, Lidden, Penzance.
WEST MIDDLESEX. C. Alabaster, 34 Lothian Avenue, Hayes, Middx.
WEST SOMERSET. T. C. Bryant, G3SB, 29 Lower Park, Minehead, Somerset.
WIRRAL. B. O'Brien, G2AMV, 26 Coombe Road, Irby, Heswall, Cheshire.
WOLVERHAMPTON. H. Porter, G2YM, 221 Park Lane, Fallings Park, Wolverhampton.
WORCESTER. J. Morris Casey, G8JC, c/o Brookhill Farm, Ladywood, Droitwich.
WORTHING. G. W. Morton, 42 Southfarm Road, Worthing, Sussex.
YEOVIL (G3CMH). D. L. McLean, 9 Cedar Grove, Yeovil, Som.

Join Your Local Radio Society

SWL REPORT SERVICE

The feature "Pse QSL" in our *Short Wave Listener* still retains the popularity it has enjoyed since first being introduced some 18 months ago. Each issue carries upwards of 40 requests for SWL reports, from transmitters throughout the world. If you want listener-reports on particular transmissions, please give us band(s), whether CW or 'phone, frequencies if CC, normal operating periods and direction or distance from which reports are wanted—all on a separate slip headed "Pse QSL—Short Wave Listener," with the QTH for reports. This service is provided on the clear understanding that all useful SWL reports so received will be QSL'd by card.

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DUAL POWER SUPPLY UNIT

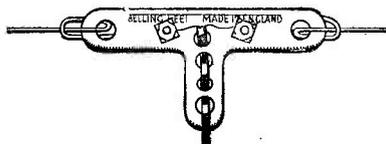
We have had on test for some time a new QRP power pack which has many useful applications both in the station and for portable operation. Its novelty lies in the fact that it is designed to operate either from 110-250v AC mains or from a 6-volt

car battery; merely by inserting the appropriate plug, either input condition is automatically selected. When run off an accumulator, a vibrator unit is brought in which then feeds the power transformer and rectifier valve. In either condition, the output is approximately 170 volts at 80 mA, fully smoothed—24 μ F of smoothing capacity is incorporated—and thus the pack has many obvious applications, particularly for portable equipment. This power unit is well designed and very neatly constructed, measuring only 10½ in. × 6 in. × 4½ in. overall, and contained in a black crackle case; price is £5 19s. 6d. complete. The Rainbow Radio Manfg. Co., Ltd., Blackburn, Lancs.

"THE 420 mc SUPERHET"

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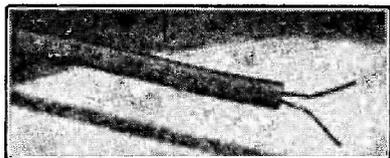
'BELLING-LEE' AERIAL SPARES



"T" STRAIN INSULATOR

Designed to take the feed from the centre of a half-wave dipole.

- L333 in porcelain. Price each 3s. 3d.
- Y7713 80 ft. lengths of cadmium copper aerial wire. Price each 9s. 0d.

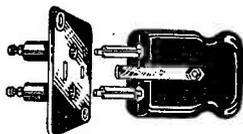


BALANCED TWIN FEEDER

- L336 75-85 ohm. Per yard 7½d.
- L334 65 ft. of L336 on reel, each 13s. 6d.
- Y7726 80 ft. lengths of L336, each 16s. 9d.

TWO-WAY CONNECTORS

- L607/PG 2-pin plug. each 2s. 10d.
 - L607/S1 L607/S2 2-way sockets, each 6d.
- "Fouling pin" on plug provides non-reversability with socket S.1 and reversability with S.2.



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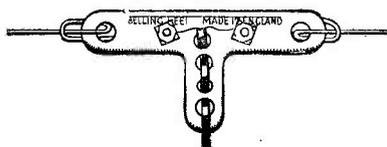
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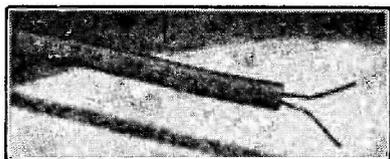
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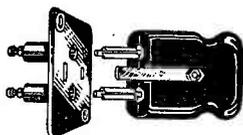


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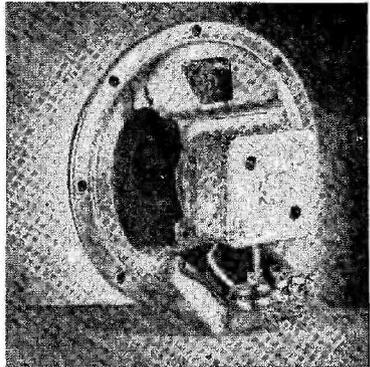
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The new and special magnets used in the construction of the Celestion 5" and 6½" speakers detailed below provide a degree of efficiency hitherto unobtainable with permanent magnets. They represent the very latest method of speaker design and construction.

Chassis Model P6Q is also available as a **Cabinet Speaker** (size 9" x 8" x 4½"). The attractive cabinet is fitted with volume control. Cabinet finish in Green, Cream or Brown. Ask for Cabinet Model CT115. Price £2/17/- (without transformer), suitable for outputs 1.5 ohms; or, price £3/3/- (with universal transformer). Suitable for all receivers.



P5Q

Write for Brochure "S.W." It gives details of all Celestion Chassis and Cabinet Speakers.

Chassis Diameter	MODEL	Voice Coil Impedance (Ohms)	Pole Diameter	Flux Density (Gauss)	Total Gap Flux (Maxwells)	Peak Power Handling Capacity
5"	P5Q	3-0	3"	8,500	26,000	2W
5"	P5T	3-0	3"	10,500	32,000	2W
6½"	P6Q	3-0	4"	8,500	26,000	3W
6½"	P6T	3-0	4"	10,500	32,000	3W

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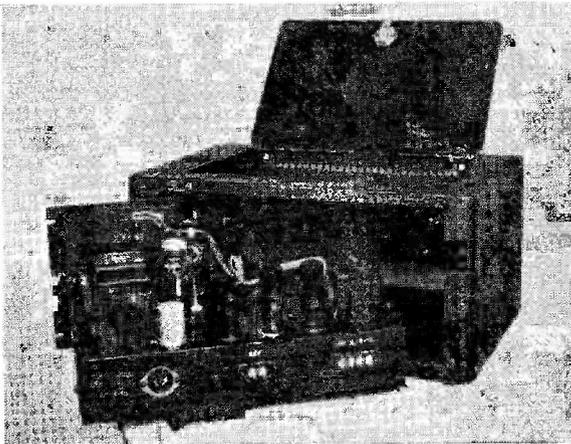
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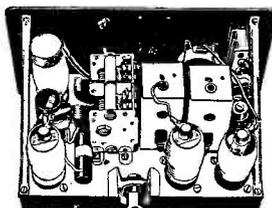


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WIND your own IP's, chokes, coils, on a KAYNITE wave-wound coil winder, 50/- (carr. 2/- extra). Stamp brings particulars from Richard Sheargold & Co., Sunbury-on-Thames.

SMALL ADVERTISEMENTS

TRADE—continued.

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ALUMINIUM chassis and panels any size plain or punched for valveholders, etc., from 3/9. Prompt delivery. Precision built superhet coil packs, 3 wave-band, aerial and oscillator type, 37/6. HF stage type, £3. Data sheets on request. 465 kc IFT's, 15/6 pair.—E.A.D., 13 Bence Lane, Darton, Barnsley.

WE now offer in addition to our famous "Home Television" Receiver Circuit SRC5 the following, using low cost ex-WD surplus. SRC8, special Long-Range Television Aerial; SRC9, Unique Television Signal Generator; SRC10, Conversion Unit for 12-in. C.R.T. (surplus), for SRC5. All at 5/- each. In sets of 5, £1.—B. W. Stevens, 122 Bath Road, Hounslow, Middx.

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BC348 Receivers, as new, £14/10/-. Post 10/-. BC433 Bendix Compass Units, £4, carriage extra. Good range of first-class G.E.C. Meters. Send S.A.E. for lists.—Radio Sales (Luton), 55 St. Mildreds Avenue, Luton.

BC348 Receivers, as new, £15/10/-. plus carriage. Admiralty "M" Type AC Motors, 5/- Muirhead Dials, complete, new 0-180°, 12/6. Send S.A.E. for lists.—Radio Repairs Unlimited, 381A Dunstable Road, Luton.

FLASH! We are extra pleased to announce the most important news of the year. We can now supply brand new and guaranteed for twelve months the famous Eddystone "640" Communications Receiver at the amazing price of £27/10/-. and more important, too, generous hire-purchase terms are available. Write at once.—Southern Radio & Electrical Supplies, 85 Fisherton Street, Salisbury, Wilts.

VALVES, new and unused, ex-Govt. stocks, and prices as advertised. Electrolytics. B.E.C. 450 volt, Metal can, 8 mF, 2/9. 8 x 8, 3/6. 8 x 16, 6/-. 16 x 16, 7/-. Television coils and chassis. Also Aerials. Send S.A.E. for list.—A.G. Supplies, (Mail Order), 90 Melrose Avenue, Mitcham, Surrey.

BC221 Freq. Meters, £7/10/- each collected. Plus 10/- carriage canvas case.—G5CP, 33 Manley Road, Sale, Manchester.

AMERICAN valves. New, boxed. 807 ceramic, 9/-; 6SN7G, 7/-. S.A.E. Full List.—Stansfield, Aireworth Terrace, Kettleigh.

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SMALL ADVERTISEMENTS

TRADE—continued.

G200'S. 6AC7, 6SA7, 6SG7, 6SH7, CV18 (RK34) 12SG7, 12A6, 12C8, 12SR7, 12SK7, 6/6 ea.; KTW61, 6D6, VR65A (SP41), VR65 (SP61), VR137 (RL16), 41MPT, 12-volt 4-pin Vibrators, 5/- each; 6K7, 6K8, 9/6 ea.; VR150/30, 10/6 each; Button base 9006, 6/6. 6J6, 6AG5, 6C4, and PT15's. 12/6 ea. all guaranteed perfect. Jones 4-pin Plug and Socket, 1/6 each, Octal valveholders, 4½d. each. 1-amp fuses, 6d.—A. C. Hoile, Loose Village, Maidstone, Kent.

READERS' ADVERTISEMENTS

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

1155 6F6 output, power pack, speaker, S-meter NL, etc., £15. R.208, fitted bandspread, S-meter, NL, 10-60 mc, £15.—G3AZJ, 55 Browning Way, Heston, Middx.

SELLING UP. Everything from recording gear to resistors. 100 Valves, 8 Receivers, Aerial gear, all components, electrical equipment, books. S.A.E. for list.—12B Uxbridge Road, Kingston.

WANTED: 230 AC power pack for Collins TCS12 Tx/Rx. Rectifier type not rotary gen. Must be in first-class condition. State price, etc.—Box 337.

HUNTS All-Wave Signal Generator, Type 4002, little used. Offers? E. & V. 250v Megger, as new, £8.—F. Myers, 43 Cross Flatts Avenue, Leeds, 11.

SELLING up! New 1155, £12/10/-; Amplifier, S/mike, 10-in. Speaker and power pack, £12; Test Set 74, modified as oscilloscope, £8; Wavemeter, Class-D, for 6v AC, £5; 19-in. rack, 63-in. high, £3; or offers the lot. S.A.E. for details and other lists, or call—Daledor, Rebels Lane, Southend.

W1191 Frequency Meters. 100 kc-20 mc, 8 bands continuous; screened oscillator and attenuator for Rx alignment, 1000 kc Xtal, CW or MCW, Pierce oscillator to radiate any xtal freq. New, unused, spare valves, in transit case, £9/9/-, C.W.O. Carr. Paid. Why Pay More.—G3ADD, 13 Derwent Avenue, Headington, Oxford.

HALLCRAFTERS S.20 in excellent condition, also 2-stage pre-selector, sell together or separately. Receiver price £20 or £25 the two delivered to nearest railway station.—G3HLL, Tregear, Sunnydale Estate, Hinckley, Leicestershire.

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WANTED: B2 Rx/Tx complete, or individual units. State price and condition.—Box 339.

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SMALL ADVERTISEMENTS

READERS'—continued.

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NEW Radiovision two-stage preselector, 3-5 to 28 mc bands, self-powered, tremendous gain. List 16 gns., accept £9. Oscillator Type 145 with power pack complete, new tubes, fine condition, £6/10/- Carriage extra on both.—GW8NP, 46 Inglefield Avenue, Heath, Cardiff.

SALE. BC.348R fitted 230v. power pack, N. Limiter, S-Meter, as new and unused, £32. R1481, separate power pack, tuning meter, for Five Metres, £9. Radio-Aid Oscilloscope, less tube, brand new, £17. Quantity of small parts. Send for list.—Box 341.

XTALS. New, in holders, 4 to 6 mc, for re-grinding, £2/- each, or £1 per dozen. As above but with output in 14, 21, 28 or 144 mc band, 3/6 each. Eddy-stone freudentite Tx coil bases, fitted 5 banana plugs, 1/- each. Genuine polystyrene 3/4-in. dia., 3-pin plug-in coils, wound 4-6 mc, 3 for 1/-. One pair 803's, new, unused and boxed, offers. Class-C Wavemeters, circuit, compensation chart, spare valve, as is, 35/-, carriage 6/-.—G4DC, 63 Erlanger Road, London, S.E.14.

SALE. Eddystone "All-World Battery Two," valves, 3 coils, 'phones, nearest £5. Few T.3180 miniature SW Transmitters, comprising midget 1.5v triode in oscillator circuit, dipole aerial, battery box, telescopic aluminium mast 7 1/2-ft. (suitable beam elements), at 12/6 each. Few 6L6GT, 6B4G, at 6/- each. Wanted:—Modified AC BC348, Class-D Mark II wavemeter, or similar.—Box 342.

AVO Model 40, needs few small reps. before using, bargain £5. 4-band coil units, cover 10, 20, 40 and 80 metre bands, new, 3/9. Valves from 1/- ca. Other Ham surplus at ridiculous prices. Send for List.—Box 361.

MILLEN "Rq'er", with 6, 10 and 20-metre coils. 1-Boxed as new, with spare 6AK5. Best offer over £15.—Box 343.

R208 receiver, excellent condition, £9. Sundry valves, 4 and 6 volt, 5/- each. List free.—Scarr, Hallgate, Howden, Goole.

WHAT offers? R103 complete, speaker, power pack, spares. MCR1, complete less power pack. Crystals, mounted, 4 and 5 mc, all new. Several Keys.—G2LI, 19 Cardinals Walk, Hampton, Middlesex.

WANTED—S36 receiver, cash or exchange AR88LF with cash adjustment.—Box 344.

MCR1 for sale. Complete with coils, 'phones, pack. Just professionally overhauled, £8. Write:—Horsfield, The Malt House, Willersey, Broadway, Worcs.

VFO Type 37 Oscillator/Transmitter, 20-80 mc, 807 output, modified CW or modulation, £10. Type 392 Power Unit for Type 145, £5. Offers considered. London.—Box 345.

R1155 internal power pack and output stage. 8-in. speaker, new front panel, £20.—J. P. Gaskell, The Fields, Lower Peover, Knutsford, Cheshire.

CNY1 transceiver, excellent condition. 220. volt DC/AC Rotary Converter. Transformer 115/230 volts, 2 amps. Must sell—no reasonable offer refused.—Box 346.

WANTED.—Details and circuit diagrams, etc., for BC.375E 150-watt transmitter and BC433G Bendix Radio Compass.—Box 354.

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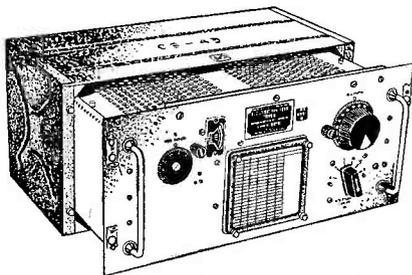
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SMALL ADVERTISEMENTS

READERS'—continued.

COLLINS TC512 Tx/Rx 1.5-12 mc, band-switched, three bands. Tx: ECO-FD/BA-PA, 35 watts R/T 70 watts CW. Rx: 7v superhet with excellent performance, fitted British plugs and sockets. Complete with 12-volt dynamotor unit for use as portable or mobile station. Perfect working order. £30. Mains power pack, 600v at 150 mA and 300v at 150 mA, 130/- Universal Avomitor, new, £6. Dynamotors, 28v input, 540v at 450 mA, new, 50/-; 250v at 60 mA, 20/- R103A, £8/10-. R1082 with valves and coils, £5. Xtals: 18125 kc, 18025 kc, 15/- each. Valves: pair DA30 25/-, pair PT15 20/-, pair 811 35/-, three KT44 7/6 each, 393A Thyatron 10/-, EK32 5/-, TDD4 5/-, 5Y3 5/-, two 6B6 5/- each, P61 5/-, two BL63 7/6 each, MHD4 5/-, two EL32 5/- each. Xtal monitor 7/6. Transformer 1750-0-1750 350 mA, £7. Modulation transformer specially made to order for two 813's by high-class maker, £6/10/-. Posted overseas.—Cpl. Winchcombe, G3BCW, 4 Estcourt Street, Devizes, Wilts.

FOR Sale. BC348, modified for AC mains, with internal power pack. Splendid performance. Offers Box 353.

I REQUIRE a high-class communication receiver must have effective noise limiter and be in new condition. Full details, please.—Box 350.

HALLICRAFTERS SX24 Defiant—S-meter, xtal and noise limiter, perfect and as new. £25.—Box 351.

URGENTLY wanted, Rx about 80-200 mc. Full details, please, and all letters answered.—Box 352.

FOR Sale. R1155N £12/10/-, and BC312, with pack. £15. Both in nice condition.—13 Heywood Road, Alderley Edge, Cheshire.

FOR Sale. BC348 (R.C.A.) 1.5-18 mc, internal 230 AC power pack, with 8-in. speaker, £22. Cossor single-beam oscilloscope, not working, £10. HMV 580 Chassis and LS complete—imperfect. Offers.—13 Cromer Road, South Norwood, London, S.E.25.

AVO Model 40 Universal Test Meter (AM Type E) good condition. Nearest £7/10/-.—Powell, 36 Cundey Street, Bolton, Lancs.

CR100/2 professionally overhauled, £23; buyer collects or carriage extra. BC-221 Frequency Meter, £12. Avometer Model 7, with leather case, as new, £18. Weston Selective Analyser E.665, complete with case, valve adaptors, etc., £14.—1 Bridgefield Road, Bellevale, Gateacre, Liverpool.

VHF Special Receiver 25 to 135 mc, in five switched bands, 10 valves with rectifier, 956 RF, 956 Mixer and 955 Oxc., 3 1F's, BFO, Det. and AVC, AF, output. Controls: aerial trimmer, AF and RF Gains, Tone Control, etc., £25. Also Receiver R.208, £8. Both in excellent condition.—R. North, The Nag's Head, High Street, Sunningdale, Berks. *Phone: Ascot 707.

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COMMUNICATIONS Receiver for the Connoisseur, by Telefunken, Type E52-B. 13-valve instrument of exceptional quality. All voltage mains and 12v DC. Range 1.5 to 25 mc in five bands. Bandsread, and calibrated to three decimal points projected on to ground glass screen. All valves RV-12-P2000's identical, and interchangeable. (Spare included in sale.) Crystal controlled, BFO, etc. The whole instrument constructed with precision of a fine watch—has been pronounced by experts to excel AR88 or anything else on the British or American markets in performance, construction and design. Has to be seen and operated to be really appreciated. Separate amplifier required for speaker operation. Matched 'phones included. Owner posted abroad. For further details, offers, etc., write Box 349.

SMALL ADVERTISEMENTS

READERS'—*continued.*

OSCILLOSCOPE by G6HP. Ready to use, cost £7/10/-, can be used on Rx. connections supplied, £4/10/-.—G3AQN, Box 2, Oswestry.

WIRELESS WORLD: Jan.-Dec. 1943 and Jan. 1945-May 1948 (4 copies missing). Accept first offer.—Box 348.

FOR sale:—First £10 secures the lot. RL18 (2), 9002 (1), 9003 (3), 12A6 (3), 832 (2), 6SS7 (1), 12C8 (1), 6G6G (1), 12J5GT (3), 12AH7GT (1), 6AC7 (1), 12SJ7 (1), 6SG7 (3), 6SJ7 (3), EA50 (2), VR59 (1), 6H6 (2). A real bargain—BRS11902.—67 Broadhill Road, Manchester, 19.

SELLING Complete Station—40 watt CW 'Phone Transmitter, 4 bands, 160 to 20 metres, commercial-built, £7. Single-Signal 7-valve Communication Receiver, 5 bands, 160 to 10 metres, bandspread, BFO, £6. Or both, 12 gns. 100TH valves, brand new, 45/- each. Write for list of smaller items, bargains.—Box 347.

HALLICRAFTER S21 8v superhet, 31-11 metres, 230 AC, £16. Class-D MK2 Freq. Meter, 230 AC, £6. 10-way plug socket, 2/6. American Valves 7/6 each, many types. See Trade Ad.—G5CP, 33 Manley Road, Sale, Manchester.

B2 Transmitter-Receiver set of coils: new, unused; Offers? Surplus really cheap, stamp for list. Wanted Mains AVO, or similarly, oscillator to 60 mc.—G6CB, 7 Caxton Road, Wimbledon.

HAMMURLUND Super Pro, rack mounting, good condition, what offers? Bugkey, J36, brand new, £2.—Box 358.

S640 Eddystone Rx, new February, very little used, £30.—W. Brown, G5MZ, 79 Fairfield Road, Morecambe, Lancs.

SALE:—T1154 with meters, all new valves, in transit case, £5/10/-, plus 10/- carriage. Reason for sale: No Mains. Or with 1,000v p.p., 4 rectrs, spare 6v heaters, £9 c.p.—G3DUC, E. H. Williams, Pleasant View, The Checkoe, Redbrook, Whitchurch, Salop.

SALE: 0.4 amp RF Thermo-couple meters, 5/- each. Two 162'S, 10/- each. R.1116, working order, £4. Exchange V.G. Synchronous recording motor, 12-in. turntable, 78 r.p.m., 110/230 AC, very solid job, for BTH Gramo-motor or Simpson turntable in good condition.—G3CPM, 49 Lime Tree Avenue, Broadway, Worcestershire.

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EDDYSTONE 640 Receiver, S-meter and matched speaker. Little used, as new. Instruction manual. Seen West London. Offers over £28.—Box 356.

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You can make a Super V.F.O from the Instructions which the A.R.R.L. League has given permission to reprint from Q.S.T. with the U.S. Signal Corps TU5B Tuning Unit. Price complete with instructions

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246 HIGH STREET,
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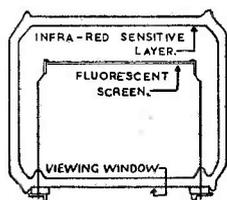
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PROFESSIONAL COMMUNICATIONS ENGINEER

Repairs, overhauls and calibration of any type communication receiver, transmitter, frequency meter, etc. SPECIAL—The G5AD Folded Dipole Antenna. Constructed entirely of 300-ohm ribbon feeder, completely assembled with insulators and centre block, together with 50 ft. of feeder. Ready to erect and attach to TX. NO PRUNING REQUIRED. As used by G5AD and other well-known DX men. Price: 7mcs, 49/6; 14 mcs, 39/6; 28 mcs, 35/6. Additional feeder 9d. yd., sold separately if desired. Official Eddystone stockists, including "640". Any radio component or valve supplied by return of post. We pay postage.

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This is a highly sensitive photocell which, in addition to ordinary ray control operations, can be used for the direct conversion of infra-red into visible light. Price 14/6, post and insurance 1/6 extra. Send S.A.E. for explanatory leaflet.

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ROTARY TRANSFORMER, Type ZA15148.
12v in, 490v 65ma out. Only 19/6.

POWER SUPPLY UNIT No. 4 Mk. 1, about 300v H.T. input 12v D.C. Ideal for car radio, also only 19/6, or converted 230v A.C. in 400v 80ma/ +4.5-6.3-12.6v 25 Watts for heaters, 45/-.

RADAR ALARM UNITS, transmitter and receiver, Type APS13. Complete with 16 button base tubes and one VR105/30. Five 6J6's, two 2D21's and nine 6AG5's, easily converted to a very sensitive superhet. receiver and TX for the 420 mc band, as new, £10/15/-.

This month's valves see classified page 436.

A. C. HOILE
LOOSE VILLAGE, MAIDSTONE, KENT

SMALL ADVERTISEMENTS

READERS'—continued.

QCC crystals, 7085, 7089, 7112, 7118, enclosed holders, with certificates, 25/- each, little-used. Transformer 1500-0-1500, 300 mA (unused), £4/10/-. Power Pack Complete, 500 volt. 200 mA HV bleeder, rectifier, etc., £4/10/-. Woden swinging choke, 250 mA, unused, 29/6. New 813, 50/- Pair 811's, new, £3. Other oddments as new, cheap.—G8UA, 406 Higher Brunshaw, Burnley, Lancs.

SALE:—Modified "Q-Max" converter, EF54, EF54, EF50; coils for 5 and 10 metres. £10.—G4LU, Avalon, Pant, Oswestry.

FOR SALE. BC.342, brand new, complete with auto-transformer, carriage paid, £19, or best offer. Eddystone speaker, brand new, £2.—G2DFH, Penennis, St. Erth, Cornwall.

WANTED: Commercially-made Tx, about 150w (or higher, if capable of operation at 150w) covering 10-80 metre ham-bands. Must be in good order and condition. Would be specially interested in Collins Type 32V-1.—Box 359.

CONDENSERS—New 4 mF, 1500v, blocks (TCC), 6/6 carriage paid.—GM3AKM, 57a Home Street, Edinburgh, 3.

SALE:—HRO Senior, nine band-spread coils, AC pack, perfect, £45. 803, 45/-; TZ40 (2), 25/- each; 811 (2), 83, 20/- each; EF8, EF9 (4), 7/6 each. Wanted: ABC1, AF3, AK2, AL4, AZ1, your price.—Box 360.

78 o.p.m. C.D.P. disc recorder, £26. Vitavox A microphone, £4/10/-. Send S.A.E. for list of other items.—Bourne, 27 Beaver Road, Manchester, 20.

ABSOLUTE bargain for quick sale. Hallicrafters Sky Champion, good condition and performance. Also Eddystone 358, 90-31,000 kc. Offers over £18 for each.—G8MM, 294 Kenton Road, Kenton, Middx. WOR 1267.

XTALS 3530, 3600, 7050 mounted, banana pins, X-17/6 each. 1805.5, 7142, standard holders, £1 each. 1950 kc, holder and base, 15/-; 1840, unmounted, 15/-; 6K7 (4) new 5/-, 807 (4) new 7/6. Xtals, 10 assorted between 4-7 mc, 27/6 lot. Marconi P.U., 10/-.—2 Parkhill Road, Chingford, E.4.

G200'S announcements now appear in the Trade Small Advertisement column and on this page.

MODULATION Transformers (Parmeko) Primary: 5,500-5,000-4,500 ohms, C.T. Secondary (1) 3,550 ohms, 360 watts, 450 mA DC. Secondary (2), for combined plate and screen modulation, 6,700 ohms, 12 watts, 50 mA DC, weight 30 lbs., £5 each, carriage paid. RF Units Type 27 (2 EF54 and 1 EC52 valves). These units are excellent for conversion to 5 and 10 metres, 30/- each, carriage paid. Both the above are brand new and in makers' sealed boxes. Also 1 only Type BC221 Frequency Meter, £17/10/-.—F. G. Dickinson, High Street, New Galloway, Castle Douglas, Scotland.

FOR SALE. Complete matched station. Tx T.1115, VFO or CO-FD. All coils 20, 40, 80, 160. CW or 'Phone. Also Rx R.1116, 142 kc-20 mc. All as new, working order, with valves. Nearest £10 lot. Collected.—Pratt, 205 Nevell's Road, Letchworth, Herts.

BC348 Receiver, modified heaters for 6 volt, £15. With power supply, £20.—J. Torry, 57 Graig Park Avenue, Malpas, Newport, Mon.

HAM, going to VK, offers the following valves, all unused and guaranteed good:—813 (6), 40/- each. PT15 (6), 866 (6), 830B (7), all 10/- each. 35T (5), 24G (5), 829B (3), all 25/- each. CR100 and R1155 spares, any type, 5/- each. 9001, 9002, IT4, 7/6 each. 955, 5/-.—G3BPZ, 5 Turf Hill Road, Rochdale, Lancs.

C43 Tx 5, 807s Drive Unit, VFO or XTAL, 2, 813s PA, 10 valve Mod/Speech Amp., new condition with circuits, offers over £30. Avo mains Stg. Gen. brand new, £12. Wanted Army No. 12 Tx complete.—64 Park Road, Ilkerton, Derby.

SAVE! buy direct from Britains leading Warehouse

INDICATORS TYPE 182A

This very fine indicator unit is suitable for television use if the E.H.T. voltage is kept low. Complete with 6" C.R.T. type VCR517, 3 EF50, 4 SP61 and 1 5U4G valves. It is a bargain at 35/-. These are in new condition, but if you want one brand new in sealed container the price is only 50/-. Try and call for these at 24 New Road, but if not add 15/- for carriage and packing. These have to be carefully packed to avoid damage in transit.

Another very fine indicator unit now available is the Type 1D6 APN4. This is U.S.A. made complete with 5" C.R.T. and 26 valves. For conversion to a super C.R.O. you will find nothing finer. Electronic switch incorporated for observation of different frequencies simultaneously. Complete with accurate 100 Kcs. crystal. Valve line up:—CRT 5CP1, 3 6SL7GT, 14 6SN7GT, 8 6H6GT, 1 6SJ7GT.

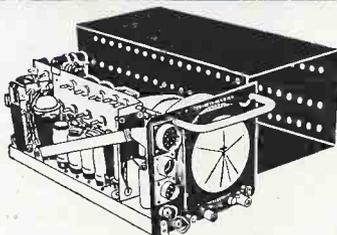
These are in excellent condition—PRICE ONLY £4 5s. Here again, call if you can, otherwise add £1 for careful packing and carriage.

KLYSTRON MODULATOR UNITS

A brand new modulator (type 169) complete with 10 cm Klystron CV67, 1 EF50, 1 5U4G and 1 CV85, 3 neon stabilisers and all for 37/6 (carr. and pkg. 5/-). Wt. 35 lbs. and packed in wooden transit cases. Size 18" x 8½" x 7½". Serious U.H.F. experimenters—please note!

ROTARY TRANSFORMERS

Type 87 Power unit: A 32 watt unit completely enclosed in steel case, fully smoothed. Input 24v D.C. Output 250v 65 ma., 6.5v. 2.5 amps. May be used as a D.C. battery charger—many other uses.



Ridiculously cheap at 10/-. BRAND NEW (3/- carr. and pkg.).

STEEL CABINETS

A very fine steel case very well ventilated, suitable for a variety of purposes. Size 14" x 8" x 7". Cover is 3-sided and lifts off top. 2 handles fitted. Only 5/- (carr. and pkg. 2/6).

FREQUENCY METER TYPE W1191

Brand new instrument covering 100 Kcs-20 Mcs and 8 bands (continuous). Complete with Xtal and 4 valves, calibration chart, instructions, and packed in wooden transit cases. For 2v operation. Will make a first class signal generator. Only £7 (carr. and pkg. 5/-).

SPECIAL VALVE OFFER

We have recently been selling quite a lot of our 6v Output Tester chassis (covering 22-85 Mcs) at 5/- each (2/- carr. and pkg.) Some of these are still available—chock full of high grade USW gear—but in addition we can supply the set of 6 valves comprising 3 Mazda HL23 and 3 D1 for only 10/- (postage 1/-). Brand new and guaranteed!

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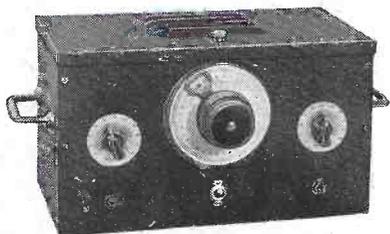
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Power supply 90VHT 1.5vLT

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V.H.F. Converter
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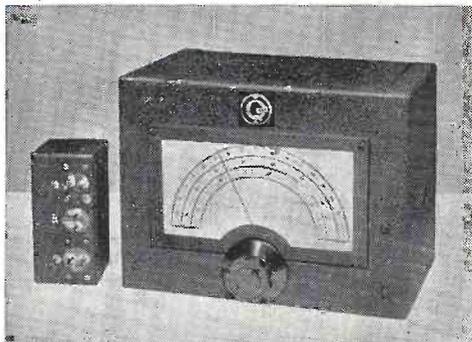
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