# The SHORT WAVE Magazine

1/6



EXCLUSIVELY FOR THE SHORT WAVE LISTENER EXPERIMENTER AND TRANSMITTING AMATEUR

VOL. IV No. 6 AUGUST 1946

# SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

Vol. IV. AUGUST 1946 No. 6

## CONTENTS



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**AUTHORS' MSS.**

***Articles submitted for Editorial consideration must be typed double-spaced with wide margins, on one side only of quarto sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and a figure quoted in the letter of acceptance. A large stamped addressed envelope should be enclosed for the return of MSS. not found suitable for publication.***

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*EDITORIAL*

# Independence

It falls to be recorded that in some quarters it is supposed that *The Short Wave Magazine* is not an entirely independent undertaking.

Let it be said, therefore, that the sole allegiance owed by this Magazine is to Amateur Radio, to which it is entirely devoted in all senses of the word. It is, in fact, the only public journal in this country which does devote all its space to the frequency bands allotted for amateur operation, as many readers have observed with approval.

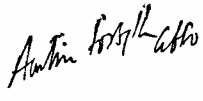
All our efforts are therefore concentrated in the cause of Amateur Radio, with which are bound up the advancement of the interests of the radio amateur and the continuing development of the art.

Though it may at times appear that the contrary is the case, in fact we are always concerned only with what we feel to be the ultimate interests of the readers of this Magazine. We lay claim to many years of labour and a considerable experience in the field of Amateur Radio, much of it long before this Magazine was born.

It is very much to the interests of the radio amateur that there should be in existence an independent publication of the character of this Magazine, if only for the reason that it is constantly the means of widening the field and enlarging the fold.

There is, of course, much yet to be done before we ourselves can feel that the Magazine has achieved all its objectives. Nor do we propose to weary readers with a recital of the practical difficulties which in these days surround anyone with independent ideas.

Suffice it to say that we of the Magazine will continue, from an entirely independent standpoint, to give untiring service to Amateur Radio and the cause of the radio amateur.



# Five Metres

## *G5BY/G8UZ Establish new Inter-G Record 256 Miles—European Activity Increasing—HB Contest August 25—G's Heard in Sweden.*

*By* **A. J. DEVON**

WITH many excellent reports on hand, let us plunge straight into the story. At 2251 BST on July 8, a new inter-G record was set up when G5BY(RST-559) worked G8UZ (RST-449) of Sutton-in-Ashfield, Notts ; this was followed by the " clincher " at 2228 on July 11, when G8UZ's CW was again 449 and 5BY's 'phone S6.

Though it takes two stations to make a contact, this achievement reflects particular credit on G8UZ, who is using very simple equipment : The transmitter is tritet CO-FD-FD, with an RK11 as power doubler, running at 50 mA 480 volts. His receiver is an O-V-1, and the aerial a copper-tube dipole with reflector—the whole sffair being only 20 ft. high. G8UZ spends all his time on 5 metres, if only for the reason that he cannot get poles for the erection of an aerial suitable for the other bands ! That his time is well spent and his results consistent is proved by the useful list of 58 mc DX worked which appears in "Calls Heard" in this issue.

### European DX

The band has again been open for European DX on several occasions during the month. Going back to June 24, the reception of several G's in Switzerland is reported in " Calls Heard" ; this was the day on which G5BY made the first G/FA contact on 58 mc, when he worked FA8B ; he says that listening to FA8B's 10-minute CQ was like waiting ten years !

It was on June 24, too, that the Lincolnshire team, G5BD and G5LL up in Mablethorpe, between them worked F3JB, I1AY, I1DA and I1HV, the time being 1730-1840. G5BD also heard F3MD in QSO with G3PO. The next day, June 25, G2MV worked FA8B at 2130 BST, getting RST-549.

On June 30, in the period 2000-2200 BST, SM5IB, SM5II, SM5SI and a Swedish listener in Enskede heard G2MC(S5), G5TX(S9), G6UH(S5) and G8RK(S5). A remarkable fact was that G5TX's 'phone was so strong that SM5IB and SM5II, half-a-mile apart and trying to make contact using indoor transceivers and rod aerials, had to QSY to avoid the G5TX interference ! Sporadic-E with a vengeance, but it's the way of European working practically every time.

SM5SI, who supplies this news *via* G5TX, will be on after August 15, with a 100-watt transmitter and superhet receiver, looking for G's. And while with the SM's, we also hear from one of our SWL correspondents, N. A. Phelps, of London, N.10, that SM6ID of Bohus-Bjorko is very active on 58 mc ; he has worked several OZ's, and he, too, is on the lookout for us.

OK1AA is on the band, and has been heard in this country—see the current "Calls Heard."

### Swiss VHF Tests

On July 14, many of the 58 mc G's put tone on their carriers and called HB for much of the day. The reason for this was that a buzz had gone round that the Swiss were listening for us. Actually, they were running a VHF field-day among themselves, and though they were of course on the watch, no G or other DX signals were heard. We are informed that inter-Swiss results were quite good in spite of the band failing to open for DX.

However, on Sunday, August 15, there will be another event of the same kind, when these HB's—1AT, 1BJ, 1CI, 1CO, 1EJ, 1FE, 1FI, 1FO, 1J, 1S, 9BQ, 9BZ, 9CX, 9DR and 9X, together with several Swiss listeners equipped for the band—will be on and hoping for G contacts.

The message from HB9T is "Please ask G's to call 'CQ Five' on CW after 1300 GMT on August 25." So there you are—and note the CW; the HB's are *not* using squish receivers.

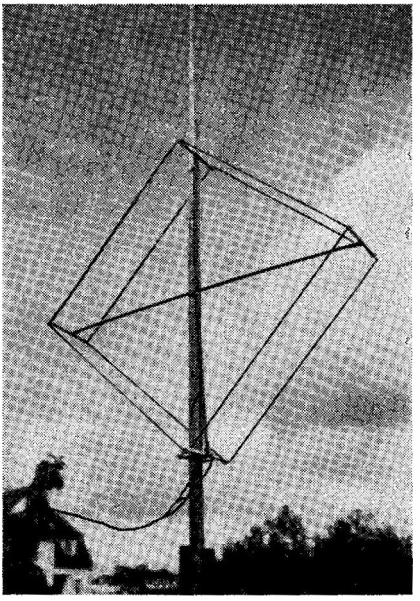
Still on the subject of European DX and the opening of the band, G5BY knocked off F3JB, F8BC and F8RSN, all in the South of France, during the period 1830-1930 BST on July 21; these were solid S9-both-ways 'phone contacts. F3JB also worked G2DN and G2ZV during this period.

### Marker Signals

In regard to indications of the band being open for DX, G6DH uses the fourth (57·6 mc) harmonic of GMR on 14·4 mc as his local indicator; the source of the GMR transmission is about 50 miles from Clacton, and G6DH finds this a very reliable guide to the state of the band.

By the same token, G5BD and G5LL follow the Italian commercial IRL on 59 mc. Another good check transmission is the high power North African broadcaster—"The Voice of America"—with harmonics between 56 and 57 mc. When the band is well open north-and-south, G6LK says this station is very strong, though often badly distorted.

G2ZV (Honiley) who used to be very keen on 5-metre work before the war and from whom we are pleased to hear again, suggests that a listening check on the beam approach transmissions in the 35-40 mc band should serve as a guide to conditions. These transmitters, located in various parts of the country, radiate a signal pattern which in a particular locality may be heard either as a string of dots, a series of dashes, or the letters "A" or "N." The point is that they are on continuously, so once found can be watched regularly.



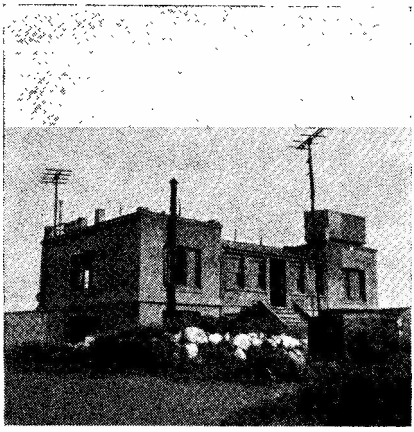
G2MV's square-beam aerial, lowered for inspection. *The elements between the cross-pieces are ½-wave for the frequency, and maximum directivity is broadside to the array.*

### Inter-G Working

Generally speaking, though patchy at times, conditions have remained good during the month for the over-100-mile G contacts. In fact, some outstanding achievements fall to be recorded.

G6LK and G5BY have now (July 21) had 52 contacts over the 156-mile path between Cranleigh and Bolberry, S. Devon, representing QSO's on 48 out of the 89 days since April 20, when they had their first contact; from June 6 to 26, they kept an unbroken schedule for 21 consecutive days! This sort of work is good.

We are glad to hear for the first time from G2BMZ (Torquay), who has also been doing extremely well with his tritet CO-FD-FD-FD-PA, using a 3.5 mc crystal with 6L6's in the first three stages, followed by an 807 doubler driving the T55 PA, running at 50 mA 500 volts. The receiver is a superhet, using 954 RF and three IF stages, with reaction on the first IF. G2MBZ's



**A general view of G5BY.** *The wires in the top foreground create some local noise, as they are part of the* 11,000*-volt grid system.*

aerial is an 8-element beam in two banks of four, spaced ½-wave apart, with only the top section driven, the bottom half being parasitic.

Though holding a post-war call, he has been specially licensed to operate 'phone on 58 mc. It sounds a fine outfit at G2BMZ, and is certainly giving him the results ; for instance, he has had 33 contacts with G6LK (134 miles). G2BMZ's log appears in "Calls Heard."

In a very interesting letter, G2XC (Portsmouth) remarks that July has been a record month for him, with some 37 stations QSO'd and six more—G2AK, G5DZ, G5LJ, G5RD, G6FO and G6YQ—heard but not yet worked; many of them, worked and heard, are DX. As we know, these results are after months of trying and much rebuilding on the aerial and receiver sides. G2XC now has a 3-element beam 22 ft. high which is going well for both transmission and reception For the receiver, he has redesigned the converter, which now uses 6AK5 RF, 954 mixer and 9002 oscillator, injection being in the suppressor of the 954. The 4 mc output is taken to an Eddystone ECR.

By July 8, G5BY had made 100 contacts over distances exceeding 150 miles, including eleven European and two African QSO's ; by July 11, he had made the 100th inter-G contact at distances over 150 miles.

### Up North

G6YQ (Liverpool) puts in a most useful report, covering 58 mc activities in Lancashire and North Wales. Among the stations now on is G4OS (Chester), who has worked I1TO and G5TX for good DX, and has heard F3JB, G2VG, G2XC, G2ZV, G4CI, G5BY, G5MA, G6LK and G6VX.

G3PD (Oldham) is coming into the news, he having worked G6VX and heard G5BY and G5MA. GW6OK (Colwyn Bay) and GW5YB (Bangor) are very active but suffer from the geography, being hemmed in on the coast by the Welsh mountains. However, GW5YB has succeeded in working G4OS, Snowdonia intervening, and GW6OK has been in contact with G3BY, Ashton-under-Lyne, who has an indoor 3-element rotary.

G6YQ himself is regularly heard down in the South of England, and has now had several QSO's with G's DX to him—notably G5BY, G5MA, G5TX and G6VX. He asks if we can arrange any co-operation for North Lancashire with EI and GI stations. So far as we know, GI6TK is the only station active on 58 mc in Northern Ireland. His schedule is given below.

### Schedules

There are several regular 58 mc schedules running now. We shall be very glad to hear of any others, not only for the sake of this record, but because they are obviously of great importance in keeping a check on conditions and helping to maintain activity.

Those schedules of which we know are the following :

G2XC (Portsmouth) and G6KB (Henley). 0800, 1730 and 2300 BST daily, except at week-ends. The path is 47 miles and 100 per cent. contact has been maintained so far.

G2MV (Coulsdon) and G6DH (Clacton). 0700, 0800, 0900 BST daily, regular contact being obtained

over the 70-mile path. G6DH also radiates automatic calls at 0800, 1300, 1830 and 2200 BST daily.

GI6TK (Belfast). Calling CQ on 58560 kc every Tuesday, Saturday and Sunday, 2130-2145 BST, with an aerial beamed on London. Schedules welcomed any day after 1700 BST, and all day on Sundays—QRAR.

**Conditions**

These early-morning and late-afternoon schedules lead us to G6DH'S comment that his observations show that suitable tropospheric conditions occur at many periods other than the late evenings which at present find favour with most operators. In particular, just now the early mornings often provide excellent conditions, and the proof of this is the very reliable link, already mentioned, between Clacton and Coulsdon.

**American Working**

The cat being out of the bag with the appearance of *QST* for July, we can say that the indefatigable G5BY has been banging away at the States for nearly two months, using a specially designed 51 mc beam for reception of the W's. They are intensely keen on the project and at least one automatic recording receiver is in operation. We can at least be sure the Americans are listening for us when conditions seem right.

On this subject, G6DH says : " . . . Contrary to the opinion held by some people, I do not consider there is any possibility of contact with USA under summer short-skip conditions. Normally, these conditions seldom produce more than single-hop contacts over distances between 500 and 1200 miles, and observations over the past few years on 28 mc or higher shows that suitable conditions do not occur during the summer. The only likely contact with U.S.A. would be by F2 layer bending during the peak periods of October-November and February. With low-angle beams, good locations and sensitive receivers, contacts might just be possible this coming autumn or winter . . . ."

Thus G6DH ; well, we shall see what happens.

**Activity List**

Several readers have asked for another Activity List, to bring those printed in April and May up to date. We have the material—thanks to the lists sent in by the more active stations on the band—but, unfortunately this month, not the space ; however, it is hoped to print our Third 58 mc Activity List here next month—unless the news tops the bill, as it has done this time.

**Reports**

Our thanks are due to the many readers from whom we have had 58 mc reports for this column. Their support and co-operation is as deeply appreciated as their complimentary references to its value.

On this latter point, perhaps we may be allowed to say (though we may be wrong) that it has been the consistent appearance, since 1938, of a regular feature article* in this *Magazine* covering 5-metre activity which has done more than anything else to mobilise the present interest in the band.

We look forward to another large mail for next month. Write or wire, A. J. Devon, c/o *The Short Wave Magazine*, 49 Victoria Street, London, S.W.1. (ABBey 2384), by August 20 *latest* with your news for the September issue.

(**A. J. Devon's first 5-metre news article was published in our issue for August*, 1938. *It has appeared regularly ever since, except during the war period, when the Magazine was necessarily quiescent.*—Ed.).

**LATE FLASH**

**Following a very hot day, the evening of July 23 was one of the best 58 mc periods so far experienced. Between 2045 ann 2345, G5BY had NINE DX inter-G contacts, all over 150 miles. G5BD/G5LL heard G5TX, G6DH and G2ZV, all " first time " DX.**

# High-Performance TRF Receiver

## *Using the EF-50 in a Straight Circuit*

By J. HUM (G5UM)

*(This is a design for a good straight receiver using the high-gain EF-50, which will be new to many readers, in all stages. A receiver built round these valves will give much better results than the same design using pre-war "standard" valves. There is still much to be said for the straight receiver if its signal frequency circuits can be made both sensitive and selective.—Ed.)*

TEN years ago few radio amateurs worthy of the name would have dreamed of buying and using commercially-made short-wave receivers in their stations. To-day exactly the opposite state of affairs seems to prevail.

Perhaps that is understandable. Ten years ago the TRF ("tuned radio frequency") receiver held sway. Then began the era of the manufactured superhet communications receiver. It achieved popularity largely because it was so much better than anything the average amateur could make—and it provided one knob, directly calibrated tuning, which made it the easiest thing in the world to master.

In passing, one might venture the opinion that the manufactured communications set had at least one unfortunate result—it removed much of the interest of Amateur Radio by discouraging people from building their own receivers.

"Superhet or straight" became a subject of discussion almost as interesting as "CW or 'phone"—though never as controversial, for there could be no questioning the advantage of the superhet over the average TRF receiver as built in pre-war years.

Nowadays, however, the TRF has good chances of a revival and for these reasons :

(*a*) First-grade superhet communications receivers are hard to obtain just now ;

(*b*) They cost far more than they did ;

(*c*) A TRF receiver can be built more quickly and needs far less in the way of tricky and tedious lining-up than does a home-built "super"—though the superhet design to be described in these pages in a few months' times may shed fresh light on those two bugbears of the amateur superhet builder.

(*d*) The advent of high-slope television-type pentodes—particularly some of those developed during the war—renders possible the construction of a TRF receiver having much higher gain than any that could be designed before the war.

Many constructors have tended in the past to stick to battery-type valves on account of their lower noise and hum level (and by the same token, lower signal level !). But the high-slope mains television pentode can be used in TRF designs nowadays at no increase in noise or hum level—and at a tremendous increase on signal level over anything ever known before in such designs. It is the purpose of this article to show how it can be turned to this use in an amateur-band receiver.

### The EF50

The valve that forms the basis of the design about to be described is the Mullard EF50 RF pentode, so widely used by the Services in wartime, and now becoming obtainable on the civilian market. It is perhaps one of the most ubiquitous valves ever developed, as will become apparent even from the modest but varied uses to which it is put in the present instance. Appreciable RF amplification can be obtained

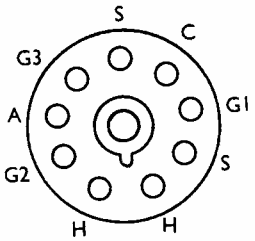



**Fig. 1. Base connections of the EF-50.** *H, H, heater, C cathode, G1 control grid, G2 screen grid, G3 suppressor grid, A anode, S valve screen.*

from it up to 150 mc, though the leaflets available from the manufacturers detail its characteristics at 50 mc. These leaflets (serial numbered 1340/1-15) give exceptionally complete information on its characteristics. Brief details of the valve are as follows :

| | |
|---|---|
| Heater | 6·3 volts at ·3 amp. |
| Max. anode volts | 300 |
| Max. screen volts | 300 |
| Slope | 6·5 mA/V |
| Dimensions | 77 millimetres long by 37 millimetres diameter. |
| Base | 9-pin pressed glass. |

In the EF50 the lead-out wires constitute the valve pins—a contributory factor to low self-capacity. The bulb is of glass but is totally enclosed in an aluminium can. The base connections are shown in Fig. 1. As is well known, the valve has beam-forming plates which enhance its low-noise properties.

Now, it is not proposed to give point-by-point constructional details on how to make a TRF receiver using this valve. The writer believes that the majority of amateurs today are sufficiently advanced in their technical knowledge to prefer to work out their own *mechanical* designs, provided they can be offered a good *electrical* design on which to build. The circuit diagram shown in Fig. 2 is that of an " all-EF50 " receiver which has been developed over the course of months. If closely adhered to electrically it will be found to be one of the most effective TRF designs anyone could want. Mechanically, most readers will prefer to use parts they have by them ; probably no two translations of this circuit into mechanical terms would end up by looking the same. A few points of mechanical design that enhance the performance will be mentioned as we go along.

The intention, then, is to analyse the circuit in detail, explaining its whys and wherefores.

### The Circuit Analysed

The circuit is so simple that the more obvious points about it hardly need mentioning here. The finer points require closer attention, however ; they determine whether this shall be " just another TRF receiver " or whether it shall approach superhet performance, as it can do if well built.

The first question readers will ask is : Why the choice of choke coupling on the RF side? The answer is that it greatly simplifies the business of ganging RF and detector tuning controls by allowing circuit constants to be made identical ; secondly, it greatly simplifies coil construction ; thirdly, the additional complexity of transformer coupling provides no extra gain. So why worry about it ?

Two important points must be observed with the system shown. The value of coupling condenser (C6) must be kept extremely small to provide good selectivity and to maintain detector grid loading at the same value as RF stage grid loading in the interests of accurate ganging. And the anode choke must be efficient on all bands to which the receiver will tune. An RF choke suitable for 10 metres will probably resonate on its fundamental on 160 metres ! Therefore two chokes are used in this position (and in the detector anode, too) ; one for the higher frequencies and one for the lower (see table for constructional data)

Another point common to both RF and detector anode circuits is the use of very complete decoupling. Here again provision is made for decoupling to function on all frequencies—the reactance of a condenser of fixed value could not be suitable at wide extremes of frequency. Large and small values are therefore used in parallel. The careful by-passing of heaters to earth

will also be observed—a precaution against modulation hum on higher frequencies.

Variable resistance R4 may perhaps be regarded as a refinement. After all, is an RF gain control really essential in a TRF set? In the writer's experience it most decidedly is, especially when plenty of microvolts are coming in from a big aerial, and overloading of the detector can more easily occur.

In the published data on the EF50 the value of RF stage cathode bias resistor R1 is given as 32 ohms. This is rather critical, and if that particular value cannot be obtained, 50 ohms will suffice—*but it should be no higher, nor should it be of a wirewound type.* It is by-passed for RF, as shown.

**The Detector**

Studying the detector stage in more detail we can anticipate three questions here. It is good practice to tap the RF output on to the top of the grid coil? Is the regeneration system the best that can be devised? And is triode connection as shown preferable to pentode connection? The answer to each is YES!

Remember that C6 is very small and the loading on the detector grid quite light. Remember that we want to keep our coil construction simple (4-pin type with no taps). Remember that we want to keep our gain, even at 30 mc, as high as possible. The connections as shown meet all these desiderata.

Now regeneration . . . well, you can ring the changes on this until the cows come home! Let us therefore eschew all systems except the good old-fashioned one illustrated. It is noiseless and smooth. What more is desired? (Go in for throttle control if you wish—it is merely a derivative of that shown.)

Triode connection . . . connect screen, suppressor and anode together as one large anode. The valve then acts as a medium impedance triode. Connect it as a pentode or SG and it will have an extremely high impedance which will be very difficult to match; the valve will probably be hopelessly unstable when set into oscillation, and reaction will be fierce and "ploppy." Reduction of screen volts will assist—but not until they have been dropped so low that the valve is almost useless as an RF pentode. Triode connection is docility itself!

Turning next to the audio stage, we may rather surprise readers by telling them that the EF50 can be used as an LF amplifier. The secret is to keep its screen at a slightly higher potential than the plate; it goes direct to HT positive, but the anode voltage varies up and down by reason of the signal fluctuations in the audio choke.

Observe the higher value of bias resistor required in the audio service as compared with the valve as used in RF applications.

The choke RFC5 is provided to avoid hand capacity effects at HF. A speaker can be connected in place of the headphones shown—*via* a suitable step-down transformer—and 200-300 milliwatts of audio can be obtained.

**General Points**

The EF50 itself—the heart of the set—being a good valve deserves a valve socket in keeping with its performance on high frequencies. A porcelain 9-pin socket is on the market and should be used in the RF and detector stages. A paxolin socket is adequate for the audio stage. It is of utmost importance in the interests of RF stability to earth not only the internal-screen pins marked "S" in Fig. 1 but to earth the spigot of the valve as well. A contact for this purpose is provided on the socket.

Equally important—in fact, probably the most important point of all in aiming at superhet performance with a TRF receiver—is not to be niggardly with the HT supply. The EF50 will take 300 volts or more on its plate without demur, and while this voltage is not proposed in the present design, the valves are not by any means underrun. In the writer's case a 250 volt pack is used, well separated from the receiver itself. The consumption totals 26 milliamperes.

With the large reserve of gain afforded by liberal operating voltages

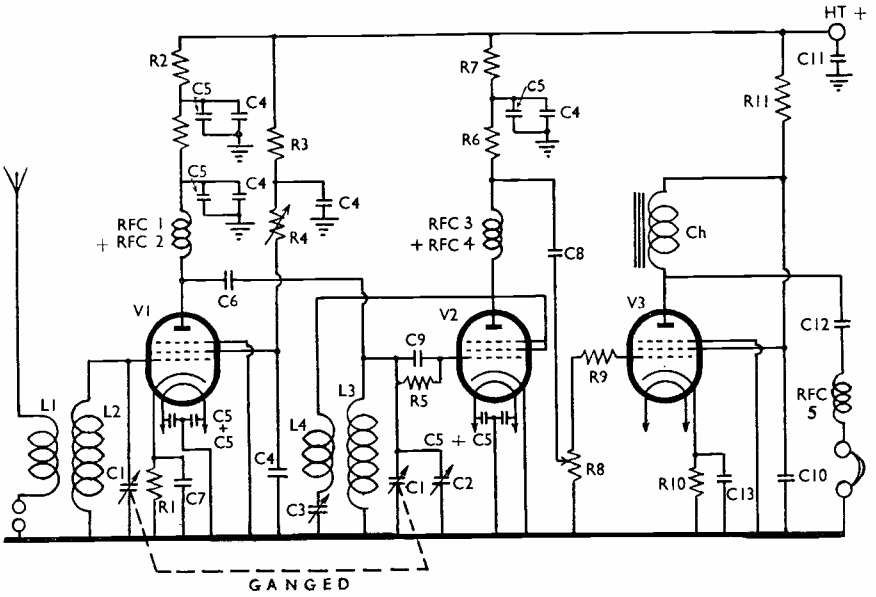



**Fig. 2. Circuit of G5UM's straight receiver, fully discussed in the text.** *The use of the high-gain EF-50's, in a standard circuit with some refinements, ensures much improved performance over a similar receiver using ordinary valves. The form of construction adopted i a matter of taste, but a metal chassis and cabinet are desirable. Note that all components having the same values are numbered similarly.*

the question may arise : why not use switched coils ? The answer is : why not !—but be prepared for some losses if you do. Best practice even in modern superhet design is to use separate coils (in a turret where cost is no consideration). Even more so in TRF design individual coils should be used.

In the present case plug-in coils are employed for the generally-accepted reason that they are less " lossy " than any other system ; but another feature must be mentioned in this respect. It is that the two coils for each band are wound to have exactly the same inductance. Identical lengths of wire were cut off first and wound close-spaced on identical formers. The aim was to achieve such a similarity of inductance values that the gang condenser would remain accurately tracked without recourse to trimming. This postulated identical values of stray capacity in both RF and detector stages. More " cutting to length " was involved here ; in other words, the " hot " leads to the gang condenser from RF and from detector valves are exactly the same length, and at the same distance from chassis and other " capacity-making " obstructions. Success attended these efforts, so much so that the RF stage and the detector stage coils can be interchanged with no alteration in the calibration of the bandset scale. Needless to say, coils that will retain such accuracy must be rigidly built and turns shellac-ed permanently into position.

Coils are wound on 1¼ in. formers, L1 and L4 at the " earthy " ends in each case.

**Band-Spreading**

The omission of band-spreading of the RF tuning will be observed. Experience showed that the slight extra complication and expense of providing it were not justified. Even at the extremes of the travel of the detector band-spread condenser no appreciable drop in gain is evident through theoretical variations of tracking. Incidentally, to spread the 28-30 mc

band over 120 degrees of a 180-degree "Utility" scale a 25 $\mu\mu$F fixed condenser was connected in series with the detector band spreader. On 1·8 mc of course, the band-set condenser is used for main tuning.

**Performance**

As has already been suggested, the EF50 audio stage will deliver enough power to operate a speaker to full volume. With an output stage after it the results sound "just like a superhet"! American stations using 10 to 20 watts have been worked, as has a West African using *three* watts input (all on 10 metres CW). This perhaps proves nothing; good aerials may have done the trick.

But the fact remains that for the man who wants a lively set mainly for headphone work, and costing but a few pounds to make, then this "All-EF50 TRF Receiver" will be found simple, reliable and most effective.

**COIL DATA**

| Frequency Coverage | L1 | L2 | L3 | L4 | SWG Gauge |
|---|---|---|---|---|---|
| 15-32 Mc/s .. | 2½ | 3 | 3 | 2 | 18 |
| 7-15 Mc/s .. | 3 | 6 | 6 | 3 | 18 |
| 3-8 Mc/s .. | 10 | 20 | 20 | 10 | 30 |
| 1·6-3 Mc/s .. | 10 | 45 | 45 | 10 | 30 |

***Note:—All coils close wound on 1½ in. formers, ¼ in. between windings.***

**Table of Values**

C1 = 150 $\mu\mu$F variable gang bandsetter.
C2 = 20 $\mu\mu$F variable bandspread.
C3 = 75 $\mu\mu$F variable regeneration.
C4 = ·05 $\mu$F decoupling.
C5 = ·001 $\mu$F decoupling.
C6 = 20 $\mu\mu$F coupling RF to detector.
C7 = ·001 $\mu$F cathode by-pass.
C8 = ·25 $\mu$F coupling detector to audio.
C9 = 100 $\mu\mu$F grid condenser.
C10 = ·25 $\mu$F screen decoupling.
C11 = 2 $\mu$F HT decoupling.
C12 = ·04 $\mu$F audio output condenser.
C13 = 25 $\mu$F audio by-pass electrolytic condenser.
R1 = 32 ohm RF cathode bias resistor.
R2 = 10,000 ohm RF anode decoupling.
R3 = 50,000 ohm RF screen decoupling.
R4 = 50,000 ohm gain control.
R5 = 2 megohm detector grid leak.
R6 = 25,000 ohm detector anode load.
R7 = 50,000 ohm detector anode decoupling.
R8 = ·5 megohm audio gain control.
R9 = 5,000 ohm audio grid stopper.
R10 = 300 ohm audio cathode bias.
R11 = 10,000 ohm audio anode decoupling.
RFC1 + RFC2, RFC3 + RFC4 = Short-wave choke in series with 200 turns scramble wound on IMO resistor or similar suitable former about ¼ in. diameter.
RFC5 = as RFC2, 4.
Ch. = small audio choke, value not critical.

# Modulating the Carrier

## *Circuits, Values and Practical Data on Several Methods*

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

*(The first part of this article appeared in our July issue.—Ed.)*

WE left off last month at the point where an anode modulation system had been agreed upon, the next phase being the correct choice of valves to suit the transmitter. From the practical point of view, there is always a wide choice here. If the reader has just built a new station, complete for CW, and is starting from scratch with the modulation gear, then the course is fairly straightforward ; he can buy two suitable valves for a Class-B modulator, and transformers to match.

If, however, he is in the position in which the writer found himself—with a station full of gear, none of which was really suitable, but all of which could be made to work—then he is in for an amusing but rather troublesome time. Actually G6QB ended up with a pair of very ancient DET1's in parallel as a Class-A modulator, chiefly for the reason that it was decided to use up everything before going out to the shops and buying any parts whatever. Not everyone will feel inclined to do this, but there is a certain amount of satisfaction in making odd bits of equipment work, and, after all, most of us have an experimental bent in some way or another.

It has already been agreed that, in round figures, the speech output from the modulator must represent 50 per cent. of the power supplied to the PA. Thus, for the common and very efficient arrangement of push-pull KT8's or 807's, with 100 watts input, we have to find 50 watts of audio. This can be produced readily by two more KT8's in Class-B, or by four 6L6's in Class-B, or by a single 35T in Class-A. The last suggestion is interesting, because many amateurs have left over from pre-war days a PA using a 35T or a T55, now discarded in favour of the more easily-driven tetrodes. Two PT15's in Class-B make another fine combination, but they are really more suitable for suppressor-grid modulation, which is mentioned later.

A Class-A modulation circuit was shown in Fig. 2 on page 287 (July). This, as it stands, is the ideal arrangement for using a valve like the 35T as modulator, with a pair of KT8's as the PA. The whole rig can be run from a 1,000-volt power pack, the 35T receiving the full 1,000 volts, and the supply to the 807's being dropped to 600. At the latter figure they should take about 150 mA between them, so that a dropping resistor of 2,500-3,000 ohms will be required. This represents the writer's own set-up, except for the fact that the two aged DET1's already mentioned have been substituted for the 35T.

### Class-B Working

When Class-B modulators are used, the only practical difference is that the dropping-resistance technique is no longer practicable ; the choke must be discarded and a properly designed matching transformer used instead. Many multi-ratio modulation transformers are available, and the taps must be so adjusted—to cover the specific case already mentioned—in that the primary (centre-tapped) matches the impedance of two KT8's in Class-B, and the secondary looks like the impedance of two KT8's in push-pull as a PA. This particular case seems like an ideal arrangement for a 100-watt station ;

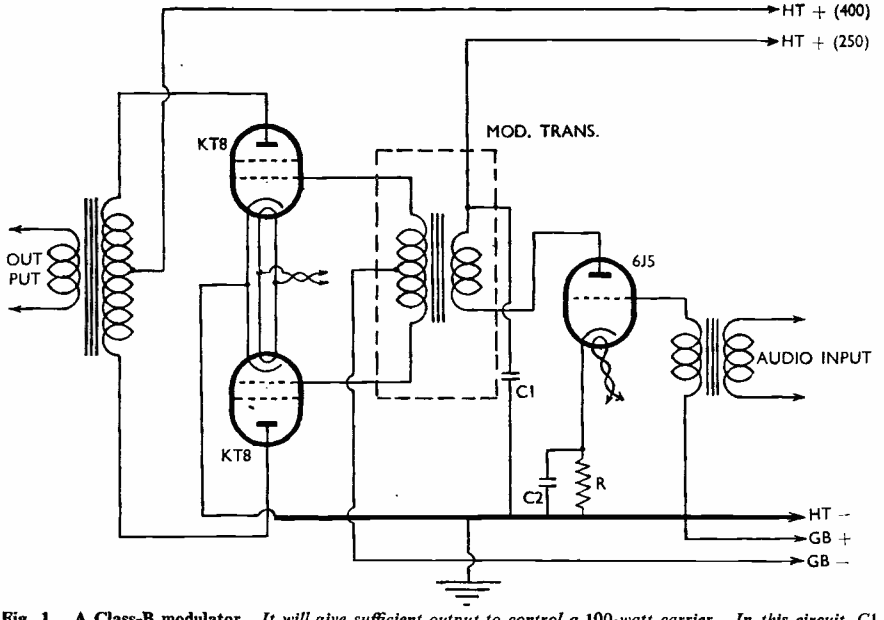



**Fig. 1. A Class-B modulator.** *It will give sufficient output to control a* 100*-watt carrier. In this circuit, C*1 *can be* 4 *μF, C*2 8 *μF, and R* 1,000 *ohms. The screen connection should be made by strapping them together, by-passing to earth with a* 8*μF* 400*-volt DC working condenser, and feeding through a* 2000*-ohm* 10*-watt resistor connected to the HT positive line.*

the manufacturer's figures for the Class-B modulator, given below, show that nothing very ambitious in the way of microphone amplifiers or power-packs is necessary.

| | |
|---|---|
| Anode volts : | 400 |
| Grid volts : | −25 |
| Load resistance : | 3,200 ohms |
| Driving power : | 0·2 watts |
| Power output : | 55 watts |

Fig. 1 shows the ciruit of a typical Class-B modulator. All that is necessary in front of the driver is one more stage with a good carbon microphone, or a suitable two- or three-stage speech amplifier with a crystal microphone. And there is no suggestion of a "make-shift" system about it ; build yourself a modulator on these lines and you will have equipment that is as good as anything you could possibly devise for modulating your 100 watts of CW. It would have been good in 1935, but it is equally good now.

The foregoing has been, intentionally, in the nature of propaganda in favour of anode or plate modulation. Many amateurs tend to shy away from it as if it were expensive, complicated, cumbersome and altogether beyond their reach. This is quite wrong ; it is the simplest system of all to operate, can be relied on to give excellent results, and, as you will have seen, need not run up a large bill. Obviously, though, the other systems have their claims, and we will now consider some of them.

### Suppressor-Grid Control

One of the most useful, most simple and most successful is suppressor-grid modulation. Its only restriction is that you must use pentodes. And nowadays very few people do. If, however, you have a pair of PT15's, or even a single one, you can not only build a very nice PA stage, and your modulation is practically done for you.

In a pentode PA, given a certain anode voltage and a certain amount of RF drive, the output may be controlled by varying the voltage on the suppressor grid. Further, a slight variation in voltage causes a large variation in

output, and thus it is an economical system of modulation. Your PA will normally run, under CW conditions, with the suppressor earthed or even slightly positive; for modulation purposes the DC condition of the suppressor grid must be negative. It must be such, in fact, that the anode current is reduced to half its normal value. The audio input is then applied in series with the suppressor grid bias. As a general rule it may be stated that a 100-watt PA will require only about 5 watts of audio input to the suppressor grid or grids.

The chief drawback to suppressor-grid modulation is that the normal CW carrier has to be reduced in power before modulation can be effected; in other words one has to be content with a state of "100 watts CW but 50 watts 'phone" or else use bigger valves than are really necessary for CW operation, keeping their suppressors negative all the time.

**Grid Modulation**

This disadvantage is even more apparent when we come to systems of grid modulation. Obviously a driven PA can be modulated by varying its grid-bias; and obviously this will require a very small amount of audio power; but the rub is that the RF power output is also much less. For one thing, the normal DC condition of the PA grid cannot be more than about 50 per cent. beyond cut-off; then, with the application of modulation, the drive must be cut down until the aerial current is half its previous value. By the time all adjustments have been correctly carried out, for a given valve, the carrier power available is only about a quarter of the power obtainable with the same valve and anode modulation. May we save time by suggesting that this is a powerful argument against the use of grid modulation? Why should one either reduce the available output to a quarter, or use

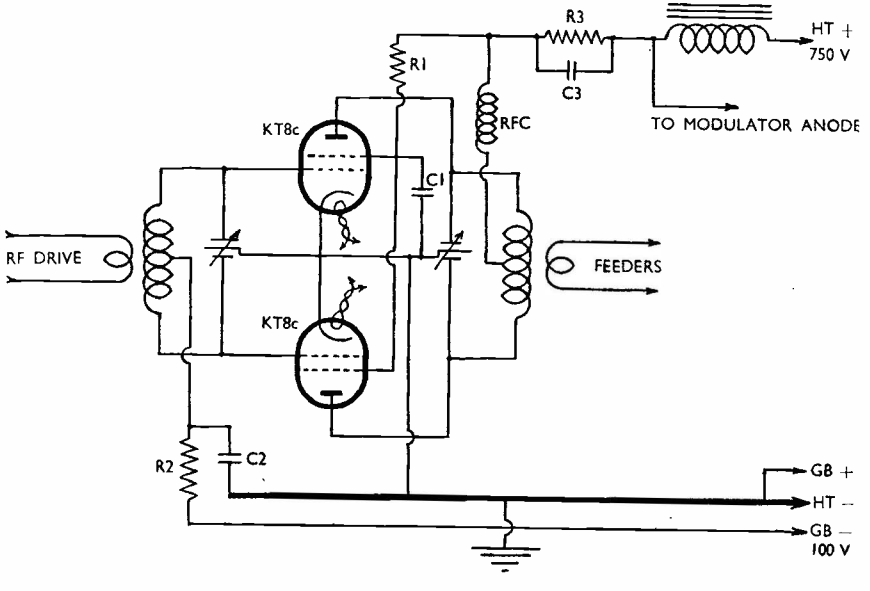



**Fig. 2. Plate-and-screen modulation of a pair of tetrodes (KT8c's or 807's) in Class-C push-pull.** *Under the circuit conditions given, they will require about 10 mA drive. Values are: R1, 30,000 ohms, 3 watt; R2, 25,000 ohms, 2 watt; R3, 1,000 ohms, 40 watt; C1, ·001 μF, 600-volt DC working; C2, ·002 μF, 250-volt DC working; C3, 8 μF, 250-volt DC working.*

a much bigger PA valve than one otherwise would, just in order to save a valve or two in the audio equipment? It always has seemed crazy to the writer, and after thinking over how to present this in print it seems even more so!

### Anode-and-Screen Control

And now back to a variant of anode modulation. We have been calling it that, and yet referring to the PA as a pair of 807's or something similar. True anode modulation is applicable only to triodes. With the modern tetrode it is necessary to modulate both the anode and the screen. There is nothing difficult about this, but many unsuspecting operators have been caught out by it. The point is that the screen must be fed from the same supply as the anode; and this *must* be done by a dropping resistance and not by a potential divider. Having got as far as this, we have to add—" and it must not be by-passed to earth by several microfarads "! This is a very obvious statement, but, believe it or not, this well-known catch has led many amateurs a long way up the garden.

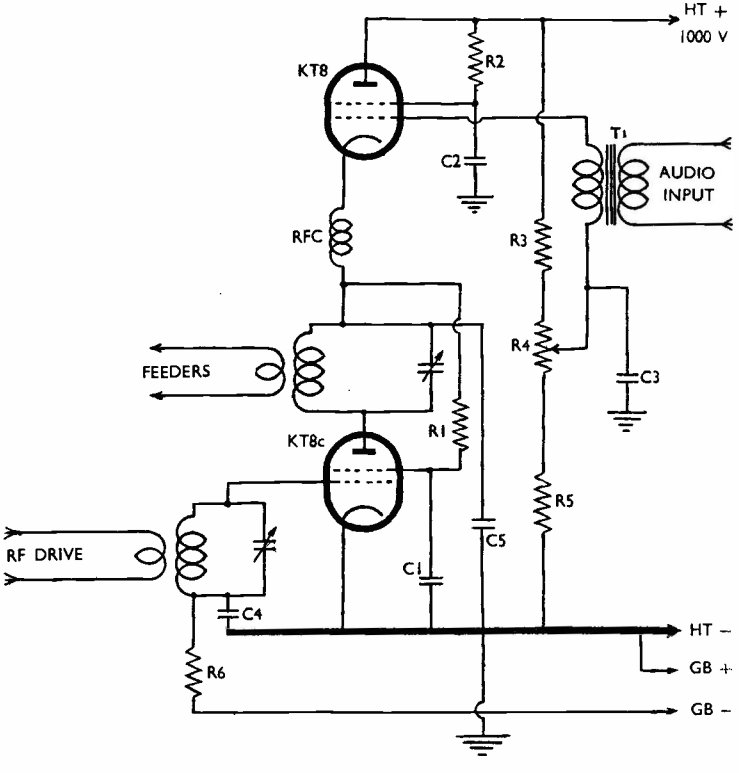



**Fig. 3. Circuit for series modulation, using two similar tetrodes—KT8 as modulator (above) and KT8c as RF amplifier (below).** *The modulator derives its bias (R4 control) from the resistor chain across the HT supply. Though this looks wrong, it works because the voltage drop across the modulator can be less than the voltage along R4; hence, the cathode of the modulator becomes positive with respect to its grid by a value which depends upon the setting of R4. This adjustment, together with that of the PA bias, makes it possible to find the correct ratio of power inputs to modulator and PA. Values are: R1-R5 inclusive, 30,000 ohms, 3 watt; R6, 25,000 ohms, 2 watt; C1, C2, C5, ·001 μF, 600-volt DC working; C3, 8 μF, 600-volt DC working; C4, ·001 μF, 250-volt DC working.*

Fig. 2 shows a layout for anode-and-screen modulation which is suitable for 807's (KT8's) in push-pull. The normal Class-C condition of the PA for CW will generally be suitable for telephony also, although it will sometimes be found that a slightly lower grid drive than that normally used for telephony will give peak efficiency for CW. In the writer's own transmitter it is found that push-pull KT8's require 7 mA grid drive for CW operation and 10 mA for telephony. With an 813, however, a standard figure of 5 mA drive is suitable for both.

Anode-and-screen modulation may be regarded as anode modulation in practically every way ; that is to say, the modulator may be a triode, or a pair of tetrodes in Class-B ; the coupling may be by transformer or choke ; and the same remarks about power ratios apply.

**Series Modulation**

There is another form of modulation well worthy of comment, although it is very little used by amateurs. This is series modulation. There are certain reasons why its popularity should increase.

Instead of applying modulation to the anode of a valve through a transformer or a choke, the entire modulator may be placed in series with the HT supply to the PA (Fig. 3).

***'PHONE/CW AREAS***

***Help rationalise the use of the 7 and 14 mc bands by keeping 'phone in the 7,200-7,300 kc and 14,200-14,300 kc areas. New 3-letter G's and CW operators, please choose your crystals to give working points in the 7,150-7,200 kc and 14,100-14,200 kc areas.***

The main reason why this might be used more extensively is the modern tendency for PA stages to use higher current and lower voltage than they did ten years ago. In 1936 the writer was using 100 watts to a PA with 1,250 volts and 80 mA. To-day the 100 watts comes from something more like 500 volts and 200 mA. What, then, could be better than to use a 1,000-volt power pack across the modulator and the PA in series ? This applies especially to those amateurs who have such power-packs left over from pre-war days, but use KT8's or similar valves which do not require more than 500 volts.

Our combination of four KT8's can be handled beautifully in this way, with two in parallel as modulator and two in push-pull as PA. The only vital point to remember is that if one uses the PA as the cathode load for the modulator, as in Fig. 3, the modulation equipment will be " up in the air " with regard to the true earth, although the use of a good transformer T1, insulated for high voltages, will obviate this.

In such a system it is of course not possible to arrange for the modulator to work at a higher anode *current* than the PA—since the two are in series—so the method is to adjust bias, drive and loading on the PA and the modulator until it is operating at a higher *voltage* than the PA. In an experimental rig of the writer's, the KT8 modulator worked with 600 volts across it and the KT8 PA with 400. This gave 100 per cent. modulation and was very easy to adjust once one had the feel of it. It is being built up into a more permanent form and will, it is hoped, be described in detail later.

There are many other systems of modulation, but those described are the most practical and important from the amateur point of view. This article was meant to be of assistance to the beginner rather than the experimenter in audio systems. It is hoped that it has fulfilled its purpose and cleared up a few practical points.

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**AMATEUR-BAND SUPERHET**

On page 243 of the June issue, we threatened to produce, " about August," a design for a home-built amateur-band communications receiver. Though the prototype is built up and working, it will be some time yet before the design can be published, due to the difficulty (the old one) of finding certain necessary components which are in reasonably good supply.

When this has been done, the rough-up job will be rebuilt and we shall then be able to prepare the constructional articles covering the design in all its details.

# Multi-Band Aerial System

## *A Coupler for the 1·8-28 mc Range*

*(This design was first published in the Magazine in February,* 1939. *It works very well, and is reprinted here as the result of many requests for details of a suitable all-band radiating system.—Ed.)*

THE subject of aerials is a never-ending problem for the amateur transmitter. Whether it is an attempt to improve results, overcome some local difficulty, or just the fascination of "trying a new aerial," there is always something to be said or written or done in connection with that outside circuit on which at least 75 per cent. of our reliance must be placed.

A particular problem is the multi-band aerial—something which will do well on several of our frequencies without a lot of matching and stubbing and tuning being necessary. Most of us know the usual methods of getting out on one or two bands, and there is very little difficulty about feeding a doublet on one frequency. But it is quite another matter to evolve a system which radiates reasonably well on frequencies lower than the fundamental, as for instance, 1·8 mc when less than 100 ft. of wire can be erected. So far as 1·8 mc is concerned, the secret is an aerial-counterpoise system, worked Marconi fashion, with as much wire out as possible. This has been axiomatic amongst 1·8 mc operators for many years.

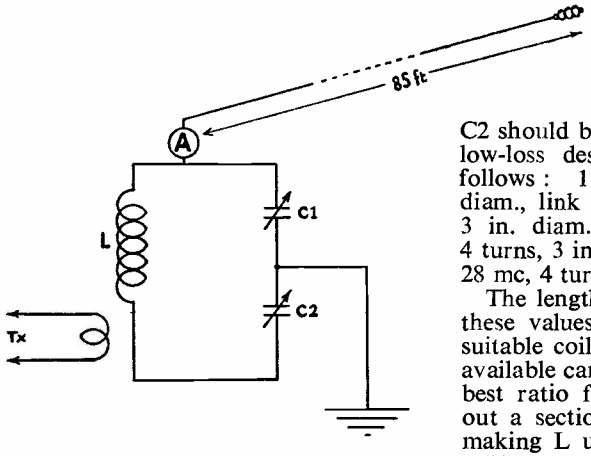
### The Matched End-on

Counterpoises not always being practicable, and the problem still being a multi-band aerial operated as conveniently as possible, look at the diagram, which is a slight modification of the well-known Collins coupler.

The coil L is linked to the transmitter output tank and tuned with the two condensers C1 and C2, which are earthed at their mid-point, operation being as follows : With the link at the transmitter end disconnected, the output stage is tuned to dead resonance in the usual way. With C1 and C2 at minimum capacity, the link is then put on and C1 gradually rotated towards maximum till the plate current begins to rise. As it comes up, C2 is adjusted to keep the circuit in resonance, i.e., minimum obtainable plate mA. Suppose PA plate current at dead resonance is 12 mA. On moving C1 it is pulled up to 35 mA ; then by resonating with C2 it can probably be brought back go about 25 mA (on these figures). The process is continued till the normal loading of the PA is obtained, C1 being used to "draw," and C2 to "resonate." The degree of loading is thus controllable within very wide limits. A little preliminary experimental work with the links at transmitter and aerial tuner ends is desirable to ensure that there is enough coupling to allow the tuner to draw fully from the PA tank.

Of course the usual precautions against overloading must be taken. The amount of draw should not be such as to "kill" the RF in the tank ; the setting for highest output is where the RF as indicated by a loop-lamp or neon held near L is at maximum. If this is over the required input, either the links can be backed off or condensers C1 and C2 adjusted for lighter loading. It does not matter which, so long as resonance is maintained.

All the adjustments are made with the aerial on. Opening the aerial switch after tuning will cause a large change in plate current—whether it is positive or negative depends upon the settings of C1 and C2 in relation to one another and the PA tank, and has no bearing on the operation of the




**The Matched End-On aerial coupler.** *C1, C2, should be ·0005 μF for all-band operation 1·8-28 mc, or ·0002 μF for 7 mc upwards. The system will also take power very effectively on 58 mc with smaller condensers and careful adjustment. Coil details are given in the text. A is an aerial ammeter, either hot-wire or thermo-couple ; a 5- or 6-volt bulb taking about 1 amp. will do if a meter is not available.*

system, since disconnecting the aerial puts the whole circuit out of tune. But the point is that there should be a change of plate current when the aerial is switched out—showing that it is taking load. Also, after having tuned the aerial side, it should be found that the PA tank condenser is still at dead resonance ; that is, it ought not to be possible to reduce plate current any further on the tank side.

The theory of this system is simply that the circuit C1-C2-L can be made to match, within reason, any wire to any frequency. Our own tests show that there is a certain amount of magic in the length of 85 ft. Hundred-foot aerials do not take well to the higher frequencies like 14 and 28 mc, and 60-70 ft. wires are difficult to load up on 1·8 mc.

### Values

The fact remains, however, that if one can get up 85 feet of wire and use it with this matching circuit, effective radiation can be obtained on all bands 1·8 to 28 mc. As to values, if the former range is required, C1 and C2 should be ·0005 μF and of a good low-loss design, and the coil L as follows : 1·8 mc, 24 turns, 4 in. diam., link 5 turns ; 7 mc, 7 turns, 3 in. diam., link 2 turns ; 14 mc, 4 turns, 3 in. diam, link 2 turns ; and 28 mc, 4 turns, 2 in. diam, link 1 turn.

The length of the earth lead affects these values to some extent, so that suitable coils which may happen to be available can be used to determine the best ratio for any band by shorting out a section turn by turn and then making L up accordingly.

Since the system works by adding sufficient inductance to the aerial to make it quarter-wave, half-wave, three-half-wave, full-wave or five-half-wave, it follows that the ammeter A will show different readings from band to band, since its electrical position will alter considerably. That these readings are high, low or different is no indication whatever of the radiating efficiency of the aerial and should only be used as a guide when coming back to a particular band from time to time.

It is also of sufficient interest to add that the Collins Company, manufacturers of the well-known American commercial transmitters, adapt this coupler to their designs in such a way that the matching system C1-C2-L becomes also the tank of the final stage.

★ ★ ★

### PIRACY—GPO ACTION

We are glad to see that things are moving in this matter of tracking down pirates, the GPO having recently obtained a conviction in Manchester. The offender was using an ex-R.A.F. T.1154, and it seems that the GPO spent nine days in obtaining the necessary evidence. Their representative stated in Court that other prosecutions are to follow.

The newspaper report also states that the Post Office explained that there is no law against the sale of these sets, though it is illegal to use them without a licence.

# Two Valve Job for 160 Metres

**Discussing a Simple CO-PA for 1·8 mc.**

*By* **E. R. WESTLAKE (G6KR)**

The objects in view when designing this transmitter were an economy of components, together with reliability in performance ; its main function is the radiation of signals in the 1·8 mc band.

The transmitter was originally built in a small steel cabinet, with a view to portable work, but as the results obtained on the air were so encouraging, it was remade and now occupies a shelf on the rack.

### Circuit

The circuit consists of a Pierce oscillator, capacity coupled to a small PA. The LT and HT supplies are provided by a transformer giving 350 volts at 70 mA. Suitable valves were on hand in the Tungsram APP4C and a Mullard PZO5/15, both of which are specially made for RF work. As an oscillator the APP4C is excellent and will normally take an anode input of about 7 watts, but as this figure is not necessary to drive the PZO5/15, the HT supply to the CO is cut down to a much lower wattage. This incidentally is all to the good as the CO electrodes are thereby not put under any undue strain. The coupling capacity between the two stages was a matter of experiment and the value given for C4 seems to meet the requirements in the way of drive. A well insulated variable condenser would probably give a measure of drive control, and could of course be incorporated in the transmitter. The anode coil L and its tuning condenser C5 are normal for 1·8 mc, the coil consisting of 30 turns of 16 SWG enamelled copper wire, close wound, of 3 in. diam. The tuning capacity is ·0002 $\mu$F and as the voltage is not high an ordinary receiver type of condenser serves quite well ; but caution should be exercised in selecting one having vanes not too closely meshed.

### Screening

The PA valve is one of the beamed RF tetrode variety and as such it well repays to screen the plate circuit components

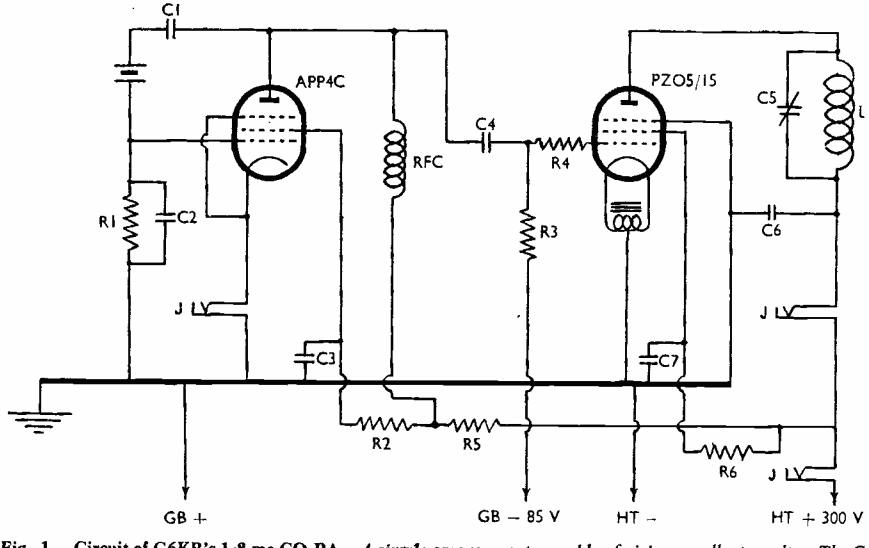



**Fig. 1. Circuit of G6KR's 1·8 mc CO-PA.** *A simple arrangement, capable of giving excellent results. The CO is a Pierce oscillator. The PZO5/15 PA is a filament-type valve ; its cathode return can be made at the heater winding centre-tap.*

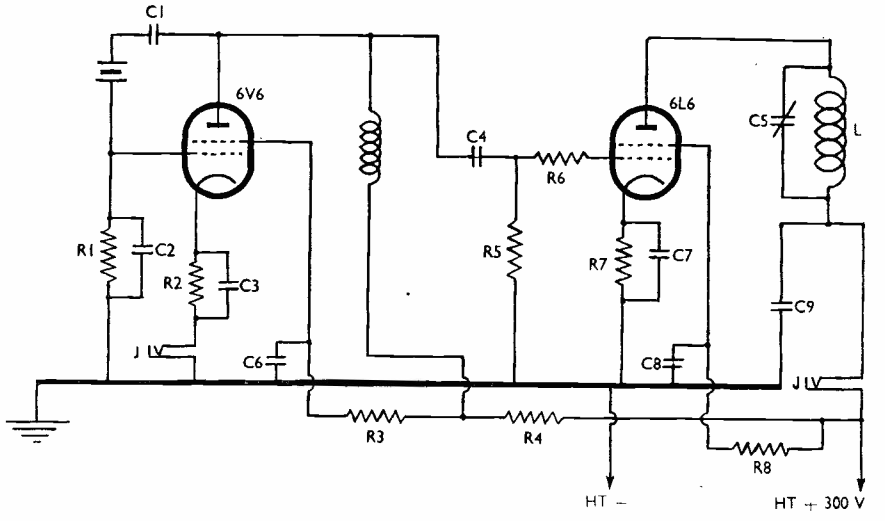



Fig. 2. The same circuit adpted for the use of the commoner 6V6 and 6L6 types in the CO and PA positions. *All values for both circuits are given in the table.*

### Table of Values

*Circuit Fig.* 1

C1 = ·001 μF,
C2 = ·0005 μF,
C3, C6, C7 = ·0005 μF,
C4 = ·0001 μF,
C5 = ·0002 μF.
R1 = 40,000 ohm, ½-watt,
R2 = 35, 000 ohm, 1 watt,
R3, R6 = 10,000 ohm, 1 watt,
R4 = 100 ohm, ½-watt,
R5 = 5,000 ohm, 5 watt.

*Circuit Fig.* 2

C1 = ·001 μF,
C2 = ·0005 μF,
C3, C6,
C7, C8, C9 = ·005 μF,
C4 = ·0001 μF,
C5 = ·0002 μF.
R1 = 50,000 ohm, ½-watt,
R2 = 800 ohm, ½-watt,
R3 = 75,000 ohm, 1 watt,
R4 = 7,500 ohm, 5 watt,
R5 = 15,000 ohm, 1 watt,
R6 = 100 ohm, ½-watt,
R7 = 250 ohm, 5 watt,
R8 = 5,000 ohm, 1 watt.

***Note :—Values for the output inductance L and a possible aerial coupler are given in the text.***

adequately from those of the rest of the transmitter. This is accomplished by passing the valve through an aluminium shield erected vertically across the shelf, the hole through the shield being sufficiently large to enable the valve to go through easily. The ideal at which to aim here is to prevent the anode and its associated coil and condenser from " seeing " any of the remainder of the components. Neutralising has not been found necessary, and by providing suitable coils, it is possible to tune the PA as a doubler.

HT and LT are separately switched, which is useful in that the filaments can be warmed up before the application of HT. Close-circuit jacks are inserted at all points where metering is likely to be of service, and keying is carried out in the jack connected in the CO cathode return lead. With the key up the transmitter is dead, and break-in becomes quite an easy matter.

### Operation

Tuning the transmitter is simplicity itself, for, with the HT switched on and the key depressed, it only remains to tune the PA plate circuit C5/L to resonance with the crystal. This can be carried out by means of a milliammeter or by calling in the aid of the ever-useful loop lamp. In the case of the meter, resonance is indicated by the lowest reading, whereas if the bulb is used, greatest brilliancy is the

required tuning point. It will be observed from the diagram that a combination of leak and battery is utilised for bias.

**Aerial Coupling**

The aerial in use with this transmitter is a Marconi 133 feet long, with a right angle bend half-way along its length ; the lead-in is joined to a coupling coil having a similar overall diameter and winding as that of the anode coil, but with only 18 turns. A ·00035 $\mu$F variable condenser inserted between the bottom end of the coupling coil and earth completes the equipment.

To load the aerial, the coupling coil is brought alongside the previously tuned anode coil, the distance between the two coils being, say, one inch. An RF thermo-coupled aerial ammeter is useful at this juncture, but is not essential as the ubiquitous bulb-cum-loop can be called in again. The loop is held alongside the coupling coil and the condenser in the earth lead is varied until the bulb lights up ; greatest brilliancy is an indication of correct aerial loading.

If it is desired to use link coupling between the tank coil and that of the aerial, 4 turns round each of these will be found about right. The PA link should normally be at the cold end of its coil, whilst the aerial coil link can be adjusted to obtain the required " draw."

**Alternative Valves**

For those who may have other valves available, such as the 6V6 or 6L6 and types with 6·3 volt heater windings, the circuit of Fig. 2 will give comparable results. Both arrangements are recommended, and not a few transmitters of this type are now being built in the writer's locality.

In using the Pierce oscillator do not be tempted to apply a high voltage to the valve, for apart from the fact that a high drive is not necessary, the crystal is, in this circuit, under a heavy strain and although a low voltage will not have any ill effects, the application of high power may possibly fracture the crystal.

## THE DECIBEL

A difference of one decibel (dB) is defined as the smallest difference in sound level that can be detected by the human ear ; or, in other words, the power ratio required to make a just noticeable change in *loudness* without regard to power level. Detectable differences are about 25 per cent., so far as the human ear is concerned.

The reference level is O dB ; hence, to increase the loudness by 25 per cent., the power ratio would be 1·26 ; another 25 per cent. increase would involve a power ratio of 1·6, raising the *sound* level 2 dB above zero, and so on.

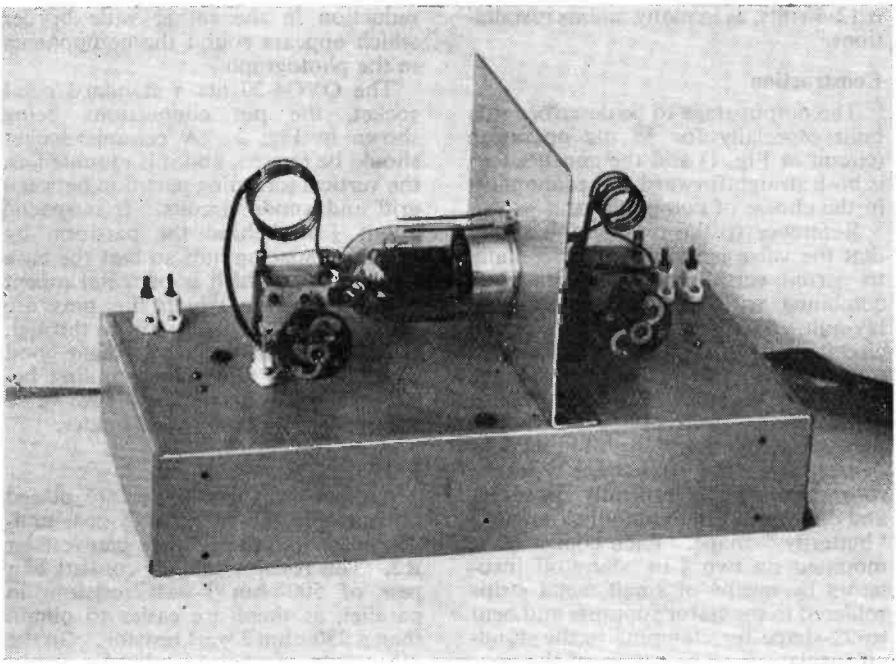
All this has nothing whatever to do with *intensity* ; for at the reference level of 0 dB and with, say, one watt in the speaker, you with your head right in it will get a louder signal than someone trying to listen in the next room. But increase the audio input to the speaker to 1·26 watts, and you will both notice a *change* in sound level which will correspond to this 1 dB.

The whole thing is simplified by the following table, which relates dB gain to changes in power ratio.

This table means just what it says ; if your 28 mc beam gives you a gain of, say, 4 dB, when compared with a plain aerial fed from a transmitter putting 50 watts into the aerial, then—using that same transmitter to feed the beam—you have as good as increased your transmitter power to 125 watts when comparing results with the plain aerial.

| *Power Ratio* | *dB Gain* |
|---|---|
| 1 | 0 |
| 1·6 | 2 |
| 2·0 | 3 |
| 2·5 | 4 |
| 4·0 | 6 |
| 6·3 | 8 |
| 10 | 10 |
| 16 | 12 |
| 40 | 16 |
| 100 | 20 |
| 1,000 | 30 |
| 10,000 | 40 |
| 100,000 | 50 |
| 1,000,000 | 60 |

The S-meter on a communications receiver is usually calibrated in steps of 6 dB, S9 corresponding to 54 dB, which by itself means nothing. But if you should be so unfortunate as to be QSO with G9BF any time, and he is lucky enough to be able to make an adjustment increasing his carrier level from S5 to S7—a most unlikely event—it would mean that he had succeeded in doing something which as good as gave you a 12 dB gain, corresponding to a 16-fold increase in power at his end when compared with the original condition with S5 on the meter. His actual power *input*, you notice, has nothing to do with it.



# Output on Five Metres

## *Using the New QVO4-20 Beam Twin Tetrode—High RF Output with Low Plate Voltage and Drive—An Efficient 58 mc PA*

*By* **B. W. F. MAINPRISE, B.Sc. (G5MP)**

ONE of the most welcome additions to the range of small transmitting valves is the QVO4-20, recently made available by Mullard. This valve consists of two beam tetrodes in one glass envelope and is designed for VHF use, operating at full ratings up to 200 mc. The overall dimensions are only 4½ in. by 2 in. diameter, and a special stemless construction has been employed, through which the leads are brought to a micanol base of standard octal spacing.

A notable feature is that full output of over 40 watts is obtainable with only 400 volts and the extremely low grid driving power of 0·25 watts; to this must be added the power loss in the grid circuit components, the extent of which depends upon their quality and the ingenuity of the constructor in providing a low-loss design. The valve can be fully excited by even a low-power doubler stage. The two heaters may be connected either in parallel for 6·3 volt operation, or in series where the supply

is 12·6 volts, as in many mobile installations.

**Construction**

The output stage to be described was built especially for 58 mc operation (circuit at Fig. 1) and the construction is both straightforward and economical in the choice of components.

Reference to the photograph shows that the valve is mounted horizontally to permit very short external wiring, combined with a symmetrical panel lay-out. The grid and anode tuned circuits can thus be placed almost touching the grid and anode pins of the valve and the shortness of the leads greatly assists in avoiding losses and parasitic oscillation. Both tuning condensers are of the split-stator type, the rotor vanes being centrally disposed, and cut to what is commonly known as ' butterfly " shape. Each condenser is mounted on two ½-in. stand-off insulators by means of small metal strips soldered to the stator supports and bent to C-shape for clamping to the stand-off insulators. The rotors of the condensers are earthed by soldering a lead to the bearings, and securing it to one of the bolts fixing the insulator to the metal chassis.

Incidentally, porcelain stand-off insulators should never be bolted directly to a metal chassis, as they would soon crack, so small strips of cardboard are prepared to shape by running a safety razor blade round the base, and these strips are inserted between the base of the insulator and the chassis. By cutting to shape beforehand they are practically invisible. The condensers are rotated from the panel (removed from the chassis for photographing), by flexible couplers and extension rods, which may be of metal or insulation, as the rotors are earthed.

A word about the chassis dimensions may not be amiss at this point. The size actually used measured 13½ × 7½ × 2½ ins., as several of these happened to be at hand. A smaller one could be used, and a suitable size is specified in the list of parts. The spacing of the components will not be affected in any way, and the only difference will be a reduction in the rather wide border which appears round the components in the photograph.

The QVO4-20 fits a standard octal socket, the pin connections being shown in Fig. 2. A ceramic socket should be chosen, and it is mounted on the vertical screening partition between grid and anode circuits. It is spaced about ¼ in. behind the partition by means of spacing nuts so that the base of the valve (which is of metal except for the disc on which the pins are mounted) can project slightly through the partition in order to obtain good screening and minimum coupling between grid and anode. The valve requires a hole of 1¾ in. diameter.

**Layout**

Against the valve-holder are placed on one side the cathode by-pass condenser C3 and the cathode bias resister R2. This resistor actually consists of a pair of 500-ohm 1-watt resistors in parallel, as these are easier to obtain than a 250-ohm 2 watt resistor. On the other side of the valve-holder is the screen by-pass condenser C4. The screen voltage dropping resistor should have a value of 15,000 ohms and as the working screen current is 16 mA it should be of 5-watt rating. A resistor of this wattage is, however, rather large to be mounted directly against the valve socket, as it should be for 58 mc operation, so it was decided to put it below the chassis, while a 1,000 ohm 1-watt resistor is wired in series with it and mounted right at the valve pin. One side of the heater is grounded by a short lead to the chassis, and the other side is by-passed to the same point by the condenser C5. Note that all the three by-pass condensers should be of the mica postage stamp variety, as tubular condensers are not usually reliable for by-pass purposes at this high frequency.

**Coils**

The grid coil consists of 5 turns of No. 14 SWG copper wire 1 in. internal diameter. The anode coil similarly consists of 5 turns of No. 14 SWG, but a larger diameter can be used here,

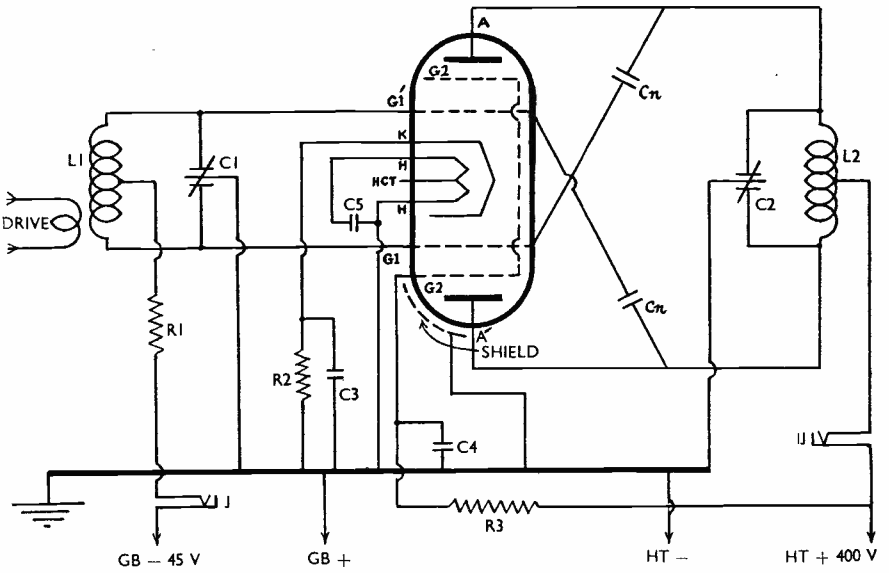



**Fig. 1. Circuit around the QVO4-20, connected in push-pull.** *The neutralising wires in the photograph are represented by Cn. The electrodes are marked for reference to the valve base connection diagram, given at Fig. 2. Suitable RF chokes in series with the grid and plate coil centre-taps might improve balance. Heaters can be connected either in series* (12·6 *volts*) *or parallel* (6·3 *volts*).

since the valve output capacity is only 8·5 $\mu\mu$F compared with 14 $\mu\mu$F for the input capacity. Accordingly, a diameter of $1\frac{3}{8}$ in. was chosen.

### Neutralising Arrangements

The anode-to-grid capacity of the QVO4-20 is 0·2 $\mu\mu$F, which is about the usual value for most tetrodes and pentodes of the small transmitting type. Neutralisation will be necessary for 58 mc operation and as the capacity is too small to be reached with ordinary neutralising condensers, two wires of No. 14 SWG copper are shaped to cross over from each grid pin, and passing through two $\frac{1}{4}$ in. holes in the vertical screening partition are set to lie along the glass envelope of the valve, parallel to the valve anodes. These two wires should be bent to shape before soldering to the grid pins so that they lie in contact with the glass, as it is much easier when neutralising them to bend them away from the glass rather than towards it. Wire of lighter gauge than No. 14 should not be employed as the smaller cross-section may not present sufficient area for the required capacity.

### Power Supply

The valve is rated for a maximum anode voltage of 400. At full input the anode current will be around 150 mA, so that allowing for the extra load of the screen and bleeder currents, the power pack will have to supply some 200 mA. Consequently, both the mains transformer and the low-frequency choke will require to be of

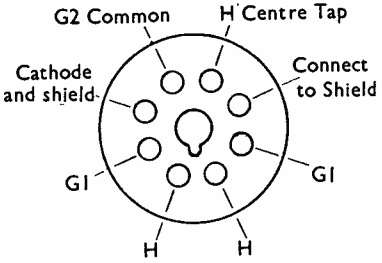



**Fig. 2. Base connnectios for the QVO4-20.**

heavier construction than is usual. Care should be taken to see that the resistance of the LF choke is kept low ; for instance if the value were 400 ohms, which is a very common figure, the voltage drop across the choke at full load would be some 80 volts, which is excessive. A resistance value of not appreciably greater than 150 ohms should be chosen, while the mains transformer should be rated at 400-0-400 volts. The reservoir filter condenser should have a value of 4 or 8$\mu$F and for this position a paper or oil dielectric condenser is usually more satisfactory than an electrolytic one.

As the present power limit is 25 watts the valve will be operated at less than half load and an ordinary power pack will be quite sufficient, but those who are purchasing components with an eye to the probable raising of this limit in due course would be wise to bear the above ratings in mind.

Coupling is by a single turn at each end of the link.

The initial tuning-up procedure is as follows :—With the link coupled to the previous stage the heaters of the QVO4-20 are turned on, *but not the anode voltage.* A milliammeter is plugged into the grid circuit jack which is mounted along the rear edge of the chassis, and the grid bias lead plugged in to − 45 volts. The grid tuning condenser C1 is slowly rotated until a reading of grid current is obtained on the milliammeter. (Note that these centre-rotor condensers rotate only through 90 deg.) With C1 at resonance, and possibly a slight re-setting of the tank condenser of the doubler stage for maximum output, the position of the link is adjusted to give a grid current of some 5 mA. The anode tank condenser C2 is now slowly rotated, and a flicker of grid current will probably be noted at resonance. This

**Table of Operating Conditions**

| Anode Volts | Anode mA | | Screen Volts | Screen mA | Grid mA | Fixed Bias |
|---|---|---|---|---|---|---|
| | Off Load | On Load | | | | |
| 400 | 30 | 150 | 145 | 17 | 4·5 | −45 |

***Note*** *:—During the present 25-watt limitation it is suggested that the supply voltage be reduced to about 320 volts, and the valve loaded to 80 mA. The drive can be reduced to about 3.5 mA of grid current. No other alterations will be needed.*

**Tuning Procedure**

Tuning procedure is perfectly straightforward. The stage is intended to be link coupled to the previous doubler stage and the link should be of parallel rather than twisted construction. If flex is used, this should be unwound and the two leads placed side by side, being lightly secured with cotton binding or narrow insulating tape at intervals. The two stand-off insulators at the right-hand rear corner of the chassis are for anchoring the link as it comes up from the previous stage, the link being clipped by two small strips of insulating material as it passes between the insulators, so that the bolts do not come in metallic contact with it.

flicker must either be eliminated or reduced to its minimum value by slightly adjusting the position of the grid neutralising wires with respect to the anodes. When this has been done anode voltage—preferably reduced—is applied to the QVO4-20. The off-resonance anode current will be 100 mA or so, depending on the value of the anode volatge applied, and C2 should be quickly re-set to resonance, indicated by a good dip to about 30 mA or less. A check that no self-oscillation of the stage is occurring should be carried out by switching off the excitation from the previous stage, when the grid current should fall to zero. If it does not, slight re-adjust-

ment of the neutralising wires is indicated. Remember always to switch off before making any such adjustments.

**Loading**

It is not desirable to leave the valve running without any load, owing to the risk of flash-over, and also because the screen current of pentodes and tetrodes often rises excessively in this unloaded condition. The manner of coupling the aerial will of course depend on the type of aerial feed selected, and the two stand-off insulators shown at the left-hand rear edge of the chassis are for anchoring the aerial feeder, where a low impedance type of feed is employed. In the writer's case, a long-wire aerial is used, voltage-fed at one end by means of a parallel tuned circuit, inductively coupled to the anode tank coil. This parallel tuned circuit consists of a 15 $\mu\mu$F tuning condenser with a 4-turn coil 1$\frac{3}{8}$ in. diameter connected across it. The condenser is mounted on the stand-off insulators and can be swung through a limited arc, to achieve correct coupling, the aerial being clipped to one side of it. Incidentally, the condenser immediately flashes over if the aerial is disconnected, showing the useful RF voltage present.

The writer uses a long-wire aerial on account of its simplicity and good radiation at about 30 deg. off its axis, so that when erected in a North-South direction it provides its main radiation lobes towards Italy and the Mediterranean coast.

In operation the QVO4-20 has proved most satisfactory, and with its low driving requirements and low maximum anode voltage it can be thoroughly recommended.

**Table of Values**

C1, C2 = 13 × 13 $\mu\mu$F split-stator condensers.

C3, C4, C5 = ·006 $\mu$F mica postage stamp condensers. 400 volt DC working.

Cn = See text.

L1 = 5 turns 1 in. diameter, centre-tapped, No. 14 SWG copper wire

L2 = 5 turns 1$\frac{3}{8}$ in. diameter, centre-tapped, No. 14 SWG copper wire.

R1 = 10,000 ohm 1-watt resistor.

R2 = 250 ohm 2-watt resistor (see text).

R3 = 15,000 ohm resistor 5-watt (see text).

J = Closed circuit Jack.

Ceramic Octal Valve-holder, 8 stand-off insulators, $\frac{1}{2}$ in. high.

Steel Chassis (or aluminium) 11 × 6$\frac{1}{2}$ × 2$\frac{1}{2}$ in.

2 Flexible Couplers and one 9 in. length $\frac{1}{4}$ in. diameter rod, either metal or insulation.

Sundry 6 BA fixing bolts and nuts, rubber grommets.

## VALVE DATA—JULY ISSUE

We went to considerable trouble in the preparation of the Table of British Amateur Valves, appearing on pp. 298-299 of the July issue, to ensure that it was both up to date and accurate in every detail. It was not just a matter of browsing through the manufacturers' lists, but of asking them to provide the essential information on all available types, which was then re-checked against any data previously published.

Nevertheless, a few corrections have to be made: The DET19 cathodes are not separate, but strapped together internally; the price of the DA41, on which we were misinformed by the makers, is 55s. and not as given; with reason, some readers have queried the linking of the 807 and RK25 with the PVO6-25 and the KT8c, to which the immediate answer is Note(4), though we agree that this is not quite good enough, particularly as the 807 is rated higher than the RK25; the latter valve is classed correctly with the 4061A; the maximum plate voltage for the RG3-250 is 3,000 volts and not as shown; and the price of the 5B/250A should include purchase tax, making it 30s. 5d.

And that seems to be about all . . .

# DX COMMENTARY

## ON CALLS HEARD, WORKED & QSL'd

**By H. A. M. WHYTE (G6WY)**

Undoubtedly most interest has been shown in the reopening of 7 and 14 mc, which are now being used to the full. The number of reports received since 14 mc has become available again confirms our impression that it is certainly the most popular band.

We are glad to see how nicely 14 mc is falling into shape. The area 14,200-14,300 kc is reserved for USA (and associated countries) 'phone, while European 'phones have confined their activities to 14,150-14,200 kc, leaving the rest open to CW more or less exclusively, although of course CW is worked on any part of the band by all stations outside USA. Many of the unlicensed or "semi-recognised" amateurs have been working outside the British and American limits of 14,100-14,300 kc, but still within the original band limits of 14,000-14,400 kc, which will become ours again in due course. Some say by September 1, others by November 1—we cannot say, but we hope it will be soon.

### Choosing Crystals

If you are not yet on 14 mc and are thinking of suitable frequencies, we suggest that you choose a frequency between 14,100 and 14,180 for CW, remembering that the first 10 kc will be the most congested, because calling from the edge is very popular at present. If you want to use 'phone, pick your spot between 14,250-14,300, but keep off the American 'phone section when USA is coming through. You will find that the American 'phone segment is very good for working Asian 'phones.

### 7 mc

We have little to say about this band, which is not popular at present owing to the continuance of the broadcasting stations which are appallingly strong. We know it is not easy, but it is to be hoped that the authorities will move these stations to other frequencies as soon as possible.

Nevertheless, 7 mc still carries interesting DX. G6CJ (Stoke Poges) celebrated the opening of the band by working a ZL on the first day, while G3SI (Thaxted, Essex) raised PY1UJ on 'phone on July 14 at 2207 GMT, chatting for half-an-hour. G4IG (London) pulled LZ1AA out of the mush on July 19 in the afternoon. At present, there is no official band planning for 7 mc, but please continue to follow our suggestions that all telephony transmissions be kept within 7,200-7,300 kc when DX is coming through.

### Local 'Phone Working

Many complaints have been received about unnecessary or excessive 'phone chatting between locals when DX has been on the band. Quick QSO's for a local check or to pass some urgent information are obviously all part of the game, but we cannot emphasise too strongly that talking for the sake of talking on 7, 14 or 28 mc when DX is coming through is inexcusable. If you want chats, then choose 1·8 or 7 mc during the mornings and early afternoons. G3AP (Fleet, Hants) supports the "purity campaign" for good operating technique and the avoidance of unnecessary repetitions. He suggests that some operators seem anxious only to keep their transmitters on the air, and so indulge in endless repetition, even though they are Q5 and S9. Let us not add to QRM in this way; in fact the whole situation now calls for very short overs. G6WY tried this with W7HRV on July 20. Only one quick question was asked and answered on an over, and QRM was therefore largely avoided.

### Long CQ's

It has been noticed that some of the newcomers (and a few of the old) are sending far too many CQ's in relation to their calls. Never send CQ more than six times consecutively. The well-known "three-times-three" cannot be beaten. We heard one lad who tried the other extreme. He sent CQ twice and his call 15 times. The motto is not too much, not too little—but just right! Finally,

let your calls be short. A one-minute call is a long call.

**Overseas Readers**

The reports that we are now receiving from overseas amateurs and SWLs are very welcome. Their "Calls Heard" lists are most interesting, and we are glad to see them coming in from the remote parts of the earth. G. Derby, 3 Coy., Palestine Command Signals, M.E.F., is listening in Jerusalem on 14 mc and is trying to move the authorities to grant him a ZC6 call. He heard the G's start up at midnight on June 30, and mentions the amazing strength of G6AG (Bexley), who comes in "just like the BBC"! Incidentally, we heard ZB1L say the same thing. SWL Derby will be very glad to stand by for anyone and run a listening schedule. He will probably be sending in some 1·8 and 7 mc logs for "Calls Heard." Another well-known amateur—SV1EC in Athens—writes in to say he's been off the air with pneumonia, never regret it, especially if they wish later on to become transmitters themselves. Apart from that, the bands become so much more interesting if one can read CW. Harold Owen will gladly stand by for any station from 1·8 to 28 mc. He hopes to be on the air himself soon with a ZD4 call.

**14 mc DX**

This band has produced some amazing DX since June 30. AC3SS is genuine in Sikkim, which is a semi-independent and self-governing State sandwiched between Nepal and Bhutan (also both independent States), in the Himalayas to the north of Assam. We are not certain whether Sikkim can count as a separate country or whether AC3SS should sign VU2SS ! *

AC4YN is still active in Lhasa, Tibet, while UAØKAA is operated by ex-U9AZ on an island at the mouth of the River Yenisei, Siberia. We hear from UA3KAE that UA is the prefix for

# ON THE AMATEUR BANDS

but is now recovering and very active on 14 mc. He worked 80 countries (plus twelve doubtfuls) on 28 mc, which is very good going.

SV1EC asks if Sardinia counts as a separate country. We feel it should, even as Sicily or Corsica. Incidentally, XAAO is licensed in Sicily and XAAX in Corsica, but neither has been on ! SV1EC worked VS9MP (now VS9AP) in Aden and VS6DY at sea. OQ5BL gave his QRA as Box 201, Jadetville, Belgian Congo. SV1EC is trying to use his influence as Chief Signals Officer, Greece, to get the Greek amateurs officially licensed. SV1KE is all ready to come back, although the Germans stole his HRO ! Another active station in Athens is XAAP, who is W6RJY. QSL's to Berkeley, California.

S/Ldr. H. Pain, of ZB2A, writes to say that ZB2A—which has several operators—is a 100 per cent. QSL station ; they are always pleased to work G's, and he welcomes reports providing they are detailed and intelligent.

Harold Owen, now a plant pathologist in West Africa and a well-known correspondent to "DX Commentary" in pre-war days, has sent some very good logs, He suggests that all SWL's should learn Morse ; they are mainly young and so should find it easy to master ; they will

Russia, UB for Ukraine and UC for White Russia. It is interesting to know the Russians are now on the air again. All QSL's to P.O. Box 88, Moscow.

EL4A in Liberia, and EP1C and EQ4DC represent unusual countries, while PK6TC is much sought after. His QTH is Sgt. T. Thyssen, 299OA, N.E.I. Air Force, Biak, Dutch New Guinea. C1PL informs all concerned that the prefix C is now being allotted to stations operated by Chinese nationals. He is ex-XU8PL and QSL's should be sent to PO Box 409, Shangai. Over 20 Chinese have already been licensed.

OX1AA and OX1A seem interested mainly in W's, but as OX1AA will be in Southern Greenland on an American air base for a year, there should be plenty of opportunity for a contact. W9YID and W9CAC both operate the same Tx in Iceland, and TF3A has come up on CW to put that country on the map.

Ian A. Bates (Perth) queries VK5AJ/P, but he is genuine, operating on a ship in the South Atlantic. He reports VE2SZ working portable in Labrador. BRS-2072 (Hull) wants to know if RN1SX is

*(* In the circumstances, undoubtedly a separate country, particularly if Sardinia, Sicily and Corsica are to be " countries " !—Ed.)*

genuine, and if so, where? Yes, ZD8A is in Ascension Island. E. Hartley (Bungay, Suffolk) reports VS1BV during the SLP. VS1BF is also a new one while VS1BA is on the way home. L. Goldsbrough (Whitby, Cheshire), another pre-war correspondent to this column, heard OX2FJ in East Greenland, YR5RW (an American in Rumania who says he will QSL) and SP1MF/I, who is ex-SP1MF operating in Northern Italy. There are no Poles on from Poland as far is known.

N. A. Phelps (London, N.10) logged OX1A (QSL via ARRL), ZD8A, Peter Ranard, Ascension I, EL4A (full QRA please?), ZC1AP, HH3A, YN1LB, PJ3X (QSL *via* ARRL), PZ1RM, ZC8AA and CR9AG. We should welcome the full addresses of some of these calls. He also heard VU5QN calling VU5QL on 7 mc. Apparently, although Icelandic amateurs are not yet fully licensed they get temporary permission from the Ministry of the Interior. TF2AX gives QRA as Box 284, Reykjavik. BSWL-538 (Dorchester) reports ET3Y giving QRA as Box 1191, Addis Ababa, and OQ5LL, Box 16, Stanleyville.

**DX Operators**

Interesting letters have been received from three of the busiest DX chasers on the air to-day, G2AJ, G2PL and G6QB. G2AJ started in a big way with *ten* watts 'phone on 28 mc. Using suppressor grid modulation to an RK25, from February to May he worked on 'phone W6NFL (Okinawa), W4YA (Burma), G6CU/ZC2, ZD4AC, PK4DA, XU1YO, KA1JM, VK4LP, W8SHI/NY4 (Cuba). The aerial used for all these contacts consisted of two ½-wave dipoles switched in and out of phase. Encouraged by these results he built himself a 100-watt rig and added VQ6MI, OE5RG, CX2CO, TR1P, XZ4AQ, VS1BA, OD2AC (Lebanon), ZE2JD and many others. QSL's have been received from W6NFL, EA1D, VQ4ERR, VQ6MI, TR1P, ZB1E, YI2CA, YI2XG, SV1EC, PK4DA and W9QCI/CT2. Using the same pair of HK24's on 14 mc, he started off at 2 minutes after deadline on June 30 by raising CE1AR. His best on 14 mc to date includes EP1C, PZ1A, ZP8AC, TI2OA, OA4M, KP4AZ, and ZC1AR, and on July 10 he made WAC in 4 hours 20 minutes.

**DX FORECAST FOR AUGUST 1946**
**(All times GMT)**

| | 7 mc | 14 mc | 28 mc |
|---|---|---|---|
| NORTH AMERICA :— | | | |
| Eastern and Central USA, Canada, etc. | 2300-0600 | 2000-0700 | 1300-2200 (*unlikely*) |
| Western States, USA, Canada | 0500-0600 | 1700-1900<br>0300-0700 | Nil |
| SOUTH AMERICA .. .. | 2359-0600 | 2000-0800 | 1300-2359 (*erratic*) |
| AFRICA : | | | |
| North of Cancer .. .. | 1400-0900 | All day | 0800-2000 |
| South of Cancer .. .. | 1900-0600 | 0600-0700<br>1600-2300 | 0700-2000 |
| ASIA : | | | |
| West of 75°E. .. .. .. | 2000-0600 | 1200-2000 | 0700-2000 |
| East of 75°E. .. .. .. | 2100-0700 | 1500-1900 | 0700-2000 |
| OCEANIA : | | | |
| VK, ZL .. .. .. .. | 0400-0700 | 0400-0800<br>1700-1900 | 0800-1200<br>2200-2359 |
| PK, KA, KB6, VK6 and Pacific Area .. .. .. .. | 2100-0700 | 1500-1900 | 0700-2000 |

NOTE.—*The times given above are the most likely periods during which signals may be expected from the parts of the world indicated. Under unusual conditions, signals may be heard outside these times.*

G2PL has no aerial masts and uses a radiator 20 feet high, yet has managed to raise 69 countries, including UOØKAA, W2OAA/J8, VS4JH (Borneo), PZ1RM, VP2AT, HK4CX, VS8AN and AC3SS. He asks if TA1AF and TR2ME are genuine. The latter says he is in Casablanca.

G6QB (Bexhill) reports WAC several times on 14 mc during the first three weeks on the band, and remarks that the most interesting features have been the "reflection" of early morning conditions in the late afternoon, with W6, W7, VK and sometimes K6 coming in with the Asiatic stations.

Interesting QSO's have included CR7RA (British ship off Mozambique), W6QPV/China, VS9AN (Aden), UAØKAA (Dixon Island, Arctic Circle), and the usual W6's, W7's, KH6's and KL7's in the early mornings. A strange one was W7GBL/MM—another ship, near Manila—who came in at about 2100 one evening.

Canadians in the new 8th District have been heard as late as 1300; VE8AW (Yukon) has been worked after 17 years interval! Others heard were VE8AI, VE8MG, VE8MR, VE8MX.

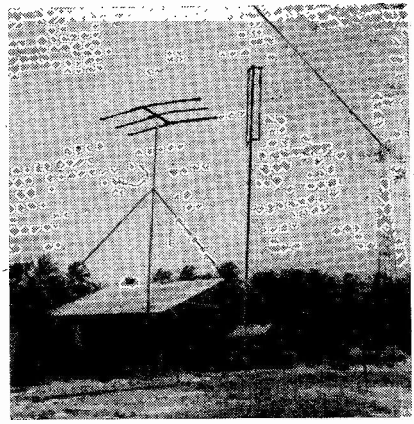
By burning the candle at both ends it has been found a fairly reliable indication that if East Coast Americans predominate at midnight, the early morning will be best for W6, W7, K7, etc.; if, however, South Americans are stronger at night, the morning will be better for VK and ZL. The Hawaiians come in on those mornings, when practically nothing else is any good; and rather later than the other DX, as they are not good signals until after 0800.

7 mc has been shunned like the plague, and 28 mc has been dead.

### General

E. M. Barlow (Ealing) has received G2MF of Sheffield (as we have) putting out a terrific signal on 1·8 mc using a *half-wave* aerial attached to a balloon of 4 ft. 6 in. diameter. As the writer had quite a lot to do with G2MF during the war, he is not surprised to hear about this. It would mean the balloon holding up an aerial about 270 ft. long!

The Jersey Radio Society is running a field day receiving contest during August. The locals—GC's 2CNC, 2FMV, 3GS, 4LI, 5OU and 8NO, would like as many QSO's as possible on 7 and 14 mc, in order to give the receiving stations plenty of scope. The test will cover the 24 hours starting 1700 GMT each Saturday in August. For those who still need GC (as we do)—here is your chance.



**General view of G6CU/ZC2, the famous station on Cocos Is.** *The 3-element rotary is beside the hut, and the 105 ft. tower in the background carried the Sterba array, put up latterly.*

D. L. McLean (Yeovil), in common with many, complains bitterly of the radar interference in that district, which seems to have a fundamental of 29·7 mc and spreads over most of the band. The Air Ministry is at present changing the aerials to work in the 60-80 mc band (a colossal job, owing to the number of sites and the complexity of the arrays) and so this QRM will disappear in due course.

### Danish Amateur Radio

Information has been received giving details of amateur licensing in Denmark. CW, 7,150-7,200, 14,100-14,300, 28,100-29,700, 58,700-59,800 kc. Telephony, 14,150-14,250, 28,500-29,700, 58,700-59,800 kc. Input must not exceed 50 watts. At present, only pre-war OZ's get their licences back.

### Careful Listening

It is frequently noted that SWL's do not use sufficient care. For example, LU6AJ, heard by everybody on 14 mc, has been recorded as "LU6HA"; VSIBV as "VS1VV," and so on. Please do not write in and tell of us calls heard unless you are quite sure of the call letters! BSWL-709 (Birmingham) suggests that we start a campaign for better logs and reports. It has always been our policy to recommend that reports to transmitters

**'Phone only.** *A pre-war impression of OZ5BW, Graasten, who with a three-stage suppressor-grid modulated transmitter and a superheterodyne receiver with pre-selector, was the only OZ to WAC on 'phone.*

should be as detailed as possible, covering a period of time-logging of the same station. He suggests using log-sheets instead of cards. We would add that either a stamp or international exchange voucher should always accompany a good report. BRS-10825 (Rugby) would like details of (*a*) receiver, (*b*) aerial, (*c*) direction and height of aerial to be recorded when sending in logs, especially for SLP's. We agree with this and again emphasise the necessity of laying out your logs *exactly* as they appear in print, using separate sheets for each band, with callsign and address on each sheet.

### QRA's

We cannot make out which is preferable—QRA or QTH. Anyway, here are some :—VP2MY, Montserrat, Leeward Is; J9ABF, HQ Signal Section, Rykom; APO331, c/o P.M. San Francisco; J9AAG, Radio Okinawa, WXLH, APO 331, c/o P.M. San Francisco; SU1KE, Box 360 Cairo; CT2AR, c/o Senor Dorricott, Depto Tracione, F.C.C.A., Estacion Rosario Norte, Rosario Argentino; YV5ABZ, PO Box 1247 Caracas; CE2CC, Box 761 Santiago; W9CAC/TF and W9YID/TF, APO 610, c/o P.M., New York; OA4M, Box 849, Lima; TI2OA, San Jose, Costa Rica; PZ1A, Box 679, Paramibo, Surinan; ZP8AC, c/o British Legation, Paraguay; ZC1AR is 3,000 ft. up in Transjordanian Hills and will QSL. Acknowledgments to G2AJ for these. He asks for QSL address for FA8JD—answer is ARRL.

### Set Listening Periods—August

August 17, 2200-2400 BST—14 mc.
August 18, 1400-1800 BST—28 mc.

Unless you are overseas, ignore the G's, and please post your material immediately after the event, so that we have time to prepare it for the September issue.

### Log Selections

Once again, a number of logs sent in for the July SLP's could not be used because the callsigns were not in strict numerical and alphabetical order or were otherwise not laid out as they appear in print under "Calls Heard." The form in which we would like to see them is

given every month under the "Calls Heard" heading, so it is quite easy to get them right !

Acknowledgments to BRS-3789 (Dunfermline), BRS-10588 (Bradford), BSWL 1206 (Leeds), BSWL-709 (Yardley, Birmingham), BRS-12838 (Perth), L. N. Goldsbrough (Whitby, Cheshire), B. Littleproud (R.A.F., Binbrook) and BSWL -1915 (Huddersfield), for good logs used for checking purposes, though not printed.

**Footnotes**

SU1KE reports that he will be recuperating in Cyprus for about a month till the end of August. Very sensibly, he has taken a portable rig with him, signing ZC4NX, frequency 14,100 kc. QSL to Box 360, Cairo.

QSL's for FA8C, who is an old timer, can be sent *via* HB9AG.

WØNVF/KG6 has been putting in a fine signal on 14,200 kc from Guam.

N. A. Phelps (London, N.10), fast becoming one of our most redoubtable DX listeners, was HAC in *three minutes* on 14 mc CW, with OQ5LL, VE1OK, VK5WA, OA4U, UA3CA, and VU2AA, using a 1-V-1 receiver and 30-ft. aerial.

XADZ, who maintains a full and official list of all XA stations, British and American, very kindly offers to act as a forwarding agent for those of our readers who wish to QSL the now numerous XA's. Address: Capt. Peter Keller, XADZ, British Army, A/5, GHQ, Central Mediterranean Forces, Italy.

Finally (for SWL's), do not forget the Swiss National Mountain Day (NMD) on Sunday, August 11. See p. 295, July, for details.


**Puzzle Picture. What is it ?** Answer on p. 370

# CALLS HEARD

***Please arrange all logs strictly in the form given here, in numerical and alphabetical order and on separate sheets under appropriate band headings, with callsign or SWL number and address on each sheet.***

## FIVE METRES

**HB9RLA, Zurich, c/o HB9T, Hadlaubstr. 34, Zurich, Switzerland.**

G2MV (59), 5BJ (57), 5BY (46), 5TX (58), 6JB (58), 8II (57), I1AY (59). *RS in brackets. June* 24, 1855-2052 *GMT, only.*

**HB9FJ, Fribourg, c/o HB9T, Hadlaubstr. 34, Zurich, Switzerland.**

G2AK, 5BY, 8RS. *All RST*-599 *steady.* I1HV, 1SS. *Both RST*-558 *QSB. All June* 24, 1900-2100 *GMT.*

**G8UZ, 29 Columbia Avenue, Sutton-in-Ashfield, Notts.**

G2MR (130), 2XC (166), 3IS (54), 5BY (256)* 5LJ (50), 6SL (55), 6VX (132), 6YQ (80), 6YU (55). **Inter-G record as at July* 21. *Distances in brackets.*

**G2BMZ, 34 Haffaway Road, Barton, Torquay, S. Devon.**

*Worked*: G2MV (140), 2NH (130), 2XC (105), 5MA (140), 5TX (95), 5UI (95), 6LK (134), 6VX (164), 8RS (128), F3JB. *Heard*: G2MR (150), 3CQ (170). 6KB (134), 8IG (160), 8OS (136), FA8B, OK1AA. *Distances in brackets.*

**G6LK, Warham Lodge, Bridge Road, Cranleigh, Surrey.**

F3JB,* 8BC, 8RN, FA8BF, I1AY,* 1DA, 1FA, 1RA, 1SS,* OK1AA. **Worked.*

**G5LF, 32 Pilkington Avenue, Sutton Coldfield, War.**

G2AK, 2ZV, 3IS, 5MQ, 5TX, 5WH, 6CW, 6SL, 6VX, 6YQ, 6YU, 8JV, 8UZ, I1AY. *All worked since March* 27.

**G4CI, 30 Bodley Road, New Malden, Surrey.**

*Worked*: G2AAN, 2AK, 2BB, 2CY, 2DP, 2FWA, 2LC, 2MC, 2MR, 2MV, 2NH, 2WS, 2XC, 2ZV, 3CQ, 3CU, 3FU, 3KP, 3NR, 3OO, 4CG, 4IG, 5AS, 5FK, 5KH, 5MA, 5MQ, 5OJ, 5OO, 5RA, 5RD, 5TX, 5VB, 5WP, 6AU, 6CW, 6FO, 6KB, 6LK, 6NA, 6OH, 6RA, 6UH, 6VA, 6VX, 6YQ, 6YU, 8BD, 8DV, 8GX, 8IG, 8JR, 8RC, 8RS, 8SK. *Heard*: G2BMZ, 2QY, 5BY, 5CD, 8KD, 8OS.

**G6DH, 234 Burrs Road, Clacton-on-Sea, Essex.**

*Worked*: G2MR, 2MV, 2XC, 4CI, 4IG, 5MA, 5TX (130), 6LK, 6VX. *Heard*: G5BY (240), 6YU, 8RC. *June* 21-*July* 12 *only.*

**G5MA, Crystaldene, 21 Broadhurst, Ashstead, Surrey.**

G2AK, 2BMZ, 2ZV, 3PD,* 5BY, 5LJ*, 5MQ, 6CW, 6YQ, 6YU, 8UZ*. *All over* 100 *miles distant.* **Heard.*

## MAGAZINE SET LISTENING PERIODS

### 14 mc

### July 13, 1800-2000 BST

**E. J. Hartley, 17 Earsham Street, Bungay, Suffolk.**

*'Phone ;* CE1LY, D2DI, 4ANB, EA1D, EI8J, I1NQ, LA7R, OZ3U, 8CM, PAØDI, SM7IK, VS1BV, XAAV, DK, PQ.

**BRS-6536, 33 Burleigh Road, Sutton, Surrey.**

*'Phone ;* D2DI, 4ABK, 4AMB, EA1D, G2HKM/I, I1NQ, 1SR, J9APM, OZ3U, 7EDR, 7HB, 8CM, PAØDR, ØWK, PY7AN, SM7IT, VS1BV, W1ILY (Manila), 3SB, XAAJ, AN, LR (Athens), PQ.

**H. Lowery, 62 Godwin Road, Hove, 4, Sussex.**

*'Phone* : AC3SS, C1PL, EA1D, I1KN, 1MP, OZ3U, 8CM, VS1BV, W1IAS, 1ILY (Manila), XAAN, AV, CO, PQ, LR.

**BSWL-1662, 131 West Bawtry Road, Rotherham, Yorks.**

*CW ;* F3DN, D4AND, EI5L, I1AZ, OQ5LL, OZ7HB, PAØOO, VS7JX, W1AXA, 2GWE.

**BRS-3665, 17 Hill House Road, Ipswich, Suffolk.**

*'Phone ;* AC3SS, D2DI, 4ABK, 4ANB, EA1D, G2HKM/I, I1ME,IMQ,1SR, LA7R, OX1AA, OZ8CM, XAAN, AV, DK, PQ.

**BSWL-1090, Heatherlea, Cranston Road, East Grinstead, Sussex.**

*'Phone ;* D2DI, 4ABK, EA1D, I1MQ, J9ANB, OZ3U, 7EDR, 8CM, PAØDR, SM5OH, 7IT, VS1BV, W1ILY (Manila), XAAN AV, CO, DK, LR, PQ.

**BRS-12868, 13 Chestnut Grove, Southend-on-Sea, Essex.**

*'Phone ;* D2DI, 4ABK, 4ALM, 4AND, EA1D, G2HKM/I, I1NQ, 1SR, LA7R, OZ3U, 7HB, PAØDR, ØWK, VS1BV, XAAN, AV, CO, DK, PQ.

### 7 mc

### July 14, 2200-2400 BST

**BSWL-1662, 131 West Bawtry Road, Rotherham, Yorks.**

*'Phone ;* I1CC, PY1UJ.
*CW ;* HB9EO, 9FK, LA2JA, 6G, 9X, OZ2UA, 5U, PY1UJ.

**BRS-6536, 33 Burleigh Road, Sutton, Surrey.**

*'Phone ;* F8ALT, 8T, I1AA, 1AX, 1CC, 1GA, 1KE, 1LBW, LA2WA, ON4PT, OZ7BO, PY1UJ.

**BRS-3665, 17 Hill House Road, Ipswich, Suffolk.**

*'Phone ;* D4AMS, 4AND, HB9ED, I1AX, 1KD, 1PW, 1RR.

## GENERAL

### 14 mc 'Phone

**BRS-2072, 28 Silverdale Road, Hull.**

CE1AH, 1AO, 1AR, 1BE, 3AE, 3AG, 3CT, 3FG, 4BP, CO2BA 7VP, CX2CO, 3BL, EA9AI, EP1C, HC1FJ, 2HP, HH1AC, 2PB, 5PA, HK3AC, 5AB, 5AE, KP4BG, 4JA, LU2AD, 4DJ, 4HI, 4HP, 9MA, 9MC, OA4M, OX1A, 1AA, PY1AEB, 1CB, 1FM, 1FN, 1FO, 2ET, 2GC, 2HV, 2KD, 2KP, 4GT, 5AQ, 5CX, PZ1A, RN1SX, TG9RV, TI2PA, 2RC, VK2AGU, VO6F, VP4TF, VP9F, W5AFX, 5DMR, 5YF, 6EJP, W9YID/TF, W8SIR/VP9, WABZA/KP4, W1IAV/KV4, XE1V, 2DS, YR3AW, 5RW, YV5AB, 5ABE, 5ABW, 5ABX, 5ABY, 5AE, 5AN, ZC1AR, ZP5AA, 6AC, 8AC,

### 14 mc CW

### BRS-2072, as above

CE3DZ, CX1DZ, HH7C, KP4AC, LU1BC, 1EP, 2LD, 3LD, 9AX, OQ5LL, PY1ABS, 1CT, 5QG, UA3AW, 3CO, UAØKAA, VK3HG, W5HBQ, 5ISF, 6PEV, 7FNK, W2OAA: J8, ZD8A.

## OVERSEAS—GENERAL

**OK1AW, Alois Weirauch, Mestec Kralove, 9, Czechoslovakia.**

### 1·8 mc CW

D2DD, 2QP, 2TG, G2CX, 2DTD, 2KO, 2QO, 2TZ, 2YU, 3JV, 4AK, 5GN, 5QU, 6KP, 6NV, 6TR, G8JP. *June* 16-*July* 5.

### 14 mc CW

CE4AD, CX1DZ, KF6SJJ, OA4AQ, OQ5BR, PY1ABS, W1AQT, 1LAX, 2CYN, 2DNW, 2OGJ, 3BES, 3HKY, 4MR, 8ADG, 8ULO, XU1LP, XX1C. *June* 25—*July* 8.

### 28 mc CW

F8AF, 8ZR, G2BY, 2BXP, 2CJH, 2DBM, 2FGH, 2IQ, 2WW, 2XN, 4AU, 4CYR, 5UI, 5VB, 6TO, 6ZO, GI5TR, 5UR, LU8AK, OK1AA, PY1GJ, SV1EC, ZS1CX, 2X, 5CD, 5DE, 6ID. *June* 20—*July* 7.

### 14 and 28 mc 'Phone

EA1D, F3RQ, G3VR, 5GX, 5OV, 5TN, 8MG, GI5ZY, GW4SW, 2UH, I1RM, PY2HV, W3EO.

### 14 mc CW and 'Phone

**Harold Owen, B.Sc., West African Cacao Research Institute, P.O. Box 8, Tafo, Gold Coast Colony, British West Africa.**

G2AJ (45), 2AK (46), 2CV (44), 2FHV (33), 2HOJ (33), 2IJ (55), 2IQ (44, 46), 2PL (54), 2UA (44), 2VV (45), 3FB (34), 3GW (44, 56), 3QD (45), 5BJ (56), 5SK (34), 6AG (45), 6AY (57), 6BY (45), 6CL (56), 6GB (56), 6GH (33, 44), 6JF (45), 6KS (45), 6NB (46), 6PD (44), 6RH (22, 44), 6WU (44), 6WY (56), 8PB (33), 8RC (45). *July* 1—*July* 7, *RS in brackets.*

## WHAT'S THE ANSWER ?

Not long ago, we had a short letter from a reader, as follows :

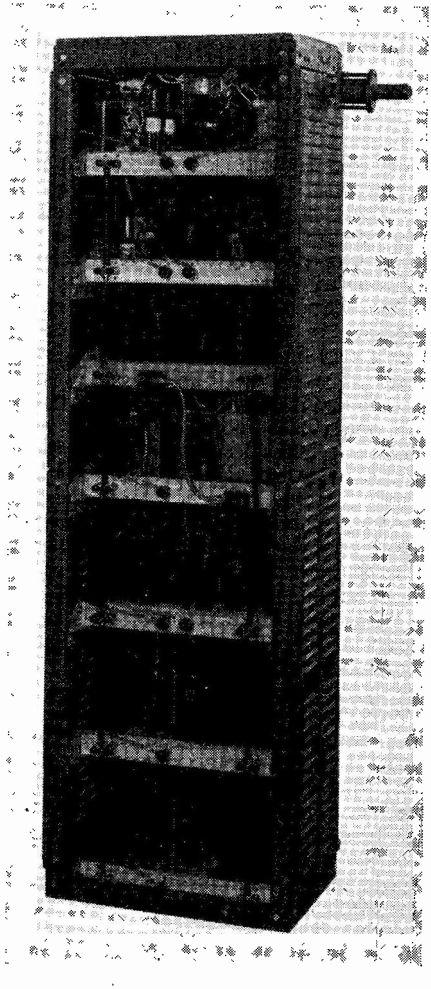
" I have been out of touch with the transmitting side of radio for several years. I wish to make regular radio contact with my brother in Cape Town. What power and wavelength do you advise ? Is such a contact fairly easy to make with suitable equipment ? " The letter is signed over the degree and qualifications of B.Sc., A.M.I.Mech.E., A.M.I.E.E.

Now, there are two ways of answering such an enquiry : The easy one is " 100 watts—21 metres (14 mc)—Yes." But would such an answer be of the slightest help to anyone asking such a question ? Obviously not, since clearly he knows next to nothing about the practical side of Amateur Radio.

Hence, to answer the question the other way, properly, something much more detailed is required—probably starting with the obtaining of a licence !

But under present conditions we can hardly be expected to give what amounts to the services of a consultant in Amateur Radio practice in return for the chance spending of one-and-sixpence on a copy of the *Magazine* ; at least one full day's work is behind the right way of dealing with an enquiry of this kind.

The problem we put to readers, therefore, is simply this—within the limits of two quarto sheets of typescript, how would you answer such a letter ? A prize of one guinea awaits the reader whose reply is considered suitable for publication.



**Example of modern design. Behind the 40-150 mc 100 watt VFO-switched Eddystone transmitter briefly described on p. 117 of the April issue.** *Note the layout of the RF end on the top chassis.*

# Station Control

## *Planning the Extras for Efficient Working*

*By* W. L. S.

ONE sees and hears of many amateur stations possessing a first-rate receiver and a very efficient transmitter ; but somehow the ancillaries seem to have been neglected. This is a great pity, because the purpose of an amateur station—presumably—is to operate on the allotted bands, and the process of operation does not imply simply pressing a key or picking up a microphone. There is so much more to it than that.

Just as the man who spends most of his time at the wheel of a car becomes particular about his cars and eventually settles down to something really comfortable to drive, so should the amateur who spends a lot of time on the air build himself a rig that is really comfortable to operate.

My own rig, when I first put it together in the grand January rush, was a very fine example of haywire run riot. It worked ; but no one would have called it a joy to behold, and from the operational point of view it was terrible. When I total up the amount of work that has since been put into it, purely from the point of view of making it easier to operate, I begin to realise that " ancillary equipment " constitutes at least one-third of the total fittings of the modern station.

What first brought home the inadequacy of the original hurried set-up, I remember, was the difficulty in changing over. The exciter unit heaters were left on, but the change from " receive " to " transmit " meant throwing the aerial switch, putting the exciter HT on, switching heat and HT to the final, and retuning the receiver to monitor the transmission. All this took some few seconds, and I resolved that I would instal a simple means of doing the whole thing by throwing one key-switch. This, of course, was before the telephony equipment was built. When that was added, also in haywire form, the operator had also to switch on the modulator, screw the key down, and carry out various " fiddles " in other directions as well.

From that rather chaotic state has been evolved the present-day arrangement. Perhaps it is simplest to describe the results first. There are two GPO type switches at the operating position. One of them gives CW operation, the other telephony. Nothing else has to be touched for changing over.

Now this is really quite simple, and need by no means involve a mass of relays and extra wiring. Actually four relays of the simple make-and-break variety are all that are necessary. The two sequences are these :

*CW Operation :*

Relay 1 switches on main HT to PA.
Relay 2 shorts secondary of modulation transformer (to avoid " thumps ").
Switch 1 (two contacts of which operate the relays) also changes over headphones from receiver to CW monitor.

*'Phone Operation :*

Relay 3 shorts the key.
Relay 4 switches on modulator HT.
Relay 1 (as above) switches on main HT to PA.
Switch 2 (two contacts of which operate the relays) changes over headphones from receiver to 'phone monitor.

**Separate Rx Aerial**

The aerial has been separated out from these operations by using a remote receiving aerial—always the best practice if a sufficiently good one

can be erected without interfering with the transmitting aerial.

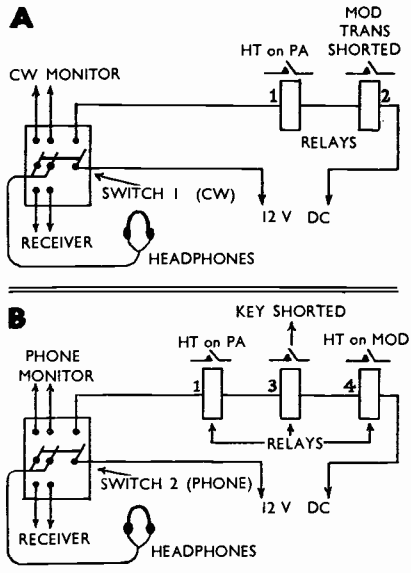
In view of the popularity (and, in fact, the necessity) of break-in operation, it has been made an easy matter to leave the headphones on the receiver instead of changing them over to the monitor. This has not even involved another switch or an extra pair of contacts. It is done in this way: For break-in operation the 'phones are plugged straight into the appropriate socket in the receiver. Naturally, they stay there then, through thick and thin. But when the monitor facility is required, another plug is inserted in the receiver jack, and the 'phones are plugged into a jack mounted at the front of the operating table. This, instead of being wired directly to the plug which goes into the receiver, is wired *via* the change-over contacts on the GPO switches, so that Switch 1 puts it into the CW monitor and Switch 2 into the 'phone monitor.

In my own case the relays used are the GPO 2,000-ohm type, which just operate nicely from 12 volts DC. This is derived from an old battery-charger no longer required for its original function. Having been lying around idle for years, this old charger is pathetically grateful for being given a useful job, and there is no reason why it should not go on indefinitely !

Owners of certain types of receiver which have two points at the rear associated with the send-receive switch can, of course, operate relays from these points ; but the different switching for 'phone and CW cannot be arranged without another external switch.

All diagrams of relay switching are rather apt to become so obscure and complicated (except to the practised eye of a GPO engineer) that I have kept the diagrams in block form. They are simplicity itself, and give a far better idea of the ease with which the job was actually carried out than would a full working diagram.

Switch-and-relay control is probably one of the simplest and most obvious methods of cleaning up the station. Those who use different transmitters for




**(A) is the wiring of the CW switch, (B) is for the Telephony change-over.** *Though four relays are shown, the operations in (A) and (B) could be performed by two relays only : One having three pairs of contacts* (1, 3, 4, *in B) and the other two pairs* (1, 2, *in A).*

different wave-bands can, of course, really spread themselves with a slightly more complicated scheme.

Actually I use two transmitters—a ten-watter for 1·8 mc and a 100-watt outfit for the other bands—and the change-over from one to the other is merely a matter of changing over two pairs of plugs and sockets. The CW and telephony switching then operates equally well on both rigs. One of these sockets carries the secondary of the modulation transformer, which may be selected if the right plug be placed in series with the HT supply to one transmitter or the other. The other socket is across the key, and as grid-block keying is used on both transmitters one merely has to put the appropriate plug in the socket.

The exciter unit of the transmitter in use is left with LT and HT on all the time, since, with grid-block keying, it is quite dead in the " key-up " condition. The LT supply to the PA in operation

is also left on, but *not* the HT, as it was thought that such a condition would be dangerous. Thus, by pressing the key with the switches off the frequency may be checked, but there is no power on the final stage until either the 'phone or the CW switch is thrown.

### The Operating Position

The layout of the station, apart from such controls as have been described, is very important to the comfort of the operator. I very much favour the scheme in which there is a spot that can be dignified by the title of " operating position." In this sacred spot are the receiver, the microphone, the key and the CW and 'phone switches—all that is required. The CW and 'phone monitors are easily reached from the chair, but the transmitter is further down the bench. Its VFO is within easy reach, but everything else is a bit remote.

*THE AMATEUR BANDS*

***Following are the bands now open for amateur operation :***

| | |
|---|---|
| **1800-2000 *kc*** | **10 *watts* (*A*) *and* (*B*)** |
| **7150-7300 *kc*** | **25 *watts* (*A*), 150 *watts* (*B*)** |
| **14100-14300 *kc*** | **25 *watts* (*A*), 150 *watts* (*B*)** |
| **28000-30000 *kc*** | **25 *watts* (*A*), 100 *watts* (*B*)** |
| **58500-60000 *kc*** | **25 *watts* (*A*) *and* (*B*)** |

***Note that the two sections of the 7 and 14 mc bands allotted are not in harmonic relation. It is proposed that telephony operation on these bands be confined to the areas 7200-7300 and 14200-14300 kc. " A " licences are all three-letter calls issued post-war, and are for CW operation only ; licensees in this category are not normally allowed the use of telephony and full power till they have had twelve months' experience. Class " B " licensees are holders of reissued pre-war two-letter call signs, and are allowed the unrestricted use of CW, MCW and 'Phone with power as given above.***

This idea of an " operating position " makes long periods of working far less tiring than at a haywire station where changing over involves doing things with crocodile clips and pieces of string. If we can compare it with a car again, remember that the important instruments are grouped on the facia board for easy inspection by the driver, and the actual controls which " do things " are all available without moving at all. Imagine driving a car with the horn button under the bonnet, the headlamp switches under the rear seat and the ignition switch left at home, and you will perhaps think of certain of your own haywire efforts !

### Monitor Arrangements

Regarding the monitors, it should be pointed out that the use of different units for CW and 'phone monitoring is really an unnecessary refinement, and the same might well be used for both. But I like to use the CW monitor as a frequency meter—it is just a straight oscillating detector in an electron-coupled circuit—whereas the 'phone monitor uses a Westector or a diode and is quite flatly tuned. One can go to endless refinements in a good 'phone monitor, building in a positive peak indicator and even a small cathode ray tube for indicating modulation percentage. This does not need any time-base circuit, as the well-known trapezoid method is excellent.

Once you become interested in this matter of ancillary equipment, it can become very absorbing, because it gives one limitless scope for ingenuity and individuality. After all, even if we all used commercial receivers and commercial transmitters, still no two stations need be alike. Those amateurs who are continually experimenting with receiver or transmitter will probably be too busy to bother much over ancillaries, but if the day ever comes when they are satisfied with their results and want to do a little operating for a change, then is the time when they feel the need of some well-planned " extras."

Conversely, if you start off with the " extras " right from the beginning, you can then experiment with the receiver, transmitter and aerial to your heart's content, and you will always have a comfortable station from which to test them out.

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**Puzzle Picture** (see p. 365). *A spark gap associated with a piece of radar equipment. By adding only the lettering and the squiggly wire for the tail, this object has become the mascot coaxing in the DX at G6QB.*

# NEW QRA's

*Only those which have changed since the appearance of the September, 1939, issue of the Call Book or were not included in it for fully licensed operation, or are now licensed for the first time, can be published here. All that do appear in this column will automatically be included in the next Call Book, now in preparation. The number of QRAs we can print each month depends upon space available. QRAs are inserted as they are received, up to the limit of the space allowance. Please write clearly and address to QRA Section.*

**EI2M** E. A. Donovan, 10 Glenayr Road, Rathgar, Dublin, Eire.

**GI2AFW** H. Shaw, 31 Beatrice Road, Bangor, Co. Down, N. Ireland.

**G2AHB** W. H. C. Jennings, Grafton Radio Society, Grafton L.C.C. School, Eburne Road, Holloway London, N.7. (*Tel.* : *Stamford Hill* 3891).

**G2AIS** P. A. Lovelock, Milford, Loudwater, Bucks.

**G2AND** R. H. Broadbent, 440 Wakefield Road, Dalton, Huddersfield, Yorks.

**G2AVW** R. W. Britton, 6 Bothal Terrace, Stakeford, Choppington, Northumberland.

**G2AXG** G. P. Lambourne, Hope Cove, Limpsfield Road, Sanderstead, South Croydon, Surrey.

**G2AYQ** J. E. Bowden, 23 Richmond Road, Montpelier, Bristol, 6.

**G2BIM** L. W. J. Leask, Greenbank, Cheese Lane, Sidmouth, S. Devon.

**G2BMN** H. Millington, 76 Roseway, Wellington, Shropshire.

**G2BOI** K. V. Draycott, 51 Great Lime Road, Forest Hall, Newcastle-on-Tyne, Northumberland.

**G2BOZ** J. E. Bagley, 2 Bagnall Road, Kings Heath, Birmingham, 14.

**G2BPA** P. Branney, 3 Talbot Gardens, Leeds, 8, Yorks.

**G2BRR** R. G. Rugg, 4 Hillside Avenue Woodford Green, Essex.

**G2BVM** K. H. Pearce, 14 South Avenue, Oldfield Park, Bath, Somerset. (*Correction*).

**G2CCD** C. Usher, 24 Carlisle Road, Dartford, Kent.

**G2CKW** J. L. Meddemmen, 203 Hollydale Road, Peckham, London, S.E.15

**G2CLP** F/O H. R. Boutle, Officers' Mess, R.A.F. Station, Yatesbury, Wilts.

**G2CUR** Capt. V. H. Thomas, 13 Denacre Avenue, South Wigston, Nr. Leicester.

**G2DCF** J. P. Walker, 40 Devon Street, Beswick, Manchester, 12.

**G2DGW** H. W. A. Holloway, 105 Northfield Road, Waltham Cross, Herts.

**GI2DHB** J. J. Hargan, 8 Epworth Street, Park Avenue, Londonderry N. Ireland.

**G2DHV** G V. Haylock, 28 Longlands Road, Sidcup, Kent. (*Tel.* ; *Footscray* 1649.)

**G2DTO** N. Hales, 165 Longley Road, Tooting, London, S.W.7.

**G2DWB** A. N. Webster, 14 Sundale Avenue, Prescot, Lancashire.

**G2FBG** A. E. Dempsey, 59 Ludwick Way, Welwyn Garden City, Herts.

**G2FCL** A. R. Thompson, 41 Sycamore Avenue, Bingley, Yorks. (*Tel.* ; *Bingley* 631.)

**G2FFO** R. Johnson, 41 Scott Park Road, Burnley, Lancs.

**G2FHI** L. Wilks, Font-Avon, Gobowen, Oswestry, Shropshire.

**GM2FVH** T. Brown, B.E.M., 22 Exeter Drive, Glasgow, W.1.

**G2FXH** L. O. Jones, Bryn Offa, Racecourse, Oswestry, Shropshire.

**G2HK** J. F. Lucas, 16 Plummers Lane, Haynes, Beds.

**G2HKU** E. H. Trowell, 27 Unity Street, Sheerness, Isle of Sheppey, Kent.

**G2HX** L. O. Rogers, 2 Percy Cottages, Lower Wilton Road, Great Malvern, Worcs.

**G2NG** J. M. R. Sutton, B.Sc., Winterbourne, Gipsy Lane, London, S.W.15.

**G2NX** H. Woodhead, 46 Oak Drive, Oswestry, Shropshire.

**G2SO** M. Geddes, The Chalet, Woodside, Leigh-on-Sea, Essex. (*Tel.* ; *Eastwood* 55438.)

**G2XR** C. J. Baxter, 12 Nazeby Avenue, Crosby, Liverpool, 23.

**G3AAE** J. D. Kay, 24a Watcombe Road, Southbourne, Bournemouth, Hants.

**G3AAJ** R. J. C. Broadbent, 24 St. Margaret's Road, Wanstead Park, London, E.12.

**G3AAK** K. Bunston, Gable Cottage, Broad Hinton, Nr. Swindon, Wilts.

**G3AAL** B. H. Miles, 6c Jameson Road, Bexhill-on-Sea, Sussex.

**G3AAN** D. E. Meekins, 24d West Street, Hertford.

**GW3AAO** W. H. Longhurst, 82 Gower Road, Sketty, Swansea, Glam.

**G3AAQ** S. L. Jacobs, 48 Elderfield Gardens, Kidderminster, Worcs.

**G3AAS** M. D. Glynn, 40 St. Martin's Grove, Leeds, 7, Yorks. (*Tel.* ; *Leeds* 41452.)

**G3ABA** L. J. Kennard, 41 Manor Road, Rugby, War.

**G3ABE** J. K. Moodie, 4 Hawthorn Gardens, Low Fell, Gateshead, 9, Co. Durham.

**G3AW** T. Arnold, 94 Burlington Avenue, Oldham, Lancs.

**G3IL** W. Parker, 20 Oak Drive, Oswestry, Shropshire.

**G3VD** B. A. Pettit, Tudor Barn, Priests Lane, Shenfield, Essex. (*Tel.* ; *Shenfield* 1363.)

**G3YO** D. S. Patton, A.M.Inst.B.E., 21 Emerson Road, Coventry, War.

**GW4NZ** S. Roberts, 29 Chesnut Road, Cimla, Neath, Glam.

**G4OO** D. Hoult, 19 Darcy Road, Norbury, London, S.W.16.

**G4QD** R. A. Delahunt, Rolfran, Warrington Road, Rainhill, Nr. Liverpool, Lancs.

**G6AJ** H. W. Hamblin, 30 North End Road, W. Kensington, London, W.14.

**G8CZ** S. Clark, 125 Thorpe Road, Melton Mowbray, Leics.

**G8NI** S. R. Long, 19 Hyde Road, Kenilworth, Warks.

**G8QO** G. A. Chroston, Rusholme, Silverne Drive, Whitby, Ellesmere Port, Cheshire.

**G8RY** F. E. Wyer, 20 Lawnswood Rise, Blakeley Green, Wolverhampton, Staffs.

# Here and There

**Booklets and Manuals**

It has been decided to issue, as reprints in booklet form, certain of the series articles which have appeared, or will appear, in *The Short Wave Magazine*.

The first of these—Handbook No. 1 in our Amateur Radio series—is "The Principles of Short Wave Reception," revised and enlarged to 32 pp. and cover, in Magazine format. It will shortly be available from bookstalls and newsagents, price 1s. 6d., or direct from us at 1s. 8d. post free. The original articles appeared in our issues of March, April and May this year, though some of the material in "The Principles of Short Wave Reception" is reprinted from pre-war issues.

The next one, Handbook No. 2, will be "The Cathode-Ray Tube," a reprint of the excellent articles dealing with the fundamentals of the C.R.T., which appeared in March, April, May and June, 1946. This, at the same price, will be ready about the end of September.

The publishing programme also envisages a series of specially written manuals, now in preparation, running to 100 or more pages, each of which will contain new material of an entirely practical nature dealing with a specific branch of Amateur Radio working. The first is to be "The Ten-Metre Manual," which will be ready towards the end of the year.

All these handbooks, which will be quality productions in the same general style as the *Magazine*, will be published by **The Short Wave Magazine, Ltd.**, and will be edited by Austin Forsyth, O.B.E. (G6FO), Editor of *The Short Wave Magazine*.

**More Rationalising**

U.S.K.A., the Swiss Amateur Radio Association, following a ballot of its members, has now decided that their use of the 3·5 mc (80-metre) band shall be as follows:

3500-3635 kc, CW only.
3685-3950 kc, Telephony only.

In the bad old tradition of everyone crowding together at the LF end of any particular band, the bulk of the Swiss activity has been in the 3500-3635 kc area. The 50 kc between 3635 and 3685 kc is a no man's land for the HB's.

**Examination Results**

We are informed by the City and Guilds of London Institute that of the 182 candidates sitting for the Radio Amateurs' Examination on May 8 last—the paper set was published in our June issue—145 passed and 37 failed, giving a passed percentage of 78%. The general standard is described as "very satisfactory."

As will be noticed in the current list of "New QRA's," elsewhere in this issue, calls are now being allotted in the series G3AAA *et seq*; these first ones go to those who are newly licensed but exempted from the written examination and, in certain cases, also the Morse test.

**FOC and QRP**

There is not necessarily any connection between them, but we did mention the First Class Operators' Club and the QRP Society in our last issue. The response to the notice regarding the proposed revival of the F.O.C., which appeared on p. 296 in July, has been greater than the interest shown in the suggestion to form a QRP Society (p. 295, July).

We feel, however, that until we have at least 40 names, it may not be worth proceeding with the F.O.C. Let us know what you think. At the same time, we agree that either could form and make a start with only half-a-dozen members.

**Do You Know That**

Power output on the RF side can be roughly measured by linking an ordinary electric lamp bulb to the output stage? A one or two-turn adjustable link, connected by a low-loss (*not* lighting flex) line to a lamp-holder, is all that is required. Depending upon the rated or expected output, bulbs of wattages varying from 15 to 75 or 100 watts can be plugged in the lamp-holder and the link adjusted for a brilliancy which bears some relation to normal. With a little care, it is possible to measure output with an accuracy of about 15 per cent. either way. By the use of a photometer, and calibration of the lamps, much better accuracy can be attained.


# G9BF Calling

*(We still hope each appearance will be the last.—Ed.)*

Usual heavy fan-mail this month (two phoney QSL's, another foreign postcard and rudery from station signing SUSIE) including letter from G saying he is XL7FB on 14 mc and asking for DX advice from famous operator KZ7LX. This of course is me G9BF.

Am well known for value my advice to beginners, so have no hesitation starting with brief description KZ7LX. Tx for 14 megs is ECO-FD-BA-BA-BA-PA with T20 in final, dragging about 150 mils at near enough 1,000 volts when drive from last BA around 60 mils. This ensures plenty RF at business end final tank coil (can strike neon *without* touching electrode on anode cap) and eliminates necessity elaborate aerial system.

Motto at KZ7LX is " If you have the RF, you can get places."

ECO is on 7 mc guaranteeing bags drive and of course has calibrated dial; calibration maintained by reference absorption frequency meter checked against self-excited oscillator tuned to Rx dial calibrated in metres. Unable poke freq. meter coil into Rx, due danger upsetting its calibration.

Modulator is some 6L6's in parallel push-pull (this technical term not understood by many amateurs) kicked up by amplifier consisting of 6C5-6C5-6C5-P/P 6C5-6F6-P/P 6F6, into 6L6's. Can use as many as eight or nine of latter if T20 won't take it.

Always recommend ample audio power. Motto at KZ7LX is " Get the audio watts and the speech is OK."

All stages modulator-speech amplifier built in wooden box about four by four by four (feet). This equipment turns out quality speech for which I am famous. Mike is same as used by GPO.

Rx is well-known C.1925 produced by firm Heaviside, Layer Radio and Motor Part Manufacturing Co., Ltd., now out of radio business but doing FB as builders' merchants. This Rx has all usual knobs like on-off switch, vol. control, jack for headphones, and row terminals at back marked Aerial on, Connect LS, etc. Also dial marked " Reaction—careful."

Always recommend good Rx for reliable DX working. Motto at KZ7LX is " It's the Rx that gets 'em."

Now for complete description my DX procedure.

*(Not this time, thank you.—Ed.)*

D

SOME

# Letters

TO THE EDITOR

## SURPLUS

I have carefully read your Editorial in the July issue and, whilst appreciating its high motives, am afraid that I—and probably many others—will disagree violently with your view that Government surplus should be dumped in the North Sea.

Much of this equipment is totally useless for amateur work, but a lot is not; for example, the R.1155 receiver, which can be bought at a lower price than the commercial communications receivers now being advertised. My opinion is that if you stop the sale of surplus or second-hand goods, it will retard the growth of Amateur Radio. From my experience, most amateurs buy more second-hand gear than new equipment.

As far as transmitters are concerned, I am inclined to agree with your dumping suggestion. As it is at present, any radio dealer who cares to go to the dumps can obtain them and offer them for sale to the general public. I am very surprised to think that this state of affairs is allowed to exist, as it is bound to encourage pirating on a grand scale.

To sum up, I suggest the sale of receivers, ampifiers, frequency meters and valves to amateurs, as I do not think many manufacturers rely entirely upon the amateur for their sales.—*J. E. Hunter, G6HU, Oakley House, Clophill, Bedford.*

I hope you are not tired of the subject, but with reference to your July Editorial, what about *giving* all the surplus back to the manufacturers? They would find plenty of work in breaking it down and rebuilding it into commercial apparatus—and it would be a saving of raw material.—*H. J. Robinson, 2 Balmoral Terrace, Trinity Hill, Jersey, C.I.*

I am very surprised to see your drastic proposals for the disposal of surplus radio equipment. Surely you realise that wholesale destruction of goods (wealth, in the economic meaning) is senseless, for whatever reason. These goods have been paid for with taxpayers' money, and they are entitled to better treatment than the loss of millions of pounds of their hard-earned money paid in taxes.

It would not be impossible for the radio manufacturers to concentrate on producing other kinds of goods of which there is a dire shortage, and to devote their efforts to producing more modern types of equipment suitable for civilian use. For instance, they are already talking of introducing a whole new range of standardised valves.

The great majority of the surplus valve types are eight to ten years old in design; that is a long time in radio. Surely the makers could now cease altogether the manufacture of such antiquated types as the 6K7 series? In that way, the surplus could easily be absorbed for replacements, or for the first few post-war types of receivers.—*A. G. Dunn, G3PL, 79 Hayton Grove, Hull, Yorks.*

(We are not in the least shaken! Though for a great many reasons we disagree profoundly with these views, we feel it would be unfair to take space here to develop our own arguments, particularly as our correspondents' letters have been abridged to save space. General reader-opinion on the July Editorial is in the ratio of 5 : 1 in favour of the North Sea.—*Ed.*)

## MORSE CODES

On p. 242 of the June issue, G8OK asks how many codes there are. While strictly speaking the answer is, of course, one Morse Code only, such an assertion requires some qualification. American Morse (consisting of dits, pauses and dahs) and International Morse (dits and dahs only) cater for the letters of the alphabet used by the English-speaking nations, with an additional thought for Europeans in the shape of eight accented or "tiddly" letters.

But every country in the world sufficiently advanced to run its own telecommunications system has been obliged to invent its own particular combination of dits and dahs for signalling certain letters or sounds that have no equivalent in the English alphabet. To quote only five instances, Russian Morse caters for an alphabet of 30 letters, Turkish for 27, Greek for 31, Arabic for 29, and Japanese (the "Kata Kana Code") for no less than 51 sounds.

As a slight digression, it might be mentioned that even tribes with or without a written language must have some sort of code—not the one invented by Samuel Morse in 1844—for drum-thumping out a CQ or passing traffic visually by smoke-signal!

While on the subject of Morse, it may interest some readers to learn that when

they send "es" for "and," they are using an American Morse abbreviation originated by the newspaper telegraphist W. P. Phillips as far back as 1876.—*N. P. Spooner*, G2NS, 26 *Southlea Avenue, Southbourne, Bournemouth, Hants.*

(We are grateful to G2NS, who used to be with the Eastern Telegraph Co., for shedding further light on these matters.—*Ed.*)

## KICK FOR THE OLD TIMER

With regard to your notes on Telephony Procedure in the July issue, and as one of the G's who use 'phone, may I raise this question—Is it fair to use plain language when QSO a non-English-speaking operator? Surely it is more sensible to say QRN and QRM, rather than "static" and "interference." And to make it clearer, surely "Norway" and "Madagascar" is more helpful than "Nuts" (Nancy), or "Margarine" (Mary). Seriously, though, don't you agree? I usually call "G 8 London Yokohama" for DX, as what foreigner would understand "Lewis" and "Young?"—*Constance Hall, G8LY, North Waltham Rectory, Basingstoke, Hants.*

(Fortunately, we don't have to try to answer this one. We passed it to the Old Timer, who skates round it by saying: "G8LY has certainly raised a point which I was not considering seriously—that of contacts with non-English-speaking amateurs. But most of the 'QRNorway' experts I have heard have been working others G's. In any case, I still think the answer is an international phonetic alphabet, and I maintain that in an art like Amateur Radio, the very worst of all words to use are place-names, because they are so tied up with the DX side. The old Ack-Beer alphabet had its uses; but the new one will never become international unless people adopt it, even if they don't like it."—*Ed.*)

## VFO AND BKS

More Franklin—since the output at the two anodes of the oscillator differs only in phase, would it not be possible to couple aperiodically to a push-pull final? I have no opportunity of testng this at present, but it would seem that a DET19 followed by a pair of PT15's should work quite comfortably, and with only two tuning controls. Since trimming and padding can be added to the oscillator without harm, it remains a possibility for the more ingenious to gang up these two controls.—*J. B.Roscoe*, G4*QK*, *Springdale, Woburn Sands, Bletchley, Bucks.*

For anyone building a VFO for BKS, I suggest a multi-vibrator circuit. A triode is RC-coupled to a second triode the anode of which is coupled by a small condenser to a tank circuit; this in turn is coupled by another condenser to the grid of the first valve. These two condensers are very small (less than 5 μμF) and are in series with the valve capacities, so variations in HT will have little effect on frequency. The tank side can be in a separate compartment from the rest of the circuit and thus kept cool.

If octal-based plug-in coils are used, a little fancy wiring can put the tuning capacity in circuit with the coils or out of circuit when a crystal is used. Thus one has VFO or CC as required—the CO being very useful for the CQ call.

An RK34 twin-triode can be used and keying accomplished by back-biassing. The circuit is very stable (I use one as a test oscillator) and gives copious harmonics.—*J. Collinge, A Sqdn.*, 3/4 *County of London Yeomanry, B.A.O.R.*

(These are ingenious ideas worth further attention. Has anyone tried to adapt the Frankin oscillator for push-pull drive, by the way?—*Ed.*)

## WORD FROM AMERICA

It was indeed a pleasure to read "Top Band Again" in the April issue. Needless to say, it brought back many pleasant memories of our schedules, and I wish to thank you for the honourable mention given W1BB. It might interest you to know that friendships I formed with G's through these Tests have been growing all the time, by correspondence and occasional contact on other bands.

I do not know what your plans are for 1·8 mc—but if it would be of any assistance to the cause, I would be glad to listen again for G's during a special test or two. However, conditions are not too good here for receiving in the band, due to Loran and BC harmonics.—*Stewart S. Perry, W1BB*, 36 *Pleasant Street, Winthrop, Mass, U.S.A.*

(Thank *you*, "SS," and for your offer to co-operate in future Transatlantic Tests on 1·8 mc; when the season comes round again, we propose arranging a cross-band 3·5/1·8 mc Test. All the G's who took part in our pre-war 1·8 mc events will look forward to hearing your signals bumping across on 3·5 mc.—*Ed.*)

# THE MONTH WITH THE CLUBS

## FROM REPORTS

With the appearance of seven clubs new to these pages, once again we have 22 reports for this month's news article. Closing date for material for the next (September) issue is August 19 *certain*, so please post on the 17th, or earlier if possible.

A matter of immediate interest to all clubs is the granting of portable facilities to Cheltenham, though for one day, and one period during that day, only. The call-sign G8DA(P) will be used, the suffix "P" indicating that the station will be operating portable; see Cheltenham notes below. So there is hope yet for field day work with transmitting equipment.

Those secretaries who did express an opinion on the present manner of presenting "Month with the Clubs"—see this column, July issue—were unanimous that it should be continued in the same style. So it will.

Herewith this month's reports—the names and addresses of the secretaries of all the clubs mentioned will be found at the foot of this article.

**Aylesbury Meeting.**—This is not strictly a club report, though it might have been if the meeting had gone on a little longer, or if the subject had been brought up earlier ! On July 21 a most successful gathering, organised by G3IF and G3PV, was held at Aylesbury. Some 72 amateurs attended, some from as far afield as West London, Bedford and Reading. A short series of useful talks was followed by a raffle (Stratton & Co. and Webbs Radio kindly donating the equipment) and later on an auction sale of secondhand gear produced some good bargains. This was the first organised meeting of such a size in Aylesbury, and for all concerned it was most enjoyable; the group photograph appears with this article.

**Woodford and District Radio Society.**—They plan to recommence activities on Tuesday, September 3, and all new, prospective and pre-war members will be welcome at the headquarters, Wanstead House.

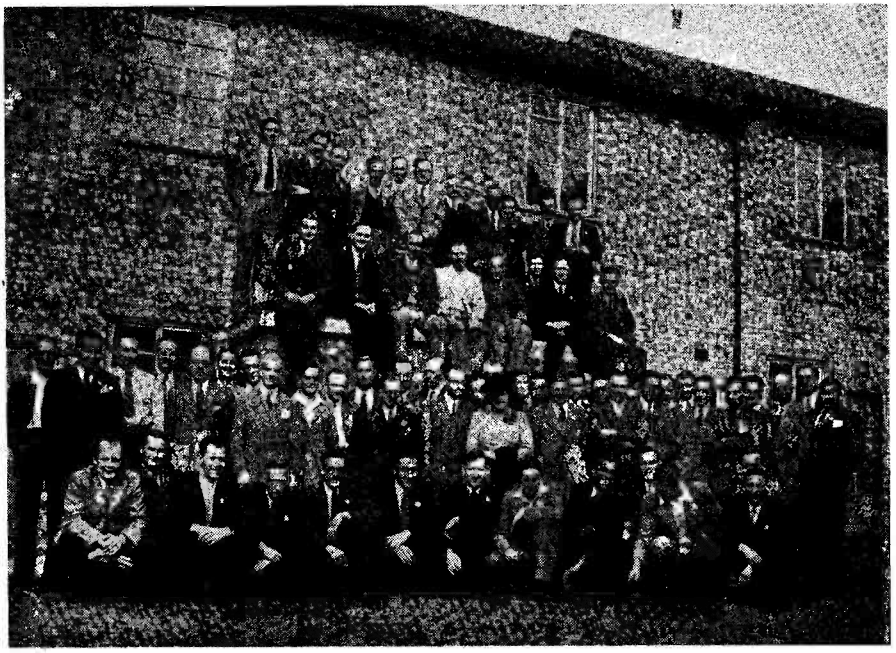
**South Shields Amateur Radio Club.**—Lectures and demonstrations are the main features of their meetings, and new members are coming in regularly. One of the South Shields objects is to encourage those starting out in Amateur Radio. G8VV, the chairman, has been talking about crystals and their uses. The club meets every Friday at 7.0 p.m. in St. Paul's School Room, Westoe, South Shields.

**Surrey Radio Contact Club.**—At the last meeting there were 36 members present, with G2TI in the chair, to hear G5BT talk about oscilloscopes. He covered the ground very fully, including the use of C.R. tubes in the amateur station, and his talk led to a useful general discussion on the subject. The next meeting is on August 13, when G2WS is to talk about portable apparatus.

**Romford and District Amateur Radio Society.**—Future meetings will be held in the Mawney's Road School, Romford, every Monday at 8.0 p.m. Secretary Beardow, G3FT, would particularly like to hear from secretaries of other clubs.

**Hounslow and District Radio Society.**—On June 26 the time was devoted to a discussion on super-regenerative receivers; G3DA showed one which tuned to 100 mc. On July 10 the future programme—to include a talk on a different subject at each meeting—was arranged, and it was also decided to form a library. In common with some other clubs, attendance has been suffering from the summer holiday season.

**Bradford Short Wave Club.**—Quite a lot has been happening up there since last month's rather brief notice appeared. They now have permanent H.Q. at 1374 Leeds Road, consisting of three first-floor rooms; one is to be used for the club station G3NN. A particularly interesting lecture was that on July 1 by G2QM on aerials, including a design for an indoor transmitting aerial. Membership is now 40, and when the club premises have been finally fitted up, it is expected they will be open most evenings in the week. All this is much to the good and shows that someone, in these times which are so difficult in regard to accommodation, has been putting in a lot of hard work.



**The gathering at Aylesbury.** *Some 72 amateurs attended what was a most successful meeting on July 7, organised by G3PV and G3IF.*

**Cheltenham Amateur Radio Society.**—They draw first blood in the matter of field days, having been granted permission to hold a D/F meeting on Sunday, August 25, between 1500 and 1800 BST, when G8DA(P) on 1900 kc will be the hidden transmitter. Reports on the reception of G8DAP, operating on very low power, will be welcome from any part of the country. Cheltenham meets every Friday evening at 7.30 p.m. in the Cheltenham Technical College, and all interested in Amateur Radio are invited to attend.

**Reading and District Radio Club.**—A high level of activity is also the theme here, in spite of the summer season. G6CU gave his promised talk about experiences on Cocos Island on June 28, which proved interesting, informative and amusing. On July 7 a party was made up to visit the Aylesbury meeting (reported elsewhere in these notes), and spent a very good if rather warm Sunday afternoon making personal contact with many familiar callsigns. When 7 and 14 mc opened there was a general migration into these bands, but due to BC QRM on the former and the congestion on the latter, there has been a drift back to 28 mc. The number of broadcast stations ocupying 7 mc is particular cause for complaint, The 58 mc stalwart locally is G8RS, who has been in on the recent European DX. With many members now out of the Services and back in the district, Reading is shortly to hold an election for certain of its offices. An SWL competition, with a cup to the winner, is now starting ; this is given not for DX' but for the best lecture and demonstration'

***It is proposed to reform the East Grinstead radio society; will anyone interested write E. C. Cooper, Heatherlea, Cranston Road, East Grinstead.***

**Liverpool and District Short Wave Club.**—Once again much activity is evident from G4QC's report. At a recent meeting, W. Balmer, who held a licence as far back as 1911 under callsign BBC (yes!) gave a most interesting talk on the trials and struggles of those pioneer days, when one's

own components had to be designed and then made up for the job in hand. G8JU, who dates back to 1929, and who has had considerable experience in both commercial and Amateur Radio, then discussed the modern trends, to give point to the previous talk. Altogether, a most interesting evening, as we can well imagine. Other recent events have been a "Quiz Meeting" and an auction sale. The club has applied for its transmitting licence and an amateur band contest is being organised.

**HI-Q Club, Giffnock.**—Though holidays have curtailed recent activities, members are active on all bands. As a result of some work on 28 mc, it appears that the ideal simple aerial is a horizontal rotary doublet —or two switched doublets at right angles —with which very good results have been obtained on those occasions when the band has opened. Members are arranging schedules with Southern English stations on 1·8 mc ; GM3AR is now an advocate of VFO, and there are some converters appearing for use on 58 mc, so that co-operation can be given on that band. A good library is being built up and the meetings (each Thursday) are very successful.

**Edgware and District Radio Society.**—The last member to return from service, G3LT, is now back, and the present membership is 66. At a recent meeting the subject for discussion was 'Phone v. CW, which will probably never be solved to everyone's satisfaction. What did emerge was a general feeling that it would be much better if the maximum power was 10 watts. It was also considered that we should have a UHF band for pure experimental work.

**Grafton Radio Society.**—They are closing down during August and the reopening meeting will be on Monday, September 2 —thereafter every Monday, Wednesday and Friday from 7.30 to 9.30 p.m. An interesting programme is being planned for the autumn ; reports on the reception of G8DF and G2AHB, both operating at the Grafton, will be very welcome.

**Sheppey Amateur Radio Club.**—Disbanded in 1939, the club has now re-formed and, it is hoped, will enjoy the support of all interested in Amateur Radio in the Isle of Sheppey. The first meeting was devoted to the formulation of future policy and a programme covering all aspects of Amateur Radio interest was mapped out.

**Grays and District Amateur Radio Club.**—They have about 28 members at present and meet at Baird's Café, Onsett Road, Grays, at 8.0 p.m. on alternate Fridays, the next being on August 16. Four members are busy on 1·8 mc, and G3GF is on 28 mc.

**Jersey Radio Society.**—The next meeting will be on August 12, at 7.30 p.m. in the Chamber of Commerce, Royal Square, St. Helier. Visitors are always welcome. Activities include Morse classes under GC3GS, and a member has very generously provided a workshop for the use of the society.

**Doncaster and District Amateur Radio Society.**—With a present membership of 30, they meet each Wednesday at 7.30 p.m. in the Leopard Hotel, Doncaster. Anyone in the district interested in radio is invited to these meetings.

**City of Belfast Y.M.C.A. Radio Club.**—With a growing membership they now have a new transmitter under construction as well as another which is to be the club memorial transmitter. Some very fine apparatus has been constructed by the membership, and a competition for the SWL's is to be held later in the year. GI6TK, the secretary, will be very pleased to hear from any amateurs who visited the club during the war; he is also prepared to forwards cards and letters for any GI'S whose addresses are unknown.

***Capt. V. H. Thomas, G2CUR, 13 Denacre Avenue, South Wigston, Nr. Leicester, will be glad to hear from anyone interested in the formation of a club in this district.***

**Stourbridge and District Radio Society.**—As most members will be on holiday, it was agreed to cancel the August meeting. Recent talks have been by the President, G6OI, also G2NV, G3UK and BRS-4806; future lectures will include one on aerials.

**Wolverhampton Amateur Radio Society.**—Their meetings are on the first Monday every month, at 7.30 p.m. at Baynell's, Merridale Street, Wolverhampton. Most members of the old society have rejoined, and among the officers are G6FK, G8KL, G2DUH and G8RY. Most of the transmitting members are active and Morse practice is conducted by G8KL.

**West Middlesex Radio Club.**—A meeting will be held on August 14 at the Labour Hall, Uxbridge Road, Southall, at 7.0 p.m. It is proposed to form groups covering a wide range of activities and all interested, including former members of clubs in the area, are invited to attend. The business will include the election of officers and the discussion of matters of organisation.

**Medway Amateur Transmitters' Society.**—Future plans are now well in hand, and members are showing considerable progress in the construction of club gear. A 100 kc calibration oscillator is available, together with lecher wire measuring equipment for VHF. The club transmitter will soon be on under call G2FJA, and reports on transmission will be welcome. A full range of talks and lectures will be given during the coming months, and one of the most successful activities has been the brains trust. Meetings are every Monday at 7.30 p.m. at the Welfare Club, 207 Luton Road, Chatham, and all interested in radio, including Service men stationed in the district, are invited.

**Wirrall Amateur Transmitting and Short Wave Club.**—Recently re-formed, all past and prospective members in the areas Birkenhead, Wallasey and West Cheshire are asked to communicate with the acting secretary, G2AMV.

Following are the names and addresses of the secretaries of the clubs mentioned this month. They will be pleased to give every assistance to prospective members.

**BELFAST.** F. A. Robb, **GI6TK**, 60 Victoria Avenue, Sydenham, Belfast. (*Tel.*: Belfast 55494).
**BRADFORD.** V. W. Sowen, **G2BYC**, 6 West View, Eldwick, Bingley, Yorks.
**CHELTENHAM.** H. Brislin, 52 Cleevemount Road, Cheltenham.
**DONCASTER.** H. Flintham, 50 Burton Avenue, Balby, Doncaster.
**EDGWARE.** P. A. Thorogood, **G4KD**, 35 Gibbs Green, Edgware.
**GRAFTON.** W. H. C. Jennings, **G2AHB**, 82 Craven Park Road, London, N.15. (*Tel.*: Stamford Hill 3891).
**GRAYS.** R. F. Read, **BRS-11753**, 26 Hillside, Little Thurrock, Grays, Essex.
**HI-Q CLUB.** J. D. Gillies, **GM2FZT**, 3 Berridale Avenue, Glasgow, S.4.
**HOUNSLOW.** A. H. Pottle, 11 Abinger Gardens, Isleworth, Middlesex.
**JERSEY.** E. Banks, **GC2CNC**, Fort Rock, Tabor Lane, Route des Genets, St. Brelade, Jersey, C.I.
**LIVERPOOL.** T. W. Carney, **G4QC**, 9 Gladeville Road, Aigburth, Liverpool, 17.
**MEDWAY.** S. J. Coombe, Stanvic, Longhill Road, Chatham.
**READING.** R. J. Nash, **BRS-4573**, 9 Holybrook Road, Reading.
**ROMFORD.** R. C. E. Beardow, **G3FT**, 3 Geneva Gardens, Whalebone Lane North, Chadwell Heath, Essex.
**SHEPPEY.** F. G. Maynard, **G4OU**, 160 Invicta Road, Sheerness, Kent.
**SOUTH SHIELDS.** W. Dennell, 12 South Frederick Street, South Shields.
**STOURBRIDGE.** D. Rock, **G8PR**, Sandhurst, Vicarage Road, Amblecote, Stourbridge.
**SURREY.** L. Blanchard, 122 St. Andrews Road, Coulsdon, Surrey.
**WEST MIDDLESEX.** H. E. Janes, **G5JM**, 215 Broadway, Southall, Middlesex.
**WIRRALL.** B. O'Brien, **G2AMV**, Caldy, Irby Road, Heswall, Cheshire.
**WOLVERHAMPTON.** W. O. Sturmey **G8KL**, 3 Broome Road, Wolverhampton.
**WOODFORD.** M. M. d'Arcy, 27 Theydon Grove, Woodford Green, Essex.

## IRISH BANDS

The EI's have so far been licensed for 58-60 mc (25 watts), 28-30 mc (100 watts) and 1·8-2·0 mc (10 watts). Presumably they will appear in the 7 and 14 mc under the same general conditions as obtain over here.

## ABBey 2384-5-6

With the installation of a new switchboard, three exchange lines and other conveniences at 49 Victoria Street, will those concerned kindly note that our telephone number is now as above.

## TRADE ADVERTISEMENTS



## READERS' ADVERTISEMENTS

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