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The SHORT WAVE Magazine

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SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

Vol. IV. JUNE 1946 No. 4

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EDITORIAL

Economics

While on the one hand there is now a keen demand for Amateur Radio equipment of all types, on the other there is a feeling that much of that offered of British manufacture is priced too highly. The comparison is made not only with pre-war values, but with post-war ruling prices of similar American equipment, in America.

All will agree that post-war prices have gone up in every field—the inevitable result of the turmoil and scarcity conditions we now suffer—but since America is in much the same plight, it does not seem to explain why British post-war prices of radio equipment of the specialised amateur types are, in general, higher than in the States.

There is a perfectly simple explanation for all this. Whatever the demand may be in this country for a particular piece of apparatus, there is roughly ten times the market for the same thing in the States. The American manufacturer's cost of production per unit is therefore very much lower than it can be for the British manufacturer, who must charge a higher price or sell at a loss. Wage rates, often quoted as a reason, have in fact little to do with the problem; in any case, they tend to be higher in America. Incidentally, the argument applies equally to practically every manufactured product common to the two countries. In other words, without tariffs it would be cheaper to buy in this country radio parts, motor cars or refrigerators made in Newark, Detroit or Michigan than the same thing made in Birmingham, Coventry or Manchester.

While this is not the place to argue economic problems or to discuss politics—fascinating though they are—the reader who has followed us thus far will now perceive that the British manufacturer does not always put relatively high prices on his goods in order to snatch a quick profit. To produce them at all, the inexorable law of the penny bun compels him to sell at a higher price in a less absorbent market.

The Dollar Agreement is now all but through. If the money is spent on primary commodities—food and raw materials—the present state of affairs may continue and ultimately we may all be better off as stability is achieved. But if, as the Americans apparently wish, transatlantic tariff walls are lowered or abolished, we may well have an easy flow of delightfully cheap American equipment. If this does happen, our manufacturers will starve as far as Amateur Radio is concerned. But will that apply only in the world of Amateur Radio, where such a situation is relatively of no great importance? We fear not. The spending of this money is a matter which will touch us all very closely and in many unexpected ways.

Five Metres

Band Opens for inter-European Working—G5BY/G5MQ have French and Italian Contacts—F3JB, I1IRA, I1AY Heard by many Gs—G5MQ/G6VX Maintain 15-day Schedule over 184 miles—New inter-G Contacts

By **A. J. DEVON**

LIKE the moguls of Hollywood, we are beginning to run out of superlatives. But above you have the highlights of another eventful month on 58 mc, with the promise of more to come. Indeed, it is not unlikely that while we write this on May 22, new records are being made. One of the problems confronting your contributor is how to be on the air and on the typewriter simultaneously —DX *always* breaks when it's time to write this article!

G5BY collects the new post-war record—the first inter-European contact on 58 mc. At 1700 on May 19, he worked I1FA on 'phone, Q5S9/Q5S7; this was followed at 1718 by an S9-both-ways 'phone QSO with I1AY, and at 1811 the same with F3JB. At 1828, he had another contact with I1FA, S9 'phone again. G5BY was also heard by HB9G.

G5MQ was on during this period and at 1740 he worked I1FA, who was then signing I1IRA. At 1810, G5MQ heard himself called by F3JB, but as the Frenchman could not take CW, no actual QSO resulted.

Much of all this was overheard by several G's, including G2OA (Liverpool), G5MP (Hythe), GW6OK (Colwyn Bay), G8JV (Nottingham), G2LC (Ruislip), G2XC (Portsmouth), G8DV (Farnham), G5BD (Mablethorpe) and G6LK (Cranleigh), all of whom were on at different times between 1700 and 1900 on May 19.

There is at the moment slight doubt about the exact location of F3JB; he is believed to be in Paris, but the Call Book address puts him in the south of France. As to I1IRA, this is virtually an "under cover" callsign, since the Italian licensing situation is vague and the custom has been for a different set of callsigns to be used on 58 mc. I1IRA undoubtedly used his old 5-metre call to identify himself to G5MQ, whom he had worked on the 56 mc band on July 2, 1938! The Italian callsigns are apt to be a little troublesome when the same station comes up with two different ones, and we may not be quite straight on I1IRA—the main point is that two separate Italian stations were heard, identified and worked.

All the foregoing will remind many readers of the events of June, 1939, when much the same sort of thing happened, and mainly with the same stations! The sudden appearance of several Italians with peculiar callsigns (all subsequently found to be entirely genuine) was followed by a number of snap QSO's under S9 conditions, with reception of the DX signals in many different parts of the country. In fact, it would not be too much to say we are now *back* to June, 1939, with the 58 mc band behaving in much the same fashion as it did in those days.

Inter-G Working

Even the pre-war G5BY-G6FO partnership, when regular contact was maintained over a 126-mile path for eight months, is now being duplicated by G5MQ and G6VX, who have worked two-way on 15 consecutive evenings over the 184 miles between Woolton, Liverpool, and Hayes, Kent. They have also had a couple of early morning (daylight) schedules, just to see if it could be done then. It could. Our prediction is that, as in the case of G5BY-G6FO, the G5MQ-G6VX link

will be found just as solid, as certain and as lasting.

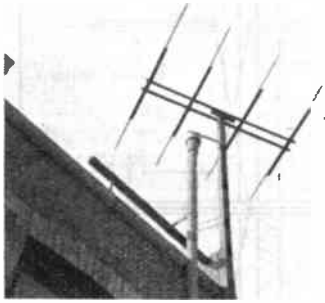
Another good contact has been G5BY-G5MQ, for the first time on May 13, at 2203, the distance being 215 miles. Then again, on May 11 G5MQ worked G5TX (Isle of Wight, 195 miles). G5BY's total of DX (over 100 mile) QSO's was 43 as at May 23.

Numerous shorter distance contacts have been made, mainly during the period May 10-12, when conditions were particularly good; many of these results are covered in Calls Heard in this issue. Broadly speaking, though there are variations in conditions and flat periods, inter-G working up to distances of 200 miles is passing from the very uncommon and exciting into the state of being an interesting thing which has happened before. The next time we get really excited will be when one of the southern stations works Scotland or Northern Ireland. It could be done if we had a little *regular* activity up there.

Theories

The European working described above is, of course, attributable to unusual ionospheric conditions, in this case our old playmate sporadic-E. When sporadic-E is right, anything can happen, but the trouble is that it is so flash-in-the-pan that weeks of patient watching is necessary to catch it. So far as the season now approaching is concerned, the prediction is that sporadic-E effects will become more and more frequent. Hence, if we get the necessary consistent activity at DX, our own regular operators should make some easy records. As G5BY remarks at this point "Quite amazing, but far too easy. Give me inter-G record stuff every time—that does require some judgment or luck—or something."

As to the 200-mile QSOs now being obtained, some quite different theory is necessary. Ducting, explained and discussed last month, no longer seems to fit the facts of regular working, as in the case of G5MQ-G6VX and the consistent reception of G5TX by stations 80-100 miles away, to say nothing of



The 4-element rotary beam at the G5BY end when, with G6CW, the 233-mile inter-G record was made.

the regular appearance of G5BY in the South London district; G6LK has established a firm link with him.

Admittedly, G5BY varies in strength, but his signal is nearly always there and, according to the observations of G5BY himself and others, *under any weather conditions*. G6DH does not entirely agree with this, he holding that recent weather can be made to explain everything. On the other hand, in an interesting letter G2LC quotes experiences which fit in well with the ducting theory. He also draws attention to the many known cases of stations which appear to be screened by high ground for transmission in a certain direction, but can receive DX from that direction.

Too Much 'Phone

Many correspondents are now complaining that there is a great deal too much thoughtless 'phone working on 58 mc, in that when conditions are good, weak and unresolvable carriers have been audible, obviously emanating from DX, which could have been identified if the operators had signed occasionally on CW. The question of 'phone QRM does not arise, since the band is still relatively unpopulated; it is simply a problem of identification.

We have always felt very strongly on this point, but refrained from enlarging in print on what was a personal opinion of no importance. But now well

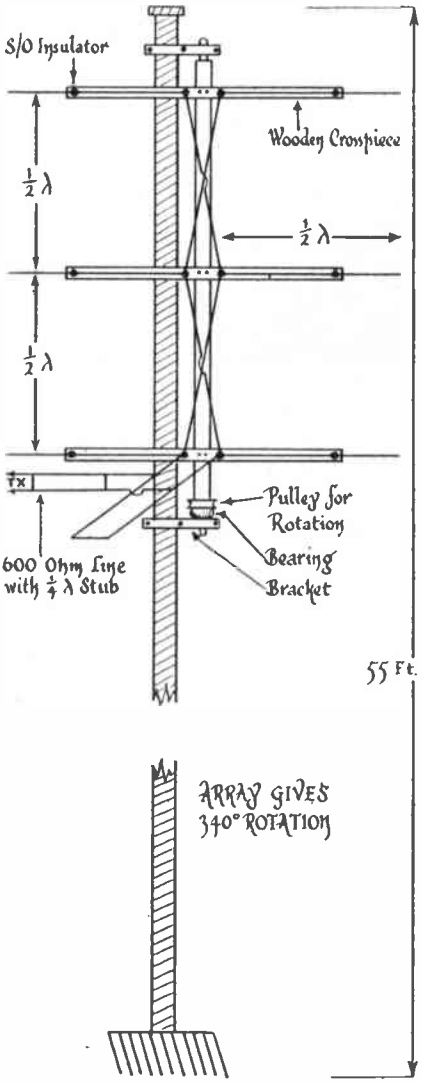


Diagram gives main details of the six-½-wave-in-phase vertically stacked 58 mc aerial at G6CW (Nottingham). ***All elements are ½-wave long, with ½-wave separation, and fed through a 600-ohm line across a ¼-wave matching stub at the base of the array. G6CW credits this aerial with his recent successes on 5 metres.***

over half of all the reports received to date have asked for the matter to be mentioned. It is of course fully agreed that for local working, 'phone is quicker and easier—and all local groups on five metres usually have a good deal to discuss. But the very fact that it is so quick and simple usually brings about two results: A lot of chatting round the group, developing into a 'phone session; and the rapid signing of calls. If there is one thing more exasperating than another, it is to hang on for five minutes or more to a weak 'phone you can just read, and then fail to identify him because he snaps out his call so fast once only that he is gone before you have time to concentrate on the call. This sort of thing usually happens when two neighbours are in QSO.

The solution seems to be: When on 'phone, sign slowly, distinctly and in the phonetic alphabet, even if you are only having a quick chat with a local. When in a 'phone ring, sign fairly frequently on CW—there is probably somebody somewhere trying to sort you out. Some stations use nothing but CW on 58 mc, but this is inclined to slow up the party when working local stations.

Another point, raised by several readers, is the congestion of stations towards the LF end of the band. This is in accordance with tradition on all amateur bands, but that still does not make it good! If on the receiver the 1,500 kc area is arranged to cover about 40 degrees on a 100-degree dial, one can get from one end of the band to the other in reasonable time without missing a weak signal.

Aerials

The long-wire addicts are finding themselves in the small minority now; beams are all the fashion, and are giving very good results. The search and coverage problems still remain, however, and our own solution is a long-wire plus a four-element rotary. But the long-wire must be reasonably omni-directional. G5JU (Birmingham, now operating G6SL) raises a point here. He says "I do not agree that

long-wire aerials are omni-directional; what usually happens, I think, is that most long-wires have inverted-L characteristics, with a vertical component and four major lobes off the top."

The three-element rotary is the favourite, though some stations are using more elaborate arrays. Two such are illustrated here.

Shorts

We are running over space, so the rest must be condensed: Strike SU1RD off the Activity List; he has never been on five, so that disposes of last month's rumour . . . G5TX will come on any time of the day or night for special tests; ring Newport, I.W. 2504 . . . G6CW (Nottingham) is on every evening between 1800 and 2300 BST . . . G8US (Bideford) says that the 0.15 amp. heater valves are much quieter than the K range, and are just as efficient . . . G5MP hears no G's, but only foreigners, as he is totally screened to the north . . . G5MQ has a 954 mixer with cathode regeneration which, when carefully adjusted, doubles a weak signal; the oscillator is a 955, with suppressor injection into the 954, which needs a lot of coupling under these conditions. He ties the 954 suppressor directly to the grid of the 955, which has a 50K leak, and is set for 0.2 mA grid current; an advantage of the whole arrangement is that the tuning of the grid and oscillator circuits does not cause the slightest degree of pulling. . . . The D2's are becoming regularly active on 58 mc and will be looking for us all the summer. . . . When G5BY worked his first Italian, there was a cloudburst outside; the 11,000-volt feeder of the grid system flashed over, producing an arc across the insulator which caused some noise in his receiver; then, in the excitement of trying to make the I understand English, G5BY blew up his modulation transformer. . . . New stations on are G2AAN (Newbury), G2QY (Pinner), G3SU (Petworth), G5BD (Mablethorpe), G6SL (Birmingham), G6YU (Coventry), G8CK (Watford), G8DT (Cheltenham), G8QY (Birmingham), G8UB (Oswestry), G8US (Bideford), G8UZ (Sutton - in - Ashfield), GW5FU (Rhyl) and GW5YB (Bangor).

G8RS (Reading) hears G2BMZ (Torquay) louder than he gets G5BY, and remarks upon the insensitive receivers possessed by some other 58 mc. operators; they can be well heard, but never seem to answer a call. . . . G2XC has worked G2BMZ (115 miles) and has consistent two-ways with G8DV (Farnham) through a hill 900 ft. high. . . . Many report the reception of 58 mc. amateur and commercial harmonics during the period May 19-20, always a sign that the band is open for DX. . . . G2AAN (Newbury) turns in a good general log of 58 mc. signals heard. . . . An excellent report from BSWL-1862 (Gosport), who is well equipped for 58 mc reception... In case casual readers, new to all this, wonder why a handful of G's are making such a fuss about working one another and a few stray Europeans, the answer (roughly) is that a 200-mile inter-G contact on 58 mc is rather more difficult than working a W6 on 7 mc; to work a European is rather like hooking a ZL on 3.5 mc . . . We see from this month's *QST* that the Americans have started a 50 mc W.A.S. contest.

Test Periods

June 14, 15, 16: 1800-1930, 2100-2300 daily; Sunday, June 16, 1100-1300.

July 5, 6, 7: As above, all times BST.

Reports

Please forward these by June 18 and July 9 to A. J. Devon, c/o *Short Wave Magazine*, 49 Victoria Street, London, S.W.1.

VFO Drive Unit

Variable Frequency Oscillator for Break-In, Single-Channel Working—Simple, Practical and Effective

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

LAST month the pros and cons of break-in and single-channel working were considered in some detail. It is now proposed to discuss the use of a variable frequency oscillator—not so much from the point of view of design as its operation and application in conjunction with the rest of the equipment.

Most electron-coupled oscillators are basically good; provided that the circuit constants are reasonable and the layout intelligently planned, they cannot differ much from each other. One user, however, will produce an apparent T9x note and be able to put his transmitter quickly on whatever frequency he wishes, whereas another will never be able to get a T9x report and will creep about the band with a chirpy note, leaving a slimy trail behind him on the dial !

This discrepancy can seldom be blamed on the VFO itself ; it may be anything in the equipment, right up to the final tank circuit and the aerial coupling, or even the aerial itself. Low efficiency in the PA stage with an unsuitable or unsuitably-coupled aerial will feed back a lot of HF into the station, and this, *via* the mains and other stray wiring, will reach the VFO, spoil its keying and even cause it to creep.

Circuit

The unit described is simply a self-contained electron-coupled oscillator. It comprises a tetrode and its oscillatory circuit (grid, cathode and screen) inside a small aluminium box. This circuit is the one that needs to be isolated ; the anode circuit can be arranged in many different ways, and if the VFO itself is good, nothing that happens to the anode circuit will have any appreciable effect upon its frequency. Therefore, after a considerable amount of experimenting it was decided to bring the anode lead straight out of the box and thus to give the unit the maximum flexibility.

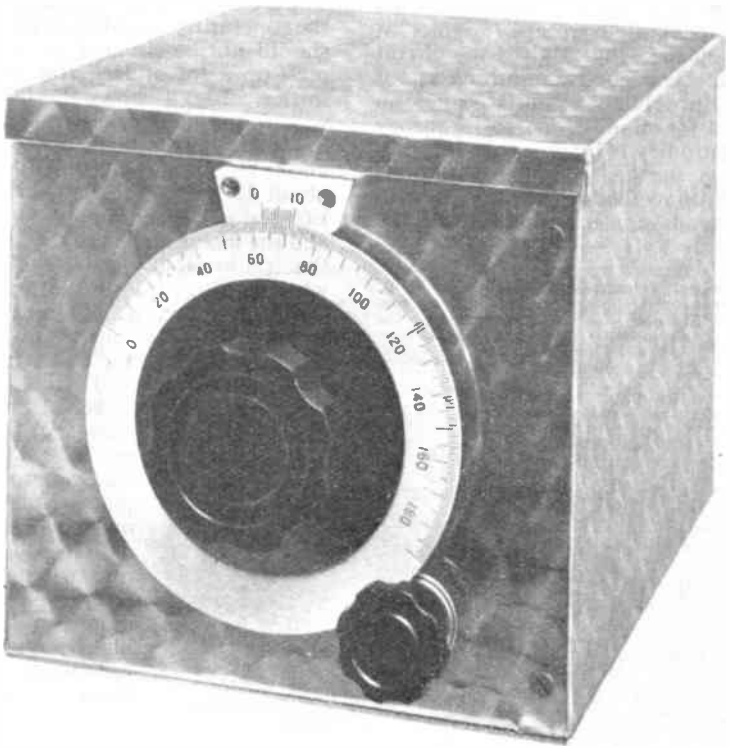
With the coil data given, the 3·5 mc band is covered in the centre of the dial. Actually, the frequency range covered is quite large, so that the unit may be used on any convenient frequencies for trebling into the more remote bands. For exclusive use on 3·5 mc, it is suggested that the 160 $\mu\mu$F tuning condenser be replaced by a 100 $\mu\mu$F fixed condenser and a small variable of 25 or 50 $\mu\mu$F in parallel.

The block diagram (Fig. 2) shows the way in which the unit has been used during its original tests. It has been tuned to 3·5 mc and left there with the heater running but the HT switched off if necessary. Outside, a 7 mc anode circuit has been arranged, this being link coupled to another 7 mc coil which simply plugs into the grid circuit of the CO in place of the crystal. The original CO thus becomes a buffer, and serves as a keying valve, the back-bias keying shown in Fig. 1 on p. 155 of the May issue remaining untouched.

The benefit of this scheme is that one has a normal crystal-controlled exciter unit which need not be altered in any way except for the removal of the plug-in crystal holder and the substitution of a coil fitted with a similar two-pin plug.

Keying

If the refinement of the buffer/keying valve is not appreciated, then the first 7 mc tuned circuit outside the VFO can be coupled straight across to the

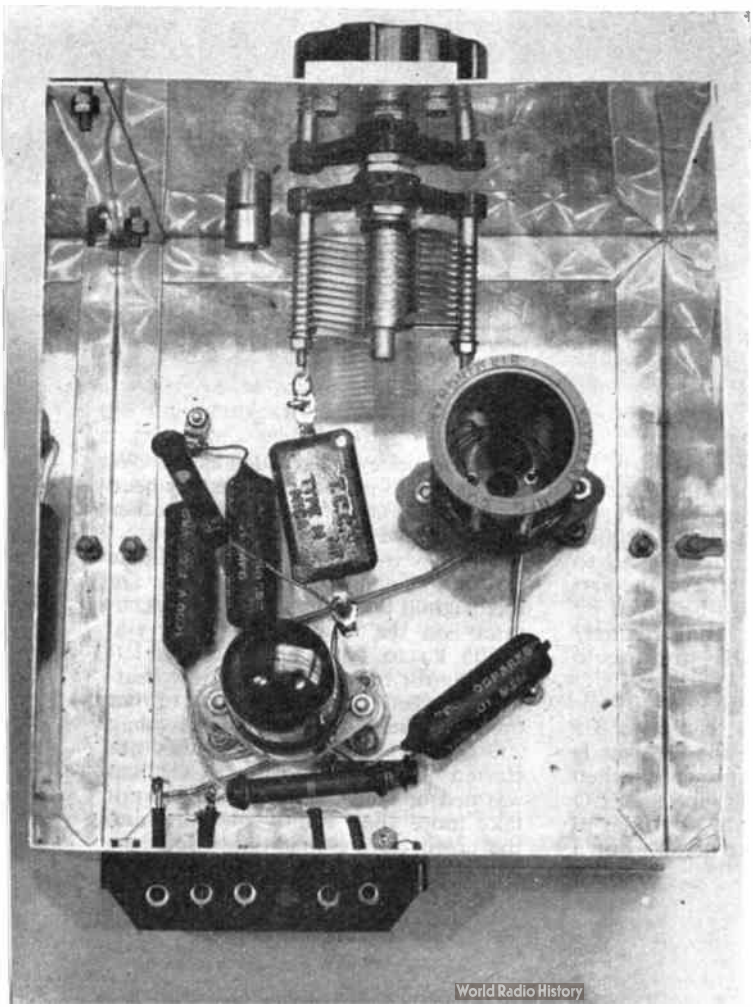


anode coil of the CO; similarly, if this VFO is going to form the basis of a complete transmitter and crystal control is not to be used, its 7 mc anode circuit may simply be link-coupled to a similar circuit in the grid of the first doubler, which may then be keyed by the back-bias method. It is strongly recommended that for HF working no attempt be made to key the ECO itself. Break-in operation is still entirely possible, because, being on 3·5 mc, the ECO signal in the receiver is quite weak. It is very easy, when listening to a CQ call, to tune the ECO right on top of it and to continue to listen with the beat-note going. For a small frequency-range, such as the CW end of the 28 mc band, it has not been found necessary to touch any other control in the transmitter.

Stability is such that a very reliable calibration curve may be drawn. On the original test the ECO was set accurately on the frequency of a crystal (3,505 kc to be exact) and was left running for four hours. The low beat-note between the two at the end of that time represented a shift of less than 200 cycles. This, of course, was not started until after the ECO had warmed up, but that process does not take more than twenty minutes, and the creep during that time (once the

heater has settled down in the first minute or so) is quite small.

The power supply for the ECO consists of a small but well-smoothed power pack delivering 275 volts at about 30 ma. Fig. 3 gives the circuit details. The good smoothing is, of course, absolutely essential, since an ECO is far more prone to frequency modulation by HT ripple than is a CO. (Witness the fact that many stations using both methods are dead pure with the crystal in use and decidedly T8 without it !)



Inside the box. *Arrangement of the circuit of Fig. 1. All external connections are brought out on the connector strip visible along the bottom edge. The cabinet, of aluminium, is 7 in. cube, with a close-fitting lid. Any metal box about this size will do equally well*

Using the VFO

Now for the all-important question of the layout of the gear in the station. The ECO dial must be well to hand at the operating position, but the box should not be situated so that it will pick up a lot of HF from the transmitter. Fig. 4 shows the layout that was found to work very well. The link-coupling lead from the ECO's anode circuit to the "substitute CO" is about 18 in. long; the lead from the ECO to its power supply is screened; and the mains are fed to the latter from the point that feeds the receiver, whereas the transmitter proper is supplied from a different source. Keying the transmitter causes absolutely no chirp in the ECO frequency; and the unit is screened and far enough from the receiver and its aerial lead not to produce too strong a harmonic when switched on. Its HT is therefore switched off very seldom—if the harmonic on the operating frequency does become a nuisance it is simply detuned; it is simplicity itself to put it back on exactly the same spot. The vernier scale with the excellent Muirhead dial used makes critical adjustment quite simple.

It is preferable on grounds of stability to use the ECO as an oscillator-doubler but there is no real reason why the anode circuit should not be tuned to the fundamental, link-coupled to another 3.5 mc circuit, and fed along the chain in that way. By doing this the original 7 mc CO can be con-

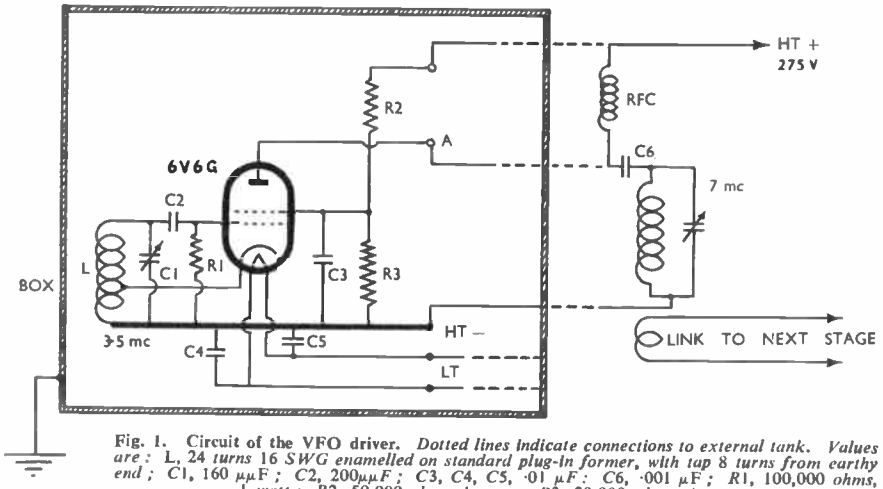


Fig. 1. Circuit of the VFO driver. *Dotted lines indicate connections to external tank. Values are: L, 24 turns 16 SWG enamelled on standard plug-in former, with tap 8 turns from earthy end; C1, 160 μμF; C2, 200μμF; C3, C4, C5, ·01 μF; C6, ·001 μF; R1, 100,000 ohms, 1 watt; R2, 50,000 ohms, 1 watt; R3, 20,000 ohms, 1 watt.*

verted into a frequency-doubler, a 3.5 mc tuned circuit being substituted for the 7 mc crystal.

Alternative Output Coupling

While justifying the claim of flexibility, it may be pointed out that the anode circuit of the ECO may also consist merely of an RF choke, energy being fed out through a small coupling condenser and thus coupled to the input end of whatever exciter unit is normally used. This method is perfectly satisfactory from the stability point of view—in fact, it is probably preferable to the use of a tuned circuit directly in the anode lead—but if the coupling lead to the next valve is too long, loss of efficiency and excessive RF pick-up is certain to result.

It is not suggested that this unit constitutes a hard and fast design to be slavishly copied; rather is it intended for the guidance of those readers who have never used a VFO, or who have experienced troubles when trying one out. The main point to make is that it certainly is worth while to use a VFO that is a separate and complete unit, rather than building it in with the

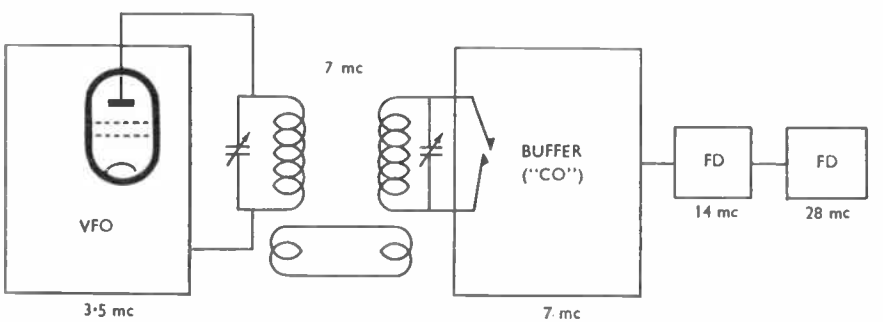


Fig. 2. Block diagram showing tuning sequence with VFO on 3·5 mc. *The 7 mc CO becomes a buffer-doubler when, with the crystal removed, it is driven from the VFO. If the original CO was operated on the fundamental of the crystal, the buffer will have to be neutralised unless it is a tetrode or pentode in a stable, well laid out circuit.*

rest of the transmitter and sharing power supplies. It becomes, in other words, the RF generator for the station ; and it can sit on a shelf in a convenient position to be used to excite the various experimental units that may be built up from time to time.

The constructional points to watch are these : rigidity of wiring, including the coil winding ; a short anode lead for the valve, going straight outside the box ; reasonable separation between the valve and the coil, to prevent excessive heating of the latter ; and the use of a good solid condenser and dial. If all these points are watched, there is no reason why such a VFO as this should not continue to generate RF for successive transmitters for years !

As a 1·8 mc Exciter

There is yet another use for this unit. With a coil of 45 turns and a cathode tap 12 or 15 turns up from the bottom end, it operates on the 1·8 mc band, and may there be used to drive a 6L6 or 807 to 10 watts with the greatest of ease. Again it is suggested that link coupling to the PA

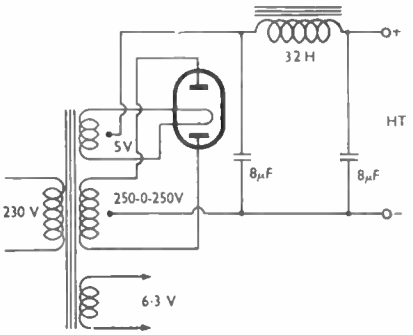


Fig. 3. A well-smoothed separate power supply is an essential for satisfactory operation of the VFO.

be used. For CW operation it will now be desirable to key the VFO, which may be done by breaking negative HT and using the normal key-thump filter with a choke and condenser. For 'phone operation a switch in the same position will "cut" the transmitter completely (if the PA is properly neutralised !).

It is preferable, but slightly more trouble, to apply the back-bias method of keying to the VFO. Last month's

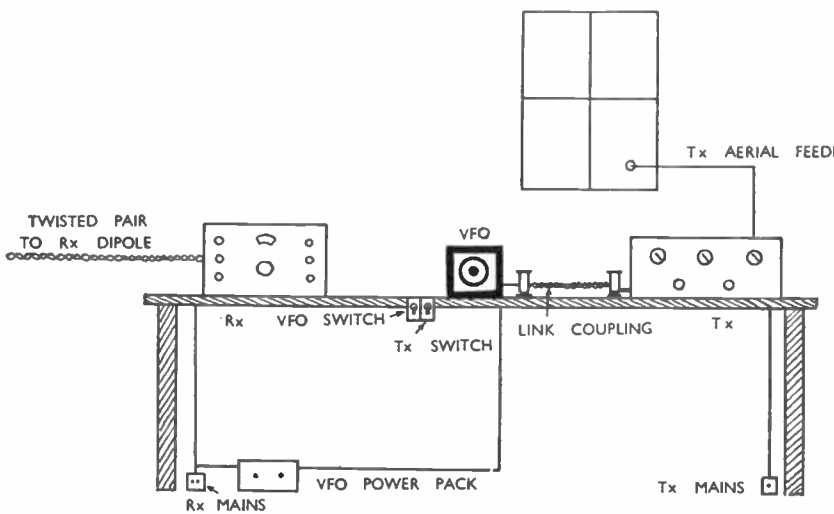


Fig. 4. Suggested internal station layout for using the VFO. *Obviously, many variants of this arrangement are possible.*

diagram, as applied to a CO, still holds good, as the grid-leak of this VFO normally returns to earth, and must be broken now in such a way that a large negative voltage is applied through a high resistance when the key is up. The only alteration necessary to the VFO is to unsolder the bottom end of the grid-leak from its earthy point and to bring it out to a terminal at the side or rear of the case.

One word of advice—or rather a plea. When using a VFO-controlled transmitter for single-channel working, *don't* tune it up, with the Tx aerial connected, on top of the station calling CQ ! If everyone did this, there would be no more QSO's for anyone ! It is sufficient to put your VFO on top of him ; no one but yourself will hear the beat-note caused by this, and if a last-minute touch to the final tank circuit is necessary, do this when he finishes his call—it doesn't take a second and causes no inconvenience once he has changed over.

At the writer's station, in addition to the VFO, three crystals are in use, giving frequencies of 28,020, 28,040 and 28,120 ; for the latter frequency a slight movement of the final tank is desirable but not strictly necessary. For 14 mc we shall probably revert to the old convention of working one end of the band at a time, so that lightning changes from 14,000 to 14,400 kc will not be necessary. These, of course, would mean a certain amount of touching up all round on the transmitter dials, and the average aerial system is not sufficiently flat to work equally well at both ends.

When operating break-in, single-channel, we suggest the use of "BKS" as the procedure signal. If this is sent while calling, other operators will know that the station concerned can not only work break-in, but is listening on his own frequency for replies.

Watch the Edges !

In conclusion, one very important recommendation : when you calibrate your VFO, mark the extremities of the bands in which you are going to work, either on the dial or on the calibration chart. The one disadvantage of a VFO is that it will go outside the band, unlike a crystal ! British amateurs have always been noted for their good behaviour in this respect, and the writer would hate to think that any doings of his were going to spoil it.

OUR CORRESPONDENCE

Grows heavier and heavier. This delights us, and we hope it will get bigger still, particularly in regard to reader-features like "DX Commentary " and A. J. Devon's column, which obviously depend for their success upon reader support. The point of this note is to ask the indulgence of those who feel we do not reply quickly enough. The fact of the matter is that our delay-factor will increase a little until we can get more staff, which is the difficulty at the moment ; it looks as if it will be some time yet before this additional staff can materialise.

However, as the months roll on, we hope that all such difficulties will be overcome, and that we shall be able to give a by-return answer to all correspondents. In the meantime, we should be greatly helped if readers would write to different departments on separate sheets ; many are very good about this, which is necessary in the interests of a tidy and efficient filing system. If we get, as we often do, a new QRA, a list of calls heard, a personal letter and suggestions for articles, all on two sides of the same sheet of paper, much transcribing is necessary. We ask you to write to particular departments or sections for this very reason. The branches running at the moment are Editor (General Correspondence), Advertisement Manager, Circulation Manager, Calls Heard, New QRAs, and regular features like "DX Commentary," "Five Metres," "On the Market" and "Month with the Clubs." All Contributors should be addressed c/o *The Short Wave Magazine*, 49 Victoria Street, London, S.W.1.

The Cathode-Ray Tube

PART IV

Some Applications of the Oscilloscope

The Mullard Cathode-Ray Tube Unit Type B.100 has been especially designed to form the nucleus round which a complete oscilloscope may be built, and by itself still has a wide range of application. The various unretouched photographs reproduced in the following have been selected from a large number as being fairly representative of the more general type of information to be obtained by the use of quite simple apparatus.

Applications not requiring a Time Base

Apart from the obvious use of a cathode ray tube as a meter for indicating and measuring voltage and current, there is a wide range of applications in Radio Engineering not requiring the use of either an amplifier or time base. Some of these applications are listed hereunder.

Condensers

Measurement of capacity and resistance, and the determination of the power factor of a condenser.

Valves

Measurement of slope, amplification factor and internal resistance. Investigation of the dynamic characteristics.

Amplifiers

Determination of amplifier characteristics, checking linearity, phase displacement, etc.

Loudspeakers

Measurement of response, determination of voltage-current characteristics, measurement of acoustic energy at different frequencies, etc.

Transmitters

Measurement of modulation depth. Testing of frequency and phase modulation. Checking of decoupling efficiency and smoothing. Phase angle measurements in capacitative and inductive circuits. Frequency comparison and synchronising. Fault finding, monitoring, etc.

Fig .25 An amplifier valve operating under conditions free from distortion.

Fig. 26. Distortion is indicated by the curvature of this diagram.

Fig. 27. Note the sudden bend due to the valve running into grid current.

Distortion and Stage Gain

The photographs shown as Figs. 25 to 27 were taken to illustrate the use of a cathode-ray tube without a time base for measuring either the stage gain or detecting distortion in an amplifying valve. The calculations necessary to arrive at the stage gain were given in an earlier article. Fig. 25 shows an oscillogram free from distortion, while Fig. 26 shows distortion produced by incorrect operating conditions, and Fig. 27 is of the same valve showing the effect of running into grid current. Providing no distortion is present the input and output voltages will be proportional and therefore the image produced, whether it be a line or an ellipse, will be symmetrical about a given axis.

Modulation Measurements

There are several different methods of producing images from which

modulation measurements may be made, and information may be obtained from these images as to the percentage modulation, harmonic distortion and phase distortion.

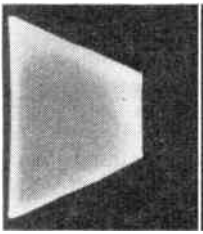


Fig. 28. Oscillogram of a signal with 38 per cent. modulation recorded without a time base.

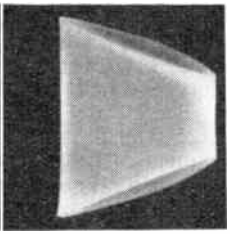


Fig. 29. This figure is similar to Fig. 28 but shows phase distortion.

Fig. 28 shows an image produced by applying the modulated carrier to the vertical plates, and the modulating voltage to the horizontal plates. Providing no phase change takes place between the modulator and the carrier output stage the sides of the trapezium will be straight as shown.

The percentage modulation is :—

$$M = \frac{E\,max + E\,min}{E\,max - E\,min} \times 100$$

so that for 100 per cent. modulation the figure becomes a solid triangle.

It is necessary, of course, when carrying out this test, that the modulation amplitude should remain constant.

Fig. 29 shows a modulation envelope indicating a phase shift between the modulator and the carrier output stage, the trapezoid in this case having looped edges.

Such a figure might also be obtained if the modulating voltage applied to the cathode-ray tube were obtained from some part of the audio amplifier other than the output from the modulator valve.

Fig. 30 shows another and perhaps a more familiar form of modulated HF carrier.

To obtain this figure the modulated signal is applied to the vertical plates and a linear time-base voltage to the horizontal plates, the percentage modulation being calculated as before. In this case the time-base must be synchronised to the modulation frequency in order to obtain a stationary figure. Over-modulation will result in the "troughs" of successive waves decreasing to form a line at the point of contact. The signal shown is a 100 kc carrier modulated by a 500-cycle note to a depth of 38 per cent.

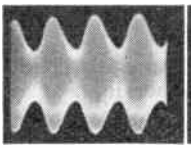


Fig. 30—Similar signal to Figs. 28 and 29 recorded with a time base.

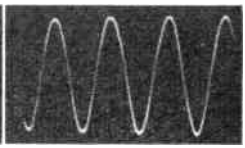


Fig. 31. Oscillogram taken from the diode stage of a receiver against a linear time base.

As has been stated, other patterns are obtainable from which the modulation may be checked and with a little experience the operator soon becomes familiar with the various patterns.

Examination of Sine Waves

Fig. 31 shows a rectified signal taken from the diode stage of a receiver. Between the diode lead and the cathode-ray tube a filter circuit is arranged to filter out the radio frequency. In the absence of the filter circuit the signal appears as shown in Fig. 32, the presence of RF being indicated by the broadness of the trace.

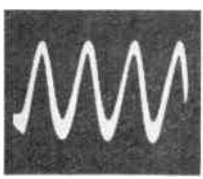


Fig. 32. This is the same signal as that recorded in Fig. 31 but with superimposed HF.

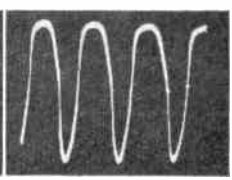


Fig. 33. Oscillogram obtained from a receiver operating under incorrect conditions.

Fig. 33 shows the distorted waveform obtained from the output stage of a receiver under incorrect operating conditions. It was actually obtained by injecting a fairly heavy modulated

signal into a receiver and cutting out the AVC control.

Fig. 34 shows harmonic distortion introduced by severely overloading an amplifier.

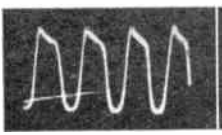


Fig. 34. The output waveform from a severely overloaded amplifier.

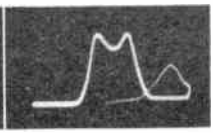


Fig. 35. IF circuit rectified image of symmetrical double peak response curve.

Tuning Circuit Alignment

Rather more elaborate apparatus is necessary for the delineation of resonance curves. The curve required is a graph of the voltage output obtained across a tuned circuit, when the input voltage is varied over a given frequency range. The voltage developed across the tuned circuit is applied to the vertical plates of the cathode-ray tube, and a voltage corresponding to a given frquency variation is applied across the horizontal axis.

One method of producing the necessary frequency sweep is to attach a small variable condenser to the shaft of a rotating motor and to connect this across an oscillator circuit tuned to the mean frequency of the circuit under test. The motor-driven condenser then varies the output frequency over a predetermined band, say 10 kc each side of the resonant frequency, and the voltage developed is applied to the circuit under test, the actual band width covered being a function of the LC values of the oscillator circuit.

If, now, a potentiometer is coupled to the same shaft as the rotating condenser, and connected in such a manner that an output voltage is developed across it proportional to the frequency sweep, then, in principle, there is available a device for drawing out a resonance curve on the screen of a cathode-ray tube.

Actually the modern commercial type of frequency-modulated oscillator or "wobbulator" as it is sometimes called, is a good deal more complicated in design than would appear from the brief information given above, and moreover the mechanically-operated type of apparatus has now generally given place to the electrically-operated unit in which all the necessary capacity and voltage changes are produced by special circuit arrangements.

There are two types of image available in the examination of response curves, one the rectified image taken after demodulation, and secondly the full HF envelope.

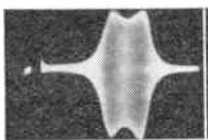


Fig. 36. This oscillogram shows the unrectified image corresponding to Fig. 38.

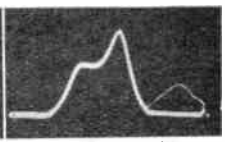


Fig. 37. Oscillogram showing asymmetrical resonance due to misalignment of tuned circuits taken from diode load.

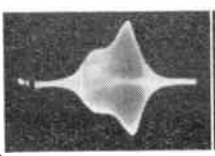


Fig. 38. Similar conditions to Fig. 37 showing full HF envelope.

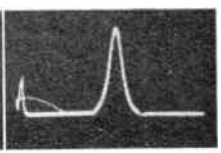


Fig. 39. Sharply packed resonance curve.

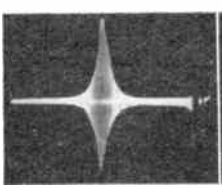


Fig. 40. Full-wave image of Fig. 39.

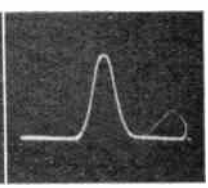


Fig. 41. A resonance curve with somewhat wider band width than Fig. 40.

The more familiar type is the single-line rectified image, and in order to obtain the full HF envelope of a circuit response in the normal receiver, it is necessary to employ an amplifier having a high gain at the mean frequency of the circuit under examination.

Conclusion

The Radio Amateurs' Examination

The First Question Paper

WE print below the paper set for the first examination, held on May 8 last in accordance with the new licensing regulations, under the ægis of the City and Guilds of London Institute, Department of Technology.

For a three-hour sitting, the questions strike us as fair and reasonable and we cannot imagine that there need have been more than a very small number of failures. The pass percentage has not yet been announced.

As a matter of interest, we should like to see (not necessarily for publication) a set of specimen answers from holders of full callsigns, with a note as to how long it took them to write the whole paper. No prizes or other inducements are offered—we simply wish to know how experienced readers would have managed these questions. Here they are :

54—RADIO AMATEURS' EXAMINATION

Candidates should attempt as many questions as possible. The maximum possible marks for each question are shown in brackets.

1. A 100-ohm resistor and a 300-ohm resistor are joined in parallel and connected to a battery of e.m.f. 7.5 volts and negligible internal resistance—
(*a*) What is the total current taken from the battery ?
(*b*) What power is dissipated in the 100-ohm resistor ?
(10 *marks.*)

2. What do you understand by the term "resonance"? If an inductance of 100 μH is connected in parallel with a capacitance of 100 $\mu\mu$F, what is the resonant frequency of the circuit ? (10 *marks.*)

3. Draw a diagram of a self-oscillating valve circuit and explain simply its method of functioning. (10 *marks.*)

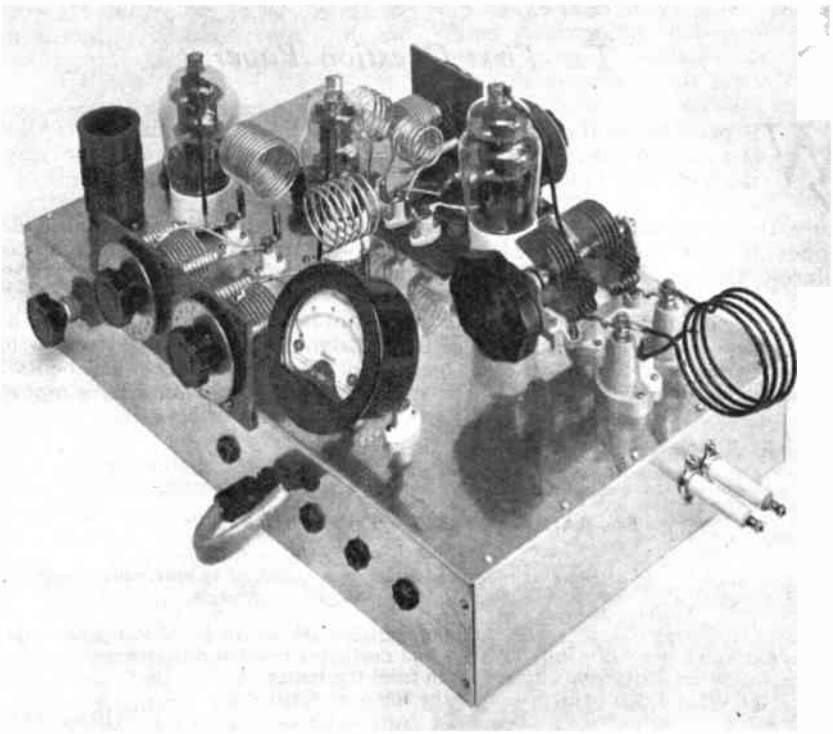
4. Why are quartz crystals frequently used in radio transmitters ? Describe, with diagram, a typical crystal-controlled oscillator.
(10 *marks.*)

5. Explain why "standing waves" are undesirable in a feeder system connecting a transmitter to an aerial. How would you detect their presence and minimise them ? (10 *marks.*)

6. Describe an "artificial aerial." How can an "artificial aerial" be used to measure the power output of a transmitter ? (10 *marks.*)

7. In what ways may a low-power transmitter interfere with radio and television reception ? What precautions should be taken to minimise such interference ?
(20 *marks.*)

8. What are the conditions laid down by the Postmaster-General for the frequency measurement and control of amateur transmissions ? (20 *marks.*)



Transmitter For Five

Construction of the Set Discussed Last Month

By **AUSTIN FORSYTH (G6FO),** *Editor*

ON pp. 151-153 of our May issue, the circuit, table of values and operating details were given for a practical transmitter design for 58 mc. The main features of this transmitter, then in its experimental form, were that it involved only three readily obtainable valves, required no neutralisation, and that the output stage was a straight PA on 58 mc, which could be driven to the full 25 watts.

Herewith, then, the constructional details of the built-up job. And let it be said that it is giving, in the form now illustrated, much better results than the prototype, as measured in terms of RF output at all stages. This has been achieved, as recommended last month, by very careful attention to layout and constructional design. For the truth is that it is not too easy to get good RF output from doublers

at frequencies of 28 mc and above unless great care is taken with the smaller details. This is not so much the case when one is going to five or more stages; in such circumstances, one should have power in hand all down the line.

But one of the main features of the present design is economy in valves, which means that if the 58 mc PA is to be operated straight, as is desirable, the 58 mc doubler must deliver enough grid drive to achieve it. This is a statement of the obvious, but the point is that there is a great difference between a doubler stage which will just give output on 58 mc—fairly easy to obtain, as shown by a dim glow in the loop lamp—and one which will drive the PA when the load comes on.

Layout

The photographs give a good idea of the general form of construction adopted, and the position of practically every part can be located.

Looking along the front of the heading photograph, the plug-in coil to the extreme left is L1 in the circuit on p. 152, May. On the chassis sub-panel immediately below is the knob for C1. The next tuned circuit is L2/C2 on 14·7 mc, followed by L3/C4 on 29·4 mc. Immediately behind the meter is the PA output circuit L6/C7, mounted on stand-off insulators. The condenser C7 is actually a pre-war Polar 30 $\mu\mu$F-per-section, with a pig-tail connection to the middle of the rotor; it is carried on a single s/o insulator, as it has a convenient central mounting hole.

As indicated, condensers C2 and C4 are mounted on a small tufnol (paxolin will do) strip fixed to the chassis, with their respective coils at right angles and immediately behind. The five jacks on the front sub-panel are J2, J3, J4, J5 and J7 in the original circuit—J1 and J6 not being necessary.

58 mc Grid Circuit

The half-rear view is a close-up of the grid side of the PA and the tank of the 58 mc doubler, with condensers C5 and C6 in the near foreground. The mounting of the circuit L4/C5 is quite clear, but L5/C6 needs a little explaining.

TABLE OF OPERATING DATA

HT, V1-V2	= 320 volts	GB−, V3	= −76 volts
HT, V3	= 650 volts	Crystal Freq. . .	7446 kc.
GB−, V2	= −50 volts	Output Freq. . .	59568 kc

Current and Power Readings

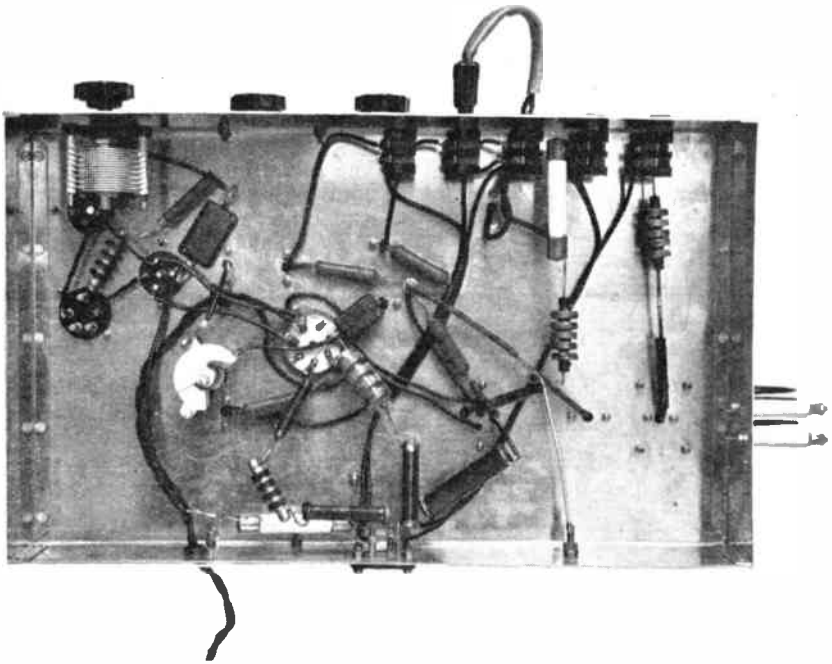
Stage	Plate	Grid	Load	DC Watts	
				Input	Output
V1 (7-14 mc)	30mA		on	9·6	—
V2 (29 mc)	24 mA	10 mA	on	7·7	—
V2 (58 mc)	50 mA		on	16	—
V3 (58 mc)	10 mA	2·5 mA	off	6·5	—
V3 (58 mc)	38 mA	2·0 mA	on	24·7	12

It will be remembered that in last month's article, it was explained that these circuits are inductively coupled. Since this involves physical movement of L5/C6 in order to find the position for critical coupling (optimum transfer between the two circuits), some tidy method had to be devised to allow for small changes in the position of L5/C6. Accordingly, the midget s/o insulators for L5 and an insulated bracket for C6 are bolted to a piece of tufnol about 3 ins. square, using countersunk 6 BA screws. A long slot—unfortunately just not clearly visible in the photographs—was cut in the middle of this tufnol strip with a fretsaw, the piece taken out being wide enough and long enough to allow movement about a 2 BA screw. Fixed condenser C13 was transferred from the earthy to the RF side of L5, its leads being sufficiently flexible to permit movement of the L5/C6 assembly. C13 can be seen suspended between L5 and the grid of V3.

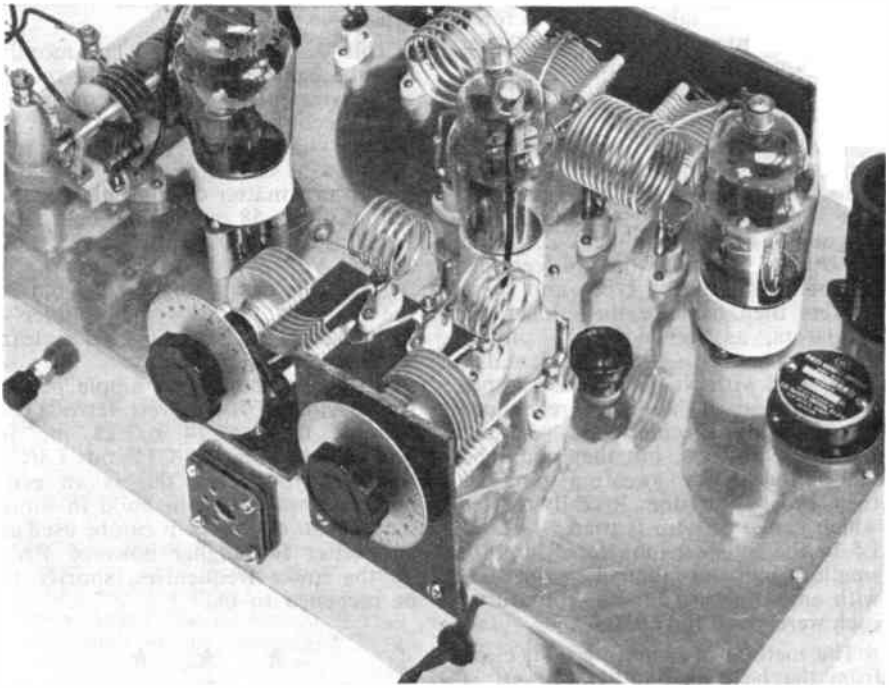
Having found the coupling setting for L5/C6 in relation to L4/C5, it is then only a matter of tightening down on the 2 BA screw, which is of course anchored to a hole in the chassis.

Underneath the Chassis

Here again, all parts are visible and little comment is required. All earth returns for the circuits round V2 and



The chassis sub-space. *All components, and practically every connection, can be seen. Note the small 58 mc RF chokes in series with the larger chokes at the 58 mc end of the transmitter. The large ceramic valve-holder is for V2, across the heater pins of which LT is fed for all three valves. Connections made through holes in the chassis are sleeved. The sub-space is 3 in. deep, and the chassis is 17 in. long by 10 in. wide*



Close-up of the inductively-coupled circuits on the grid side of the 58 mc PA. *These are C5/L4 and C6/L5 in the circuit on p. 152 of the May issue. C6/L5 is mounted complete on a tufnol strip which moves in a slotted screw-hole for final fixing. The knob of C3, coupling V1 on 14·7 mc to V2 on 29·4 mc, is immediately to the right of the nearest small s/o insulator: it can be adjusted with a screwdriver. The flex lead on the sub-panel is for LT, the Belling-Lee 5-way socket brings in HT and bias supplies, and the terminal is for earthing. All condensers are as set for output on 59·6 mc.*

V3 are brought to a common earthing point—a 1in. 2 BA bolt through the chassis, which can be seen about two o'clock from the valveholder for V2. The earthy circuits round V1 are returned to another bolt near C1.

The Q.C.C. crystal unit is plugged into a 5-pin valve-holder, on the extreme left in the sub-chassis view and to the right in the top rear-half photograph. The only reason for using a 5-pin valveholder in this position is because the pin spacing on the crystal holder happens to fit nicely across the socket—and we had no other mount immediately available.

Construction

Having laid out the parts and drilled and punched the chassis, all components except fixed condensers, resistors and chokes were mounted. All the latter items are subsequently carried in the run of the wiring.

The arrangements for V3 need explaining. Since L5/C6 is on a movable mounting and because it is necessary, in order to prevent loss of 58 mc grid drive, that the grid lead to V3 should not have to dive down through a hole in the chassis, it was decided to elevate this valveholder above the chassis. This is clearly shown in the rear-view photograph; the valve-holder can be seen held off the chassis by means of 1⅛in. ceramic sleeves, the whole held in position by 1½ in. 6 BA bolts.

Where necessary, all other RF circuit inter-connections are taken off the centre screw of the midget s/o insulator and down through a large sleeved hole in the chassis midway

between the insulator fixing screws. The HT feed and by-pass condenser connections are obtained similarly; all this can be traced out in the chassis sub-space photograph.

The last constructional point of importance is the mounting of the coils, particularly L2, L3, L4 and L5. The sockets for them were taken off a couple of valveholders — cracked or broken and of the old ceramic baseboard mounting type—and these sockets then fixed to the midget s/o insulators, as shown in the photographs. The coils—which, incidentally, are wound with No. 14 silvered copper wire, instead of No. 12 bare copper as originally specified—are soldered into these sockets, but they could be made plug-in by sweating pins to their ends. Nor does it really matter which gauge of wire is used. L4 and L5 in the finished job are of slightly smaller diameter than L2 and L3, with an extra turn on L5—four turns each were given for L4 and L5.

The method of mounting L6 is clear from the heading photograph. It is wound with No. 12 enamelled wire and its physical dimensions, quite unusually large for a 58 mc circuit, are an indication of the efficient, low-loss nature of the PA output side, in this particular form of construction.

Parts Used

Individual components for this transmitter are not specified, because so long as they are of the correct values, parts of any good make can be used. All items required are readily available in various makes, and those actually used in the design as pictured here include a Tele-Radio (1943) chassis, Eddystone variable condensers and stand-off insulators, Denco and Eddystone RF chokes, Webbs valveholders, plugs, sockets, jacks, fixed condensers and resistors, and a Ferranti milliammeter. The valves are two E.M.I. KT8c's and one E.M.I. DET19, costing a total of 72s. 6d. for the three; very complete data, including base connections, are supplied with them.

Operation

This was fully covered last month, and the figures obtained on the model as illustrated here are given in the table accompanying this article. It will be noted that V1 and V2 are operated at the same plate voltage—this is as a matter of convenience, the output at the 58 mc doubler being the same as with 400 volts on V1 and 250 on V2.

Keying is now being carried out in the plate of the 29.4 mc doubler—J3 in the original circuit—and a clean T9 signal results.

It will be found that ample power for driving a 50-60 watt tetrode or pentode PA on 14 or 28 mc is obtainable from L2/C2 and L3/C4 respectively. Thus, this is an economical transmitter to build in more senses than one, since it can be used as an exciter for higher powered PA's on the lower frequencies, shortly to be reopened to us.

★ ★ ★

R.A.F. RESCUE

A short time ago, complaints reached us that in the South-West a particularly virulent type of noise interference was making the 5-metre band virtually useless above 59 mc. After investigation, the trouble was diagnosed as a probable radar harmonic.

Our instinct led us to the Air Ministry, where it was confirmed that the pulse navigation system, with its fundamental on 29·7 mc—operated from the master station at Bullbarrow Hill, Swanage, with slaves at West Prawle and Truleigh Hill, Conewdon—was radiating strongly on the second harmonic.

Through the good offices and ready co-operation of the Director of Radio, Air Ministry, immediate steps were taken to eliminate the interference by suppressing the harmonic. We are also able to state that this particular navigational aid system will shortly be moved to new frequencies in the 60-80 mc band.

We print the foregoing not only as an example of the official willingness to be helpful, but as an expression of thanks from those of our readers who had to suffer the interference before it could be traced and stopped.

Amateur Operating

Some Notes on What to Do, How to Do It and What to Avoid

By **THE OLD-TIMER**

(Our contributor is a well-known amateur transmitter of great experience and long standing. His article is intended to help the not-so-experienced to get the most out of Amateur Radio.—Ed.)

IT is a well-known fact that Amateur Radio enthusiasts will read all sorts of technical articles with avidity—even if they cover subjects that the readers know inside out—but that they have a rooted objection to being told how to *operate* their stations. You will hear many a keen amateur declaring to others that he is "not so hot, technically"; but I have never yet heard one telling a fellow-amateur that he knows he isn't much good as an operator! To accuse any amateur of being a bad operator is rather like accusing any Englishman of having no sense of humour—it produces instant and violent results.

Well, please read on; for I assure you that this article is written in no spirit of snobbishness or patronage. It is a genuine attempt to help bring about a general improvement in the standard of operating, not only so that some unnecessary interference can be cleared up, but in order that amateurs who are not so clever at operating can improve their own results. After all, an improvement that can be achieved without spending a penny and without altering any of the gear is surely worth having.

If you are one of those who are convinced that their operating technique is perfect, you may still find it worth reading on. A faintly superior smile now and then is a good tonic!

Facts

Now, the basic fact before us is this: That everything that takes place in an amateur station has to pass through the brain of the person operating it. You may build the finest, most efficient station in the world, with a fine transmitter, a perfect receiver, and an aerial system of incredible efficiency and complexity; but put an incompetent operator in the chair and that beautiful station is worth very little. If we are first considering CW work, we may put it this way: Send out a CQ call and instal in the chair a man who cannot read eight words a minute. You might just as well put a deaf man there! He can tune round the band, which may be full of feverish activity, but he will actually understand very little of what is going on.

So let us establish some headings under which we can classify really good operating. Take the following to start with:

(i) Real familiarity with the Morse code, both receiving and transmitting. This does not imply merely knowing the letters; that is just the kindergarten stuff. "Real familiarity" means instant recognition of what is happening up to a speed of 16-18 w.p.m., knowledge of correct amateur procedure, "Q" signals, "RST" code and so on.

(ii) Intelligent appreciation of the possibilities of the various bands at different times of day. This will prevent an operator from happily watching a dead band at a time when he ought to

know that another band will be full of activity—and from selfishly working locals when the band is open for DX.

(iii) Knowledge of the general behaviour of short-wave signals at different times of day and different times of the year.

(iv) Ability to "winkle out" weak signals through noise-level, interference from other stations, static, and so on. The weak signals are always the ones that turn out to be interesting.

(v) Knowledge of correct (and polite) telephony procedure. This is just as essential as a thorough knowledge of Morse procedure.

(vi) Appreciation of the technical possibilities of the gear used—rough polar diagram of the aerial system, for instance, and signal-strengths that can reasonably be expected, having regard to conditions and time of day.

(vii) Instinctive consideration for the other fellow—the ability to put oneself in his place. This leads to considerate behaviour on the air and rules out the causing of unnecessary interference in purely selfish ways—e.g., tuning-up on a lively band.

(viii) A kind of sixth sense which will come as a result of proficiency in the foregoing sections. This is difficult to describe, but embraces instinctive knowledge of whether the fellow you are waiting for is likely to be tuning round the band; whether it is any use calling so-and-so or whether it is better to wait; whether to send a CQ or to continue listening round for something interesting; whether the band is "packing up" or whether it would pay you to stay on for another hour, even if there are not many signals about.

It is very difficult to describe "good operating" under such broad headings, but if I may now dilate on each one in a somewhat rambling manner, I hope a few tips will emerge which may not have occurred to someone reading this. So, G4AAA and G2XYZ—don't think I'm preaching; I'm only trying to help!

Familiarity with Morse

There is many an amateur on the air who just scraped through the GPO test of 12 w.p.m. and then made no further effort. Such a man either works on telephony only, or has such an inferiority complex regarding Morse that he will only work stations that are extremely strong and sending slowly. Thus, on CW, most of the interesting DX in the world is a closed book to him. It is never too late to improve your speed at Morse; and the best way of doing it is continual practice on stations which are right up to your maximum or even sending too fast for you. At any rate, *practise*—there simply is no short cut. Proficiency in Morse means hard work at some time or another, and those who never achieve it are usually just the lazy ones! But they are also the losers by it.

There is no doubt that a good, solid "fist" is an added help in working DX. I know that when I am lucky enough to receive several replies to a CQ call, I instinctively turn to one with nice firm sending, and think "this chap knows what he is doing." Conversely, the fellow who sounds as if he is tentatively pushing the key with one finger about fourteen inches long will receive the go-by unless he possess a very interesting call-sign!

To be a good Morse operator does *not* mean a passion for sending furiously on a "bug" and to be incessantly working at a speed too high to be comfortable at the other end. Some of our best operators send habitually slowly—but well. But they can take it—and give it out—when necessary.

I do not intend to quote the RST Code and the "Q" signals here—they are printed in many places where they are accessible to all amateurs; but please get familiar with them and use

them properly. And, in connection with the RST Code, if you give the other fellow R5, do not complain of QRM next time over! You have told him that he is perfectly readable with ease, so he is fully entitled to come back at a reasonable speed and he will not send doubles. Conversely, if someone gives you R5, do not send each word twice or he will put you down as a bad operator. Many times I have heard an American give a British station a "579" report, and then the British station has gone back laboriously sending doubles, slowly, in reply. If you are given "579", assume that it really *is* "579" and behave accordingly.

Band Sense

This does not apply fully as yet, but when from July we have the use of 7 mc and 14 mc it will. There will be many times when 28 mc is completely dead, but DX is roaring in on 14 mc. This sort of thing is best found by

THE AMATEUR BANDS

Following are the bands open or opening for amateur operation:

1800-2000 *kc*	10 *watts (A) and (B)*
7150-7300 *kc*	25 *watts (A)*, 150 *watts (B)*
14150-14300 *kc*	25 *watts (A)*, 150 *watts (B)*
28000-30000 *kc*	25 *watts (A)*, 100 *watts (B)*
58500-60000 *kc*	25 *watts (A) and (B)*

The 7 and 14 mc bands become available from June 30; note that the two sections allotted are not in harmonic relation. "A" Licences are all three-letter calls issued since the war, 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 callsigns, and are allowed the use of CW, MCW and 'Phone with power as given above.

experience, but the most superficial knowledge will show that when 28 mc fades out in the evening there will still be some hours of life in 14 mc.

Under this heading, too, comes the crime of working with locals when the band is open for DX. This is often perpetrated by owners of not-so-good receivers and those to whom weak signals mean nothing. They listen airily round the band, say "Oh, nothing on but a few CW stations", and proceed to work telephony with someone 20 miles away. While doing so they are spoiling someone else's first contact with Midway Island, Madagascar, or Mauritius. ("Oh just a weak CW"!)

28 mc, 14 mc and 7 mc are all DX bands. You might not think so to listen on 7 mc on a Sunday morning, but that band produces stronger signals from the Antipodes at times than do either of the others. 7 mc after about 2300 is worth watching for real DX, which may continue until 0900 or later. Much interesting DX on this band has been completely submerged beneath interminable duplex 'phone conversations about nothing in particular, carried out by people within easy telephone range of each other. (But tell them that they are not good operators . . . . !)

Knowledge of Propagation

This heading is really important for the man whose chief interest is DX work. It is best acquired by listening a little more and transmitting a little less. Those of us who have been able to spend whole days on 28 mc during the early part of this year know the behaviour of the band inside out. In March we found Australia at 0830, Guam and Philippines at 1000-1300, India and South Africa during the afternoons, South America later. On some days the USA poured in and swamped everything from 1300 until 1800.

But only the unintelligent listeners decided that conditions were bad because they could not hear a "bandfull of Yanks." Very often this meant that conditions were better than usual i.e., that skip was longer. A little thought and a glance at a Great Circle Map would show, from the range of the stations coming in best during the morning, whether the USA would be there during the afternoon or not.

(To be continued)

Useful Combination Instrument

A Combined Absorption Wavemeter and Volt-Ohm-Milliammeter

By HILTON O'HEFFERNAN (G5BY)

THIS instrument combines in one cabinet the standard text-book circuits for a DC measuring instrument and a plug-in coil absorption frequency meter.

Since the best type of absorption wavemeter uses a crystal rectifier unit and a 0-1 mA meter to indicate resonance and as that same meter is also the heart of any good DC 1,000 ohms-per-volt instrument, there is every advantage in combining the two junctions ; moreover, this will provide the station with a piece of apparatus which will become indispensable.

The complete circuit diagram for the combined instrument is at Fig. 1, and the photographs show the general form of construction adopted.

DC Ranges

The various DC ranges are obtained by the switch S4, and are as follows : Position 1, 0-500 ohms, with meter calibrated to full-scale deflection by means of R3 ; Position 2, 0-500,000 ohms ; Position 3, 1 mA at full scale ; Position 4, 10 mA ; Position 5, 100 mA ; Position 6, 500 mA ; Position 7, 1,000 mA ; Position 8, 10 volts ; Position 9, 50 volts ; Position 10, 250 volts ; Position 11, 1,000 volts ; Position 12, off, with meter isolated from test leads.

By leaving the switch on position 11 and moving the positive test lead to the right-hand socket in the front view photograph, voltages up to 5,000 may be measured. The socket on the extreme left allows for the use of an additional external battery for measurement of higher resistances than the 500,000 ohms obtained with the 4½-volt internal battery provided. If this external supply is 45 volts, the resistance scale is multiplied by ten.

Frequency Ranges

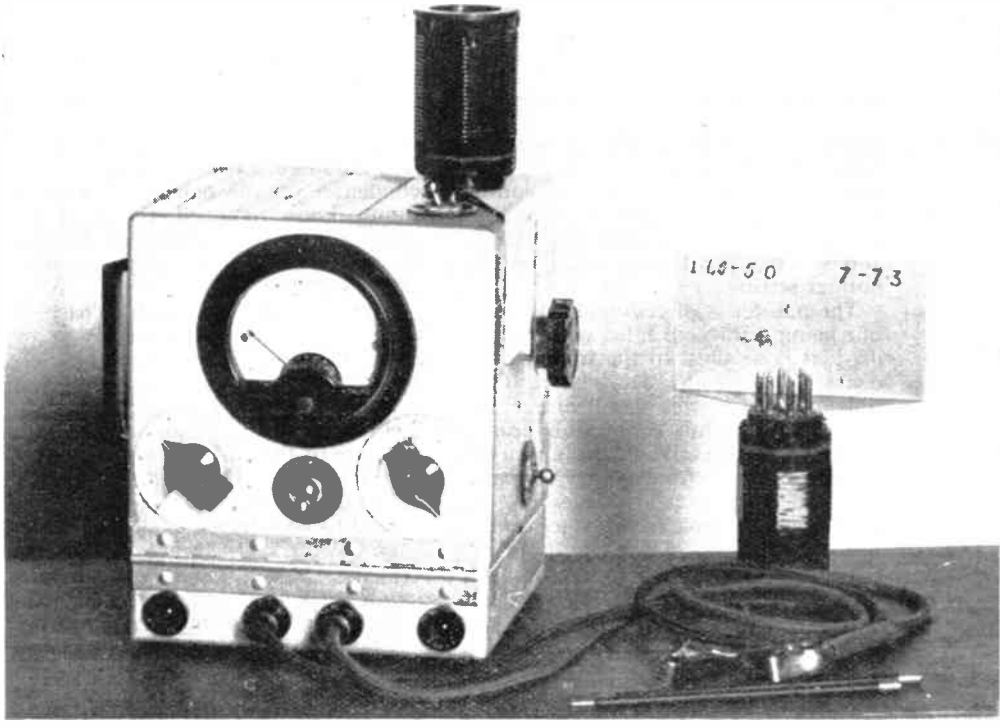
The frequency meter portion uses plug-in coils (6 pin) each carrying its own calibration scale giving direct reading of frequency without the use of charts. A special feature, which the writer has never seen employed before with this type of instrument, is a band-spread switch which, apart from spreading out one amateur band on each coil, also enables that coil to cover *three* bands. This saves an immense amount of coil-changing when lining up a transmitter.

Six coils between them cover a continuous frequency range of 1-35 mc, with band-spread on the 3·5, 7, 14, 28 and 58 mc bands. As it is hoped that eventually a new amateur band may be allotted in the 21-25·5 mc region, provision has been made for this in coil No. 4 ; otherwise only five coils would have been required.

Construction

The cabinet is an aluminium box, with hinged lid, measuring 5½ in. wide by 5⅛ in. deep and 6⅛ in. high ; any similar metal box of about these dimensions will do equally well. Small rubber feet are provided on two sides, so that the instrument can be used with the panel either vertical or horizontal.

The meter shunts for the 10, 100, 500 and 1,000 mA ranges are home-made by the "cut and try" method, using resistance wire wound on the outside of any ½-watt type resistor, of over 100 ohms value. The exact values will of course depend upon the



G5BY's V.O.M.-Frequency Meter. *General view of an instrument covering 1-35 mc, and giving readings up to 5,000 volts, with current scales to 1,000 mA and resistance readings to 500,000 ohms.*

internal resistance of the meter used, and could be obtained ready matched to an 0-1 mA instrument from advertisers in this *Magazine*. As a guide to the ranges involved, the following values are given :

10mA, 5-10 ohms ; 100 mA, 0·4-0·8 ohm ; 500 mA, 0·07-1·0 ohm ; 1,000 mA, 0·04-0·08 ohm.

When making up these shunts, always allow the resistance wire to cool off after soldering it, as otherwise false check readings will be obtained. On no account use a single 0·75 megohm resistor in place of the 0·5 + 0·25 megohm units specified, nor a single 4 megohm instead of the four 1 megohm resistors. The series arrangement is necessary in order to secure adequate safety on the 1,000 and 5,000 volt ranges.

All the various shunts and series resistors are mounted directly in the wiring round S4 itself, except for the four 1 megohm units already mentioned, which are wired, in the form of a V, between the 5,000-volt socket and the + V.O.M. socket, with a small stand-off insulator supporting the apex of the V. Make quite sure these resistors are well clear of the case and all other components, since they are at 5,000 volts potential when the meter is at full scale deflection on that range.

The internal 4½-volt torch battery is held in place by a metal band round it, which is then secured to the inside of the case by two screws used for bolting on the carrying handle.

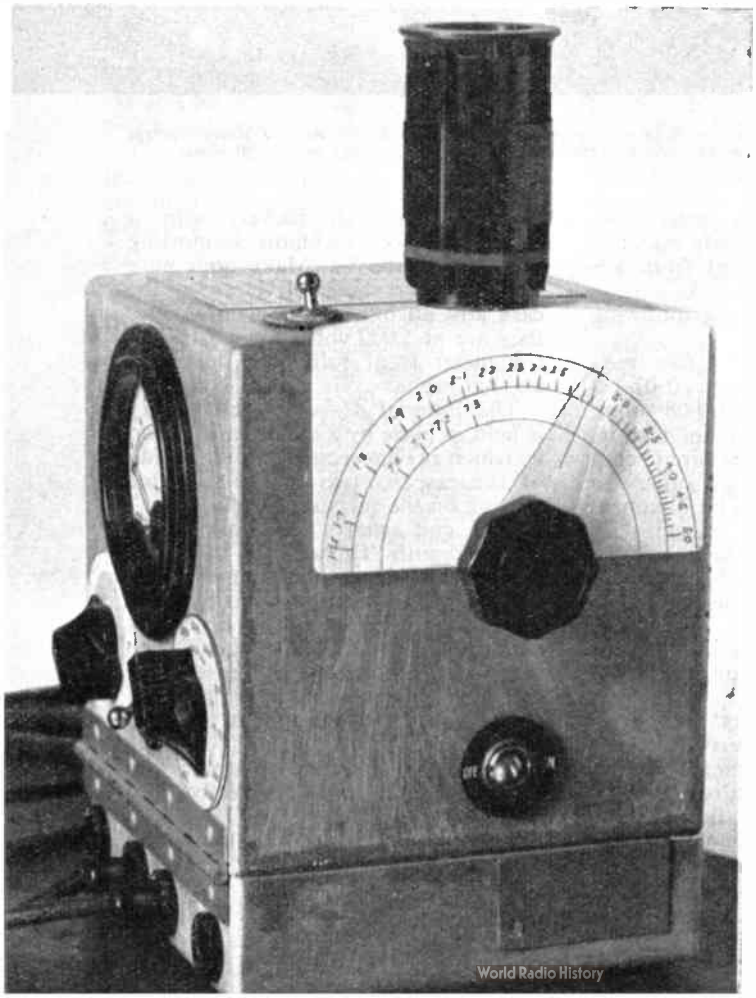
The coil charts are of paper, mounted with "Durofix" on to copper foil, bent as shown and secured to the coil former by drilling two holes to correspond to pins 1 and 4 (see Fig. 2) and soldering the foil to the pins so that it is flush against the base. The coil socket must be set with these two pins nearest and parallel to the edge of the case below which the tuning condenser is mounted, in order that the coils may plug correctly into position.

Note that the nut securing the tuning

condenser is made to tighten with its sides vertical. A cut-out on the coil chart fits over this nut, thus automatically centring the chart as the coil is pushed home into the socket, and so ensuring the accuracy of the pointer setting.

The pointer is of celluloid, the hair-line being a thin cut filled with Indian ink; it is secured to the tuning condenser knob with "Durofix." Two tiny holes on this line, about an inch apart, permit calibration points to be made directly on the chart by means of a pin. An easy way to mark out the semi-circular scales is to centre-punch a hole in the exact centre of the tuning condenser spindle before it is mounted. Then, having fixed the condenser on the panel and with the tuning knob removed, the scale line can be drawn with the chart in position by pivoting a pair of compasses in the punch-mark.

The upper scale on each chart gives the full continuous coverage; the lower one is for band-spread. The band-spread arrangement consists of a tap and, except in coils Nos. 1 and 2, a 3-30 $\mu\mu$F air trimmer mounted in the base of the coil and wired in series with the tap. The switch beside the coil allows full coverage or band-spread to be selected as desired.



Close-up of the frequency checking side, with No. 2 coil in position. *Three bands are covered on one coil; upper left is the band-spread switch, S1.*

Since this instrument is sensitive, a toggle switch, conveniently placed below the tuning knob, allows a 10mA shunt to be brought across the meter during preliminary transmitter checks.

The copper backs of the coil charts are treated with aluminium paint and then, when dry, the frequency ranges of each coil are marked on this surface, so that when the coil is out of the socket and standing upside down, the figures can be read.

Calibration

It is not easy accurately to calibrate an absorption type wavemeter directly from either a signal generator or a superheterodyne receiver.

The writer worked from a commercial signal generator using the following method: An ECO unit was made up, using parts from the

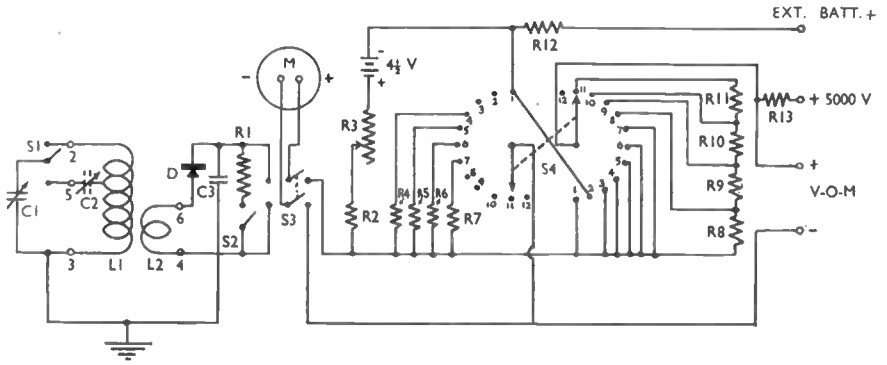


Fig. 1. Circuit of the Combined Instrument. *S3 is the change-over switch, selecting either RF or DC measurements. By using an external battery, the resistance range can be multiplied up to ten times.*

junk box, since the quality of the components employed in connection with this particular requirement is almost immaterial. The only function of the ECO is to maintain any set frequency for about 30 seconds. Use a plug-in coil for the ECO and link couple between this, with one turn at each end, and the coil in the frequency meter. Couple the output of the ECO and the signal generator together and listen to the resulting beat on the receiver. Use very loose coupling—link at extreme bottom end of coil—at the frequency meter end and gradually tighten the coupling of the ECO until a just perceptible change of note, or "flick," occurs when the frequency meter tuning condenser is

Table of Values

C1	= 160 $\mu\mu$F.	R8	= 10,000 ohms, ½-watt.
C2	= 3-30 $\mu\mu$F, air trimmer type, mounted in coil.	R9	= 40,000 ohms, ½ -watt.
C3	= ·001 μF, mica.	R10	= 0·2 megohm, ½-watt.
D	= Crystal detector, fixed.	R11	= 0·75 megohm (0·5 + 0·25, ½-watt, in series).
M	= 0-1 mA m/c meter.	R12	= 40,000 ohms, ½-watt.
L1, L2	= 6-pin plug-in coils (see coil table and Fig. 2 for details).	R13	= 4·0 megohm (four 1 megohm, 1 watt, in series).
R1	= 5-10 ohms, for meter 10 mA shunt.	S1	= SPDT, toggle
R2	= 3,000 ohms, ½-watt.	S2	= On-off, toggle
R3	= 2,000 ohms, wire-wound, variable.	S3	= DPDT, toggle
R4	= 10 mA shunt.	S4	= 2-pole, 12-way, continuous rotation, Yaxley type, without stop.
R5	= 100 mA shunt.		
R6	= 500 mA shunt.		
R7	= 1,000 mA shunt.		

(Note.—See text for details of resistors R4, R5, R6 and R7.)

COIL DATA—ABSORPTION FREQUENCY METER

Coil No.	Coverage mc	Band Spread	Amateur Bands Covered	No turns, L1	Tap Condenser	No. turns L2
1	1·0-2·5	3·5-4·0	1·8, 3·5,	75, 30 SWG, close-wound, tap at 12 turns	Out	17
2	1·65-5·0	7·0-7·3	1·8, 3·5, 7,	39, 26 SWG, close-wound, tap at 5 turns	Out	11
3	3·4-9·0	14·0-14·4	3·5, 7, 14,	22½, 22 SWG, spaced 14 t.p.i., tap at 13 turns	28 μμF	6
4	6·2-17·0	21·0-21·5	7, 14, 21,	12, 18 SWG, spaced 7 t.p.i., tap at 12 turns	6 μμF	4
5	6·8-20·0	28·0-30·0	7, 14, 28,	10½, 18 SWG, spaced 7 t.p.i., tap at 4½ turns	25 μμF	3
6	12·0-35·0	58·5-60·0	14, 21, 28, 58,	4½, 18 SWG, spaced 3½ t.p.i., tap at 2 turns	6 μμF	2

NOTES : All coils L1 wound with enamelled wire of gauge given.
Taps on L1 counted from earthy end of winding.
Spacings stated in "turns per inch" (t.p.i.).
Settings for tap condensers C2 are approximate.
All coils L2 close-wound with No. 36 DSC, winding.
spaced 5/16 in. from earthy end of L1.

rotated through resonance. The "flick" is, of course, the calibration point.

To calibrate from a straight receiver, use the same link coupling method, substituting the receiver for the ECO, and resonance will be indicated by the receiver going out of oscillation ; use the loosest possible coupling that will produce the desired effect.

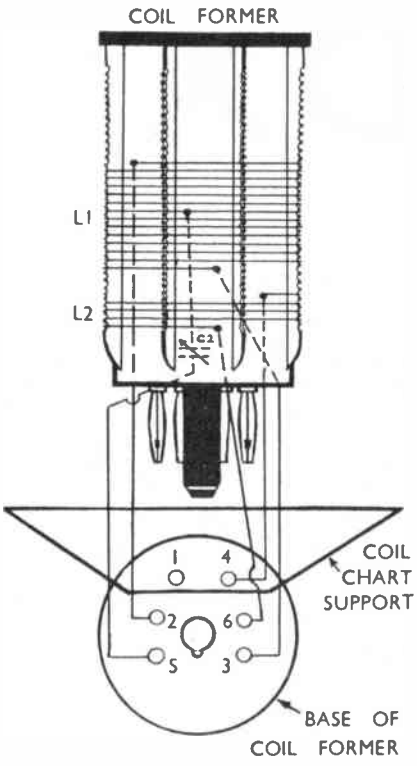
Most text books, by the way, state that "this same method may be used with a superhet receiver by coupling to the oscillator coils, but it is necessary to remember that the oscillator frequency differs from the calibrated signal frequency by the intermediate frequency. It is also necessary to know whether the oscillator is on the high or low side of the incoming signal ; in most receivers the high side is used throughout, but some receivers shift to the low side on the high frequency ranges." This being so, the writer prefers his ECO idea !

Operating Hints

To ensure long life for the meter and to prevent accidental damage to the movement, always make a point of setting the range switch S4 to the "off" position and switching the meter, by means of S3, to the frequency measuring side, after making a DC measurement. By making a habit of this, even if on some occasions the range switch has been left in the wrong position, no damage will be done to the meter.

To secure the utmost sensitivity on frequency checks, the number of turns of L2 should be varied, since

Fig. 2. One way of making up the coils for the frequency meter portion.



the inductance needed here will depend upon the actual crystal rectifier used; this adjustment should be made *before* the coil is finally calibrated.

Individual Modifications

If you are chiefly interested in the use of the instrument for purely V.O.M. purposes, it is suggested that a larger box be used and a Pullin 3½ in. scale foundation type meter substituted, with all the necessary resistances to suit the new meter. Ranges for AC could also be added. Remember, however, that the smaller the physical dimensions of the case, the handier the instrument becomes for frequency checking purposes in restricted positions.

Coil No. 1 could, with advantage, have slightly more inductance—since the overlap with No. 2 is more than adequate—and then its low frequency range could be extended to, say, 800 kc, which would prove useful for fundamental checking of ECOs used with a frequency-doubler for the 1·8 mc band.

THE UTRECHT TRADE FAIR

We are informed by Messrs. Ritchie Vincent & Telford, Ltd., of Kenton, Harrow, that at the first international Trades and Industries Fair held in Utrecht (Holland), they had their own stand. On this they were exhibiting the products of some ten British manufacturers, including Cossor, Labgear and Furzehill Laboratories, and a British Government photographic display on radar developments. The whole effort met with a good reception and had an excellent Press.

QSL G6SL

G6SL, the station of Messrs Stratton & Co., Ltd., Eddystone Works, Alvechurch Road, West Heath, Birmingham, 31, is now on the air on 1·8, 28 and 58 mc, and is in charge of G5JU. Reports will be very welcome; all will be acknowledged by QSL card.

ERROR CREP' IN DEPT.

In the May issue, p. 177, we drew attention to a mistake in the circuit on p. 82 of the April issue. Following some correspondence with A. G. Dunn, G3PL (Hull), and A. A. Mawse, it is now evident that there is yet another mistake in the same circuit. The reaction condenser C9 is connected to the wrong side of the reaction winding—it should go to the plate of V2; that is, the "hot" side of the reaction coil. The explanation on the working of the circuit is then quite correct.

While we cannot all be humming birds, we regret these two elementary errors, which have resulted in much correspondence and, on our part, an anxious re-scrutiny of *all* the circuits in the first three issues.

The result of these researches will be notified.

DX COMMENTARY

ON CALLS HEARD, WORKED & QSL'd

By H. A. M. WHYTE (G6WY)

The big news this month is that we are to be allowed on 7 and 14 mc again! The frequency allocations will be 7,150 to 7,300 kc and 14,100 to 14,300 kc; the Post Office is doing its best to clear the rest of the bands for us. It will be agreed that even if the Fighting Services and others concerned do not do things quite as quickly as we would like, they move very surely. July 1 is the date when these areas in the short-wave spectrum will bulge with pent up activity, although we have plenty of reports to show that 7 mc is being extensively pirated by impatient British amateurs using the prefix "X." We know this stands for the unknown quantity, but in this case, it is quite obvious that these stations should sign "G." We deplore this impatience—to use the mildest terms.

Band Occupancy

Last month we wrote that there was plenty of room on 1·8 mc, rather in the spirit of "the more the merrier." This month we withdraw that statement! Have you listened? Many have said that it is like 7 mc used to be before the war, with 'phones and ECO's snarling at each other, all mixed up in a hopeless tangle. This is surely a foretaste of what we can expect on 7 and 14 mc, and because of this we are going to offer some suggestions which we hope may be adopted by the majority for the benefit of all.

G6ZH (Devizes) recommends that G's refrain from using 1·8 mc telephony for the two hours before dark and the two hours after. Now, we are dead against rules, regulations and restrictions in Amateur Radio, as many of us have already had enough of them, but we strongly recommend—in the general interest—that all G's refrain from using telephony on 1·8 mc. at peak periods when the band is crowded. By peak periods we mean from 2100-2400 BST and possibly Sunday mornings between 1000-1300 BST. But the most important time to refrain would be in the busy hours after early darkness. Activity drops off sharply at midnight.

We must make our own bed because it is the only one the Post Office will give us to lie on. It has already been noticed that the large majority (90 per cent. or more) already use CW only during these peak hours, so our recommendation is made to a few and their co-operation (for such it is) will help to make the band fit for everyone.

7 mc and 14 mc

A similar recommendation for 7 mc does not appear to be so practical, as the band is going to be open the 24 hours round. However, we suggest that all British amateurs should co-operate in keeping telephony transmissions within 7,200-7,300, leaving 7,150-7,200 kc free for the key thumpers; remember, all newly licensed amateurs *have* to use CW for 12 whole months before they can come on 'phone, so they must have room in which to operate. This is not a rule, nor is it the policy of the *Magazine* to try and make rules, but to offer practical help.

Similarly on 14 mc, telephony operation should be restricted to 14,200-14,300 *as far as possible.* Later on, when the Americans are licensed for 7 and 14 mc, we shall see what they are going to do about 'phone operation. Unless we are determined to work together as one large noisy, but harmonious, family we shall spoil the fun for everyone. Do not forget, every time you go over to 'phone working you are causing at least *three times* as much QRM.

There is another aspect to keep in mind. It seems we are approaching a sunspot maximum in 1948 that will leave the maxima of 1927 and 1937 in the shade; furthermore, this maximum is approaching very rapidly and the number of sunspots for June, 1946, equals the maximum recorded in the 1927 peak—and we still have two whole years to go! All this means that we are entering a season unequalled in the history of Amateur Radio and we can expect DX on all bands from 1·8 to 58 mc! We

shall not only have G 'phones with which to contend, but telephony from the rest of the world as well. You can expect phenomenal signal strengths ! Yes, and phenomenal QRM !

28 mc and DX

Conditions on ten metres have been far better for the time of year than was expected—no doubt due to this sunspot business. VSIBJ on CW and VSIBA (ex-G3WH) on 'phone have represented Singapore. QSL to Royal Corps of Signals, Radio Club, Singapore. VS7CX (G2CX) has been active in Ceylon. PK4DA in Sumatra has been heard on 'phone, but we still await full details of this station. EA1D, using 1 kW 'phone in Madrid, has been coming in on short skip, but is due to leave for the States

ON THE AMATEUR BANDS

about the time this appears in print. XACP has given many a new country ; GM4FK (Kinghorn, Fife) says that he should be QSL'd to Signals Officer, R.A.F. Station, Sardinia, A.P.O. S.497, C.M.F.

According to SU1KE, Lebanon is represented by ARLA on 28550 and ARLB, who will operate as from June 1. SU1KE was heard calling EZ4X (any details ?) From the Western side, 'phone from VP6YB and numerous K4's, including K4ESH and K4HQU, has been heard. The W's made a most unexpected appearance on several days in May, but did not last long. Such reception has never been known before on 28 mc. South America was frequently heard, the most consistent signal being from LU8AK, but others were CX1FY, LU8EE, PY1DH, LU7CD, LU3AX ('phone) and PY2OS.

G8UA (Burnley) has had a card from VS3JH, who is officially licensed. His full address is Sgt. J. A. Hunt, c/o H.Q., B.M.A., Labuan Island, North Borneo, but he is expected home soon, so send QSL's to his address in Chingford, as given in last month's "DX Commentary." G. Hodgkiss, BSWL 1938 (Birmingham) informs us that ZB2A is officially licensed in Gibraltar and is working on 28,040 kc with 25 watts input, but although he can hear G's he can't work them ! It is usually the other way round ; we hear the DX but can't raise it ! ! QSL to 2220095, Cpl. Allsopp D., Hut No. 133B, "D" Site, R.A.F. North Front, Gibraltar. Put a 1½d. stamp on your card and he will reply. GI6TK (Belfast) is very active indeed in Northern Ireland, and pulled a quick one when he worked W9OLD/TA in Istanbul ; he asks, "Is this really Turkey at last ? " We should be glad to know ! GI6TK also sends a list of stations worked, which includes practically everything we have ever mentioned in this column. J. Douglas Kay (Bournemouth) gives the following QRAs : ZD4AC, Box 555, Accra, Gold Coast. XZ4AB, W/Cdr. A. G. Strutt, R.A.F., Air HQ., Rangoon. HK3AB, Box 1728, Bogota. Thanks—these are useful.

N. A. Phelps (London, N.10) asks if we have information on TR1P in Tripoli on 14 and 28 mc 'phone. Nothing known here yet. Another very active DX hunter during the month has been G3D0 (Sutton Coldfield), who has worked 33 countries this term already, including such rare ones as HH5E, W3GXQ/NY4, XZ2DN, VO1I, VU7BR (Bahrein Islands) and VS3JH. He has done all this with 95 watts to a 34 ft. Zepp 45 ft. above ground. Beams are not always necessary !

An interesting report comes from HB9T (Zurich), who informs us that the number of licensed HB's is steadily increasing. HB9EB is working on board "*S.S. Chasseral*" (Swiss Navy) on 14,250 kc. QSL cards have been received by HB's as follows : from EL4S (Fisherman's Lake, Liberia) by HB9CX ; EP1A (Khorramshahr, Persia) by HB9CE ; LI3JU by HB9CE, 9DO and 9AG ; VS5JH by HB9DO ; YI6JS (Basra), by 9DO ; KB6RF (Saipan) by 9CE ; CR9AG (Macao) by 9CX ; and TG9FG by 9CE.

P. Harris (West Byfleet) asks us for the QRA of KA1ABA, but we feel this is a mistake, as there are no 3-letter KA's.

The Top Band

As previously mentioned, 1·8 mc has carried the bulk of the energies of G's. Welcome signals heard have been OK1AA, worked by G8JR for first post-war contact. It is good to learn that these European countries are getting going again. More D2's have been on, and we hear from D2DI (G4DI, Maidenhead) that they are now licensed for 1·8 mc under the same conditions as we are.

Another 27 D2 licences have been issued, and thanks to the efforts of D2DI, Amateur Radio in the British Zone is now on an organised basis, with a QSL section—see QSL Bureaux list herewith. D2RX, D2KW, D2XZ and D2JB are active on 1·8 mc. Several EI's have been heard and worked, including EI4N, EI6G and EI9B. G6HB/I and G6ZO/I have been representing Italy, while a PA was on one night; ON4STD has also been heard. GI5QX (Belfast) says that Northern Ireland has been putting in a full quota of hours on 1·8 with GI's 5SJ, 3JP, 3ML, 5DX, 8LF and 6WG sharing the work. We can do with more of them, as GI is in great demand.

Have you noticed that 1·8 mc is behaving much better in daylight now than in pre-war days? Everyone is remarking on the extraordinary distances covered; for instance, G3HS (Faringdon) worked GC4LI (Jersey) at midday, and G6WY (Beckenham) worked G2BG (Abergavenny) and G3YH (Bristol) around 1800. Contacts up to 50 miles are now regular and common—in fact, the band seems to behave much as did 3·5 mc in the years preceding the war. We feel this is just another effect of the large increase in sunspots. Look out for transatlantic DX next winter.

Our contributor is not often able to reply by post to readers' letters, owing to the large amount of correspondence involved in the preparation of this article. He will, however, always discuss in it any matters of general interest raised by readers, who will thus receive a reply in print. G6WY welcomes a large volume of incoming mail, which should be posted to reach him c/o "Short Wave Magazine," 49 Victoria Street, London, S.W.1, as early as possible in the month.

We are still on probation on the top band. It is up to us to see that we do not abuse this privilege. G2HKU (Sheerness) is disgusted by some of the rotten 'phone operation he hears, and fears that such happenings may well queer our pitch with the Post Office. G6ZH, on the other hand, considers that key work has been pretty good. We agree with both opinions.

Slow Morse Exercises

G5UM, 9 Windermere Ave., St. Albans, Herts, has commenced his slow Morse practice transmissions on 1900 kc at 1030 BST every Sunday morning, preceded and followed by telephony announcements. These exercises have met with a good response and G5UM regrets that he cannot reply individually to all who have expressed their appreciation. He is glad to be able to fulfil a need. R. W. Britton, 2AVW (Choppington, Northumberland) has been listening to some Morse "exercises" up in the North and requests that the operators try and send Morse properly! He points out that the right way to transmit practice Morse is not to drag out the dits and dahs, but to send the letter at reasonable speed in a clean-cut manner, with a lengthy space between each letter; thereby, the listener is taught the correct *sound* of the letter, which is not conveyed if it is drawn out unnaturally.

Let us have calls and schedules of any other Morse practice exercises, and we can tie them together and publish each month for the benefit of readers.

7 mc is a DX Band

We have already warned you to look upon and expect 7 mc to be a DX band, and we recommend that you keep off local 'phone working (remember, between 7,200 and 7,300) in DX hours. These can be reckoned as one hour before dark to three hours after dark. T. B Williamson, BSWL635 (Angmering) has been checking up on this and between 0100-0500 he has heard the following 'phone stations: CE3CT, CO2PM, 3FP, 5AV, 8RL, HK7CA, PY2AY, CK, NO, OA, 3EA, 4AB, CF, TI4JG, XE1A, G, 3AH, YV1AN. He asks that we encourage the use of the band from a DX point of view. We cannot say more than that it *is* a DX band, and local 'phone should be severely frowned upon when DX is coming through!

From the States

We have an interesting letter from W2OEN, who is now operating from Farmington, Conn., and is keen to work G's. He lists 32 G's and 1 GM worked, using an HRO receiver. His aerial is 277 ft. long, with a large lobe for G which (to quote from his letter) "really pours it down into England"!

14 mc DX

Just to whet your appetities, here is a report from N. A. Phelps (London, N.10) on some CW DX heard on 14 mc. OQ5AU, 5BR, 5HR, 5BQ, HC1FG, HK4AF, FM8AC, ZC6FC, ZP6AP XE2KF, TF4B, CX1CX (QSL to Box 37, Montevideo), VQ6MI, EA9AI,

ES1D, OH5NK—also a station actually signing G9BF!! Patrick Masterson (Dublin) reports 14 mc signals from YV5ABY, 5ABE, 5AE, HK4CH, T12PA CE1AO, OQ5AA, EA9AI, XACS, and, Europeans. G2HKU says that FO8AN is on with 'phone.

Call Books and QSLs

A note appears elsewhere on how to obtain the new Call Book, out this month. Bulk supplies are not likely to be available over here, as the currency regulations permit only technical publications to be imported from U.S.A. We print an up-to-date list of all active QSL Bureaux at the end of this Commentary, as we know the information is required by many readers. But we strongly advise that you send your card direct where the address is known.

Egypt

Norman Joly (SV1RX), who is about to return to Athens with ideas of a 250-watt transmitter for all bands, informs us that SU1RD is not on the air as he cannot obtain a licence. Only Egyptian nationals are now licensed. Since 90 per cent. of the pre-war SU activity was by foreigners, this means that SU will be rare in future. XACR, who was operating in Athens, is now back in Caserta, Italy.

General

G6PJ (Sheffield) feels that the use of "handles" by locals in particular and G's generally is to be discouraged, as not being in the best traditions of British Amateur Radio. He remarks that some G's constantly heard on 'phone have put up a very poor show when they have used the key. We believe that operation should be balanced between 'phone and key. G6PJ notices much unnecessarily childish behaviour and great ignorance displayed in local 'phone contacts. One remark

QSL BUREAUX

Cards for the Countries named may be forwarded via the addresses given.

ALASKA. J. W. McKinley, Box 1533, Juneau.
ANTIGUA. A. Tibbits, 27 St. Mary's Street, St. Johns.
ARGENTINA. Radio Club Argentino, Av. Alvear 2750, Buenos Aires.
AUSTRALIA. W.I.A., Box 2611 W, G.P.O., Melbourne.
BELGIUM. Baptiste, 153 Av. Charles-Quint, Brussels.
BRAZIL. L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro.
BR. HONDURAS. D. Hunter, Box 178, Belize.
COLOMBIA. L.C.R.A., P.O. Box 1266, Bogota.
CUBA. James D. Bourne, Lealtad 660, Havana.
CZECHOSLOVAKIA. C.A.V., Vaclavske Nam 3, Prague II.
DENMARK. E.D.R., Box 79, Copenhagen K.
EIRE. 17 Butterfield Cres., Rathfarnham, Dublin.
FINLAND. Tatu Kolehmainen, Kasarminkatu 25.C.12, Helsinki.
FRANCE. R.E.F., 1 Rue des Tanneries, Paris 13°.
GERMANY. (American Zone, D4's) Signal Dvn. HQ, USFET, APO 757, c/o Post Master, New York, N.Y., U.S.A.
(British Zone, D2's) Capt. J. T. Blackwood, P & T. Section, c/o 609 Det. Mil. Gov., Hansestadt, Hamburg, B.A.O.R.
GREECE. C. Tavaniotis, 17a Bucharest Street, Athens.
GREAT BRITAIN. 29 Kechill Gdns., Hayes, Bromley, Kent.
ITALY. A.R.I., Viale Bianca Maria, 24, Milan.
LUXEMBOURG. R.L., rue Neyperg 33, Luxembourg.
MEXICO. L.M.R.E., Av. Juarez 104-22, Mexico D.F.
NETHERLANDS. V.E.R.O.N., Postbox 400, Rotterdam.
NEWFOUNDLAND. N.A.R.A., Box 660, St. John's.
NEW ZEALAND. N.Z.A.R.T., P.O. Box 489, Wellington, C-1.
NORWAY. N.R.R.L., P.O. Box 898, Oslo.
S. AFRICA. S.A.R.R.L., P.O. Box 7028, Johannesburg.
SWITZERLAND. U.S.K.A., Postbox 196, Berne—Transit.
URUGUAY. R.C.U., Casilla 37, Montevideo.
VENEZUELA. R.C.V., Apartado 981, Caracas.

Keep this list. We will give you additions to it as they become available. Acknowledgments for some of these to *QST* for May.

Join Your Local Radio Society

heard was "When I shout in my mike, why do my modulation anodes glow red?" We agree that much that is said on 'phone would be better left unsaid. But Amateur Radio would not be the same without the lids!

J. O. Parker (Brigg., Lincs.) is new to the listening game, and was under the impression he heard a W6 on 1.8 mc. We can assure him that W6 'phones have never been heard on this frequency in England, and what he did hear was undoubtedly the W6 operating from the American Zone of Germany with a D4 call. He notices, too, the number of "foreign 'phones" on this band; these are almost certainly foreign trawlers off the Lincolnshire coast.

Set-Listening Period—June

June 13 2100-2359 BST, 7 mc.

Please send in your logs immediately after this, in order that they may be considered for inclusion in the July issue.

Useful QRA's

D2DI supplies the following, obtained in the course of recent contacts: VK6FL, Box 1002, G.P.O., Perth, Western Australia; XZ2DF, *via* 103, Church Road, Richmond, Surrey; ZE2JD, Box 1284, Salisbury, S. Rhodesia.

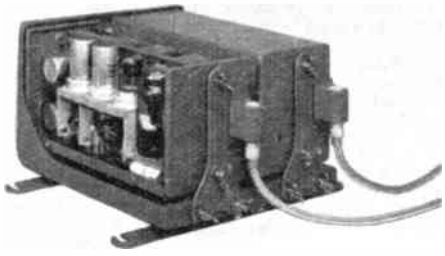
A late note from G2HKU gives us, for 28 mc, VS6DY on 'phone from Hong-Kong; W8WSY/ZC3 on Christmas Island; W8NEX on the Russo-Manchurian border; PK4DS in Sumatra; W8CJR is a Chinese typist with UNRRA in Shanghai (why the W8 call?); W5DGO is portable in Ceylon, and AK1LO, who says he is Korean.

Late Items

G6ZH (Devizes) comes through with another list of stations heard or worked on 1·8 mc. There are 56 G2's, 27 G3's, 16 G4's, 27 G5's, 30 G6's, 27 G8's, 3 GI's, 11 GM's, 3 GW's, EI8J, G5HB/F (Paris), D2AF, D2DA, D2KW, D2TG, D2XZ and OK1AA—a mere 208 stations in all! He remarks that the great majority are crammed between 1800-1940 kc. Loran is not as bad as all that, surely, especially in daylight. However, operators do well to avoid any possibility of causing QRM.

Some 45 SLP logs were received, and of course it has not been possible to print them all; a representative selection has been made for publication, and here we should like to thank readers concerned for having observed so carefully the Calls Heard rules for arrangement of the lists. In future, we can only print lists that are so arranged; anyone who has tried to get a long list into correct order will know why! Even if your list does not appear this time, it was still useful for checking purposes. So go on sending them in; we shall try to give everyone a turn in print, provided the lists give the information asked for and conform to the rules.

See you next month. . .



Puzzle Picture. *What is it?* *Answer on p.* 243.

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

(*Stations DX on this band marked with an asterisk.*)

G5MQ, 38 Linkstor Road, Woolton, Liverpool.

G2AK, 2NH*, 2OA, 3PD, 3BY, 4CI*, 4OS, 5BY*, 5LJ, 5MA*, 5TD, 5TH, 5TX*, 6CW, 6LK*, 6SL, 6VX*, 6YQ, 6YU, 8JV, I1IRA*. *DX all worked.*

G2AK, 42 Stanford Avenue, Great Barr, Birmingham, 22A.

Worked: G4CI,* 6LK.* *Heard:* G2NH,* 5BY,* 5TX,* 6CW, 6FO,* 6SL, 8QY, 8UZ.

G5TX, 82 High Street, Newport, Isle of Wight.

Worked: 2BMZ,* 2MR, 2MV, 2NH, 2NM, 2XC, 3NR, 4IG, 5BY,* 5MA, 5MQ,* 5OJ, 5TP, 5UI, 6FO, 6LK, 6VX, 6YQ*, 6YU,* 8DV, 8OS, 8RS. *Heard:* G2AK(589),* 2BI(559), 5WP (569), 6CW(558)*, 8LY(569). *Report in brackets.*

BSWL-1862, 64 Shaftesbury Road, Gosport, Hants.

'*Phone:* EAID*, G2XC, I1FA, I1KG. CW: G2NM (14), 2XC (7), 5BY (129), 5MA (62), 5OJ (47), 5TX (5), 5UI (5), 6LK (45), 6VX (80), 8DV (40), HB9AW,* *April* 11-*May* 20. *Stations marked * are harmonics.*

G8RS, 26 Shinfield Road, Reading, Berks.

Worked: G2BB (12), 2BMZ (125), 2LC (25), 2MV (36), 2WS (42), 3NR (28), 4IG (42), 5BY (153), 5OO (28), 5TX (55), 5WP (19), 6LK (29), 6OU (13), 6RA (35), 8IG (44). *Heard:* G2FWA (37), 2UA (28), 2XC (47), 3CQ (50), 3OO (42), 3PW (12), 5AS (28), 5FK (36), 5KH (26), 5MQ (160), 5UI (52), 6CW (107), 6YQ (160), 6YU (70), 8CK (?), 8OS (38) 8SK (40). *Exclusive of list appearing May. Distance in miles.*

G2LC, 56 Jubilee Drive South Ruislip, Middlesex.

Worked: G2FWA, 2MR, 2NH, 2UA, 3CQ, 3KP, 3PW, 4CG, 4IG, 5MA, 5RD, 5WP, 6FO, 6LK, 6VX, 8OS, 8RS. *Heard:* G2MC, 2MV, 2PT, 2WS, 3FU, 4CI, 4CK, 5BY*, 5FK, 5KH, 5TX, 5OO, 6RA, 6YU*, 8CK, 8GX, 8PO, I-1IRA*. *April* 28-*May* 19.

G6DH, 234 Burrs Road, Clacton, Essex.

Heard: G5MQ*, 6FO*, 6YQ* 6YU*. *May* 4, 11 *and* 13 *only.*

G6CW, St. Ann's, Bramcote Lane, Wollaston, Notts.

Heard: G2OA (82), 2RQ(?) 5RW (?), 5TX (150), 6DP (75), 6FO (100), 6YU (40), 8IC (?), GW6OK (110). *Worked* G3IS (50), 6LK (130), 8OS (143). *Distances in brackets.*

G5BY, Resthaven Hotel, Thurlestone, Nr. Kingsbridge, S. Devon.

F3JB, G2NH, 5MA, 5MQ, 5TX, 6LK, 6VX, 8IG, 8RS, I-1AY, 1FA. *All DX and all worked.*

MAGAZINE SET LISTENING PERIODS 1·8 mc May 18, 2100-2359 BST

T. Figgitt, 56 Whitmore Road, Birmingham, 10.

'*Phone:* D4ADJ, 4AIR, G2BG, 2JH, 2OR, 2XS, 3PH, 6SJ, 6SN, 6ST, 6YV.

G4LX, 31 Harley Terrace, Newcastle-on-Tyne, 3.

D2AU, EI7J, 'G2AJK, 2CLM, 2HBY, 2HIN, 2KO, 2NJ, 3BU, 3GW, 3VM, 5BM, 5DZ, 5KT, 5PJ, 5OH, 6OA, 6TC, 6VQ, 6ZH, GM3KC.

G2BVN, 43 Pettits Lane, Romford, Essex.

G2BU, 2DT, 2FIX, 2FZR, 2HBY, 2HFO, 2RY, 2SD, 2TC, 2YY, 4AK, 5FB, 5MN, 5UF, 6AO, 6HB, 6LC, 6TI, 6UC, 6WY, 6TR, 8CZ, 8LG, 8RC, 8TR, GM3NS, 4GK, GW3CF,

D. J. Starling, 15 Preston Gardens, Ilford Essex.

CW: G2BVA 2FZR, 2HBY, 2NJ, 2YZ, 4AK, 4AU, 4LV, 5KT, 5FW, 6AO, 6UC, 6WY, 8RC, GM6XI. '*Phone:* G2BG, 2DC, 2HR, 4GA, 6GO, 8TL.

G2HKU, 27 Unity Street, Sheerness, Isle of Sheppey, Kent.

G2BG, 2CO, 2DF, 2FZR, 2JV, 2KH, 2NJ, 3BA, 3OA, 3NQ, 5CT, 5OH, 6HD, 6ST, 6TC, 6VC, 6WY, 8RC, 8TL, 8UL,

H. S. Young, Bishopgarth, Heathside, Road, Woking, Surrey.

G2BOO, 2DT, 2FJG, 2FMT, 2FWA, 2FZR, 2HD, 2HFO, 2HOJ, 2KO, 2NK, 2NJ, 2YY, 3JW, 3MI, 3RQ, 3RV, 3UB, 3VM, 4DU, 4GX, 4LV, 5BM, 5FB, 5HH, 5KO, 5KT, 5OH, 5YK, 5ZN, 5ZZ, 6AO, 6BO, 6GO, 6HD, 6KR, 6NA, 6NW, 6PM, 6SX, 6TC, 6UC, 6ZH, 8LX, GI8LF, GW3JI, 2HIR.

GENERAL

1.8 mc CW and 'Phone

D2DI, 1 HQ. Signals, HQ., B.A.O.R.

(*G's heard or worked, April* 20-*May* 14.)

G2BG, 2DT, 2DU, 2FIX, 2KO, 2JM, 2JU, 2PU, 2QV, 3FJ, 3NQ, 3OJ, 3PW, 3SI, 3VO, 4AI, 4OC, 5BK, 5GN, 5IU, 5JO, 5KT, 5RO, 6AB, 6BA, 6DV, 6IA, 6NM, 6NW, 6PD, 6SL, 6SQ, 6ST, 6TL, 6UJ, 8PX, 8SR, 8TP, 8UG, GM6LS.

3.5 mc CW

N. A. Phelps, 17 Leaside Mansions, Fortis Green, London, N.10.

D4AUF, EK31, HA3N, 4EA, 5AU, HB9, AJ, BJ, BP, BT, CT, CU, DT, EG, EI, EJ, EL, ES, EV, EX, I 1 AK, LA 1C, 1V, 2B, 20A, 2P, 2UA, 2W, 2YA, 3BA, 3BR, 3C, 3D, 3GA, 3N, 3Q, 4K, 4S, 5B, 5G, 5H, 5K, 6U, 7L, 8B, 8D, 8F, 8M, 8U, 9Q, 9U, 9W, LB9K, LY5F, OE2LN, OK1RX, ON4ZC, OZ1X, 2LF, 2PAX, 4PA, 5IE, 5QE, 7EM, 9FAR, 9JAZ, P, PACRV, NK, PKD, SM 3VP, 3XJ, 4JD, 4XM, 4XQ, 5IX, 5JL, 5JV, 5KM, 5QH, 5QV, 5SI, 5UI, 5VR, 5VW, 5WE, 5WI, 5WU, 5YT, 6ID, 6JL, 6JO, 6KA, 6OE, 6OP, 6OR, 6QL, 6QP, 6VE, 6WW, 6YZ, 6ZWM 7JP, 7KN, 7MV, 7NF, 7PD, 7PK, 7PN, 7PQ, 7QY, 7SV, 7SZ, 7TH, 7YC, SP1AL.

28 mc CW and 'Phone

BRS-3789, 24a Watcombe Road, Bournemouth, Hants.

CE1AH, 3FB, CX1FY, EP1C, FA8JD, HK3AB, KA1ABA, 1AJ, 1JW, KF6SJJ, KZ5AW, K4ENT, 4FSP, LU3DH, 6AJ, 8AK, 8EE, 8EN, OQ5AE, 5BH, 5BQ, PJ3X, PK4DA, PY1AFO, 1AJ, 1DS, 1FO, 1HQ, 2AO, 2DH, 2KT, 2OL, 2RE, 5AQ, SU1CX, 1JM, 1KE, 1MW, 1RC, 1USA, SV1EC, TF5Z, VQ2NC, 2WP, 6MI, VS1BA, VU2AA, VO1G, 1O, 2CX, W2KGW/VO, W7GXR/KG6, XAAP, XAAV, XABL, XABW, XACD, XACP, XZ4AB, ZB1E, ZD4AC, ZE1JU, 2JD, ZS1AJ, 1AV, 1AX, 1AZ, 1BF, 1BM, 1CV, 1CX, 1CZ, 1KT, 1T, 2AL, 2AW, 2X, 2AZ, 4AA, 4AF, 5B, 5BB, 5BZ, 5J, 6AM, 6BJ, 6CM, 6CY, 6DW, 6EU, 6EQ, 6T.

Here and There

Believe It or Not

Recently on 7 mc, three pirates—"X2DY," "X4JL" and "G7RY"—were overheard discussing the remarks of our misguided contributor G9BF in the May issue. It seems that X4JL was most annoyed about it all, and said that G9BF must be a fool if he puts screwdrivers across a power transformer!! X2DY maintained that he is not QRO, and that G9BF would be surprised to see his simple little 807 rig!

We would hardly have thought it possible that such a conversation could have been heard on the air. G9BF says that what he objects to is the use of DX call-signs from his own unique collection.

Half-Guinea Ideas

Many amateurs have some very good ideas, often quite original, which they apply to their own equipment and then forget, without realising that these ideas might help or be of interest to others.

We therefore propose starting a new feature—"Half-Guinea Ideas"—the intention of which is to give a little encouragement to their appearance. It may be a switching trick, or a receiver modification, or a new way of using old equipment, or one of a hundred other things. Whatever it is, if you think it may be original, let us see it.

A half-guinea will be paid for any ideas printed. There is no need to write an article; we do that. A clear diagram or photograph (extra payment for photographs) with an explanation in your own words is all that is required.

Do You Know That

It is often a good thing to earth the heaters of indirectly-heated valves used in 28 and 58 mc transmitters? This frequently results in greater RF output and helps to take the dip off the grid meter if the valve is a tetrode or pentode and is not supposed to require neutralisation. To prevent heater current shorts in a multi-valve transmitter, earth through ·01 μF condensers in preference to a direct connection.

Band Warming Party

During the period February 22 to March 3 we were puzzled by hearing Americans, Canadians and some Dominion stations calling "CQ BW." It now transpires that this was the first post-war Amateur Radio Contest, organised by A.R.R.L. but not notified in this country. Apparently, everyone enjoyed themselves, though activity was by no means world-wide, due to the lack of publicity.

Some preliminary results have just been announced in *QST*. The lead station is W6RBQ, who made 49,822 points (yes!) with 409 contacts, exclusively on 28 mc. He is followed by W6TT, with 400 contacts and 47,216 points. Apparently, conditions for the W's were extremely good, for both DX and inter-W working, and the band is now adjudged to have been well warmed up. An interesting item in the report records that W6ULE, working exclusively on 144 mc, made 26 contacts in the Los Angeles area.

Making Holes

When working in metal, one of the most difficult and least satisfactory parts of the job from the amateur point of view is usually the obtaining of clean holes where the diameter required is greater than normal drill sizes; as, for instance, when mounting valve-holders. Of course, the operation can be undertaken in several tedious ways, from scooping out an irregular excavation with a reamer, to cutting through a series of small drill holes with a fretsaw. Webbs of Soho Street have the solution for holes up to 1¼ in. diameter—a series of steel punches which cut a perfect hole in metal up to 16 gauge with one, or perhaps two, good clumps with a 4 lb. hammer. These tools are available in sizes from the 1¼ in. (large enough for anything likely to be required, except meters) to ¼ in., costing 10s. 6d. in the larger diameters and 9s. 6d. for the smaller. We know they are worth it, because we have a set.

The other man's station

G2AK

ILLUSTRATED HERE IS G2AK, C. H. Young, 42 Stanford Avenue, Great Barr, Birmingham, 22A, who was first licensed in 1926 and has been active on all amateur bands open ever since.

The interesting thing about this photograph is that it depicts a station which has been built and installed since VE-Day. It therefore represents the best modern design and practice, and incorporates the ideas of a very experienced operator.

The main transmitter frame—the handsome cabinet rack on the left—provides for operation on the 3.5, 7, 14 and 28 mc bands. The bottom unit houses a 2 kW auto-transformer for mains adjustment since, at G2AK, the supply varies between 195 and 230 volts. This transformer gives independent control of HT and heater supplies and also has a 110-volt tap to allow for QRP operation and tune-up—a very useful feature. Power supplies are 350, 650, 1100-1500 and 1100-1750 volts. Below the meter panel, which gives all necessary voltage and current checks, is the TZ-40 main modulator unit, with its associated input and output matching transformers.

The transmitter itself is tritet 6L6-807-P/P 35T, which feeds into a pi-section aerial matching network, covering all bands. This is the top panel on the rack.

On the operating desk is seen, left to right, the twin input speech amplifier (6SJ7-6SJ7-6C5-P/P 6L6), for either crystal or moving-coil microphone, the HRO receiver and the station control panel, with the meter for mains voltage monitoring. The whole change-over system is relay-operated and controlled by a small toggle-switch on the control panel. This puts aerial from receiver to transmitter and applies HT in the correct sequence to the various transmitter units.

58 and 1.8 mc Units

The 160-metre and final 5-metre transmitters are at present under construction. They will also be built into a cabinet rack, to stand on the right of the control desk, and like the main transmitter, will be relay-operated. The 58 mc job now in use is 6A6-6A6-829, and the 1·8 mc transmitter is CO-PA, with suppressor-grid modulation. The modulator for the 5-metre transmitter is 6N7-6C5-P/P 807, and for the 1·8 mc suppressor-controlled outfit, 57-57-56-P/P 2A3. The five-metre receiver is a converter using 9001 RF, 9001 mixer and 9002 oscillator, coupled to the HRO tuned to 10 mc.

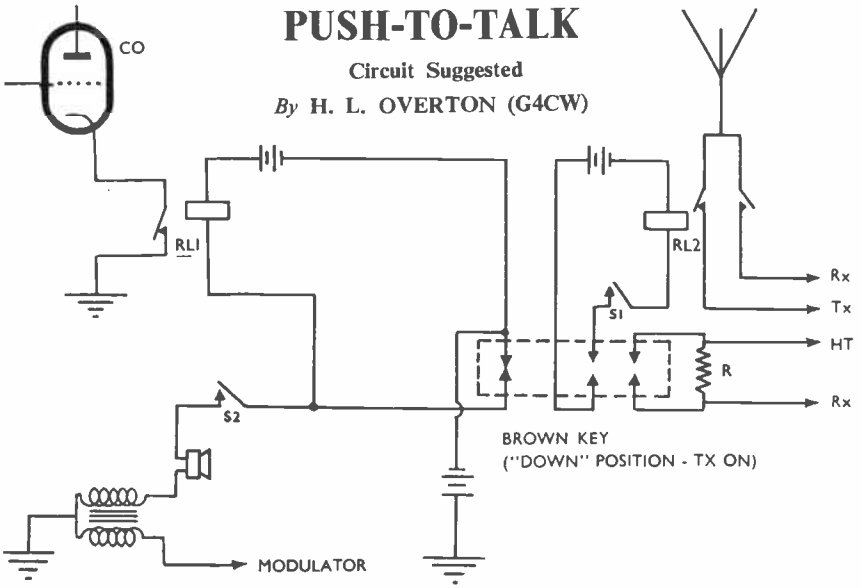
The station main aerial is 5-½-wave on 28 mc, suspended in an E-W line between a pair of 50 ft. masts. It is working well on 58 mc, but will probably have to be modified for the LF bands.

Altogether, a very fine amateur station.

PUSH-TO-TALK

Circuit Suggested

By H. L. OVERTON (G4CW)



Circuit of G4CW's change-over system. *It involves use of a multi-contact key, such as the old Brown, though for telephony working only, a spring switch would give the same result. RL1 is the keying relay, and RL2 the aerial change-over relay ; S1 is to save the battery when the station is off the air, and S2 can be the switch in the microphone stand.*

The quick change-over system employed at this station is based on the use of the Brown police key, well known to many pre-war amateurs. This key, in addition to the usual front make-break contacts, has in addition two pairs of contacts on the back of the arm. Since the same aerial system serves for both transmission and reception, a GPO multi-contact type relay has been adapted for the aerial change-over ; all the contacts are taken off, and across the armature is fitted an insulating strip to which are attached two spring contacts from those removed. Further spring contacts are fitted to Eddystone midget stand-off insulators, the whole thus making a low loss double-pole change-over relay. A second relay is used for keying, this being the brass-cased GPO type, polarised, which can be obtained for a few shillings less contacts ; these can be provided by silver wire soldered to the screws.

Operation

The operation of the system is as follows : Current is on the aerial relay for receiving. When the key is pressed, the two pairs of back contacts break first ; one pair breaks the aerial relay circuit, thus changing the aerial from "receive" to "send." The other pair, connected across a 100,000-ohm resistor in series with the receiver HT lead, puts this into circuit, thus muting the receiver. Following the breaking of the back contacts, the front pair make, which actuates the keying relay and puts the transmitter on the air. The same contacts are used to switch on the microphone.

The microphone and the keying relay batteries are connected in opposition, thus allowing only a very small current to flow in the "receive" position. The keying relay is in the cathode of the CO, and the PA is biased well beyond cut-off.

When the key is up, for "receive," the transmitter goes off *before* the aerial changes over to the receiver, the microphone is switched off and the receiver muting resistance is shorted out, restoring normal HT to the receiver.

This system, the circuit details of which are given herewith, has been in use for a long period with very satisfactory results. The aerial relay follows the key so well that it is possible to operate CW with T9 reports ; it also allows for break-in and listening-through, since the receiver is always mute with the key down. No heavy-current circuits are broken, and the system could, of course, be adapted to the back-bias method of keying suggested in Fig. 1 on p. 155 of the May issue.

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.

G2AGD	W. Grant, 35 Cotswold Road, Westcliff-on-Sea, Essex.
G2ALM	R. F. Wilkins, 1 Becket Buildings, High Street, West Tarring, Worthing, Sussex.
GI2ARS	D. Rutherford, Ballyveamore, Ballymartin, Co. Down, N.I.
G2CBB	H. R. Hatch, Rylands, Limpsfield Road, Sanderstead, Surrey.
G2CIW	J. F. Moseley, 54 Clarence Road, Grays, Essex.
G2CPF	A. Stansfield, 62 Aireworth Terrace, Keighley, Yorks.
G2CQY	E. J. Simonard, 221 Bradford Road, Frizinghall, Bradford, Yorks.
G2CWH	W. C. Hodson, 5 Upper Brook Street, Rugeley, Staffs.
G2CXO	F/O G. Miles, Cotswold, Mottingham Lane, Mottingham, London, S.E.9.
G2CYV	B. R. Meredith, 81a Loughborough Park, Brixton, London, S.W.9. (*Correction.*)
G2DBF	J. F. Squires, M.B.E., 80 Victoria Road, Bournemouth, Hants.
G2DNI	E. G. Bell, 13 Rutland Street, Grimsby, Lincs.
G2DPQ	C. W. Pettifar, 3 Greenway, Campton, Shefford, Beds.
G2DRB	G. H. Heppel, c/o District Officer, H. M. Coastguard, Berwick-on-Tweed, Northumberland.
G2DRY	T. W. Lee, The Nook, Great Tattenhams, Epsom Downs, Surrey.
G2FCJ	D. F. Sullivan, 34 Elmwood Road, Chiswick, London, W.4.
G2FFQ	T. Read, 41 Yoxall Avenue, Hartshill, Stoke-on-Trent, Staffs.
G2FNI	W. E. Blocksidge, 134 Rake Lane, Wallasey, Cheshire.
G2FOZ	L. J. Crange, 22 Lidgate Road, Peckham, London, S.E.15.
G2FRW	L. H. Metcalfe, 4 Altar Drive, Heaton, Bradford, Yorks.
G2FUV	R. P. Munn, Whitenest, Sandgate Lane, Storrington, Sussex.
G2FWA	S. E. Janes, 72 Kimberley Road, Croydon, Surrey. (*Correction.*)
G2HDT	E. Crouch, 25 Alexandra Road, Winshill, Burton - on - Trent, Staffs.
G2HFC	N. Lowe, 7 Bellingham Avenue, Wigan, Lancs.
G2HNU	D. M. Byrne, 50 Ashby Road, Winshill, Burton - on - Trent, Staffs.
G2LC	C. J. Greenaway, 56 Jubilee Drive, South Ruislip, Middlesex.
G2QU	D. Campbell, 9 Queensmere Road, Wimbledon, London, S.W.19.
G2RS	F. V. Mourant, 28 Paget Rise, Plumstead, London, S.E.18.
G2YZ	A. K. Wall, 32 Onslow Drive, Sidcup, Kent.
G2ZC	A. M. Houston Fergus, Threeways, Churt, Farnham, Surrey.
G2ZF	B. L. Stephenson, 22 Moss Lane, Bramhall, Cheshire.
G3JO	W. C. Barnes, 7 Surrey Road, Swindon, Wilts.
G3JZ	V. H. Penfold, D.S.M., King's Head Cottage, Cuckfield, Haywards Heath, Sussex. (*Tel.* : *Cuckfield* 275.)
G3QS	F. Judd, 511 Fulbridge Road, Werrington, Peterborough, Northants.
G3XP	F. C. White, Chester House Hotel, Chine Crescent, Bournemouth West, Hants.
G4FO	G. E. Cockroft, Tudor Drive, Oadby, Leicester.
G4GH	R. Whitelaw, 3 Daltry Close, West Derby, Liverpool, 12.
G4HU	W. F. Morris, 34 Birch Avenue, Romiley, Cheshire.
G4NY	J. Bowers, Alpine Nursery, Durrington Lane, Worthing, Sussex.
G4PF	W. A. Lawson, 16 Marina Crescent, Netherton, Liverpool. (*Correction.*)
G4PR	S. H. Avery, Dinorwic, 81 Bromfield Road, Redditch, Worcs.
G5FF	F/L A. Blackman, R.A.F., Utopia, Uplands Rd., Denmead, Hants.
G5FI	G. R. Scott-Faruie, Old Mill House, Maids Morton, Buckingham. (*Tel.* : *Buckingham* 3175.)
G5JM	H. E. James, 215 Broadway, Southall, Middlesex.
G5SG	Major N. Edwards, R.E., 6 Axholme Avenue, Burnt Oak, Edgware, Middlesex.
G6QC	E. T. Pethers, 1 Jubilee Avenue, Sileby, Nr. Leicester.
G6XJ	A. C. Edwards, c/o Stratton & Co., Eddystone Works, Alvechurch Road, West Heath, Birmingham, 31. (*Correction.*)
G6XS	F. Cropper, B.Sc., A.R.I.C., (Garth), 394 King's Road, Ashton-under-Lyne, Lancs.
G8OK	P. Denison, Oakfield, 91 Bradford Road, Birstall, Nr. Leeds, Yorks.
G8PO	Lt./Cdr. J. E. Ironmonger, R.N., 15 Princes Way, Wimbledon, London, S.W.19.
G8UA	H. Tee, 469 Higher Brunshaw, Burnley, Lancs.
G8UB	G. V. Marchbank, Four Ways, Llynclys, Oswestry, Salop.

SOME

Letters

TO THE EDITOR

OLD TIMER

I was licensed DHX in 1909 and except for commercial calls at sea and ashore have held various amateur transmitting licences ever since. My post-war rig is on the stocks; by June it will be percolating. Now let me ask a harder question than the one about "73." How many other codes are there in existence in addition to International Morse? Turkish, Russian, Japanese, Siamese Navy, Chinese and Greek Navy are but a few I have heard in half-a-lifetime tramping the seas.—*P. Denison*, G8OK, *Oakfield, Bradford Road, Birstall, Nr. Leeds.*

(This is all news to us; we always laboured under the delusion that there was only one International Morse Code—nor do we fancy starting to learn the Siamese Navy code now. Anyway, good luck with the new rig, and your note regarding "73" appears on the next page.—*Ed.*)

SUGGESTION

I would suggest as a subject for future articles, the properties and methods of use of grounded grid triodes. While these are well understood by those professionally concerned with radio during the war, to the true amateur such as myself but little information has filtered through. As it is understood they have some valuable applications, e.g., straight un-neutralised RF amplifiers at very high frequencies, and are reasonably priced, it would be useful to the uninitiated to have this information made available.—*R. F. G. Holmes*, 90 *Lakenheath, Southgate, London, N.*14.

(We have ideas on this subject which we hope to unfold in due course; in the meantime, perhaps other readers with experience in this field would let us have their views.—*Ed.*)

HELP FOR HOLLAND

We have seen the letter of your Dutch correspondent on p. 178 of the May issue. Our Continental office in Hilversum (Postbox 40) will be very glad to attend to his troubles and those of any other Dutch amateurs in a similar plight.—*L. R. Vincent, Director, Ritchie Vincent & Telford, Ltd.*, 136A *Kenton Road, Kenton, Harrow, Middlesex.*

(No doubt the Secretary of the V.E.R.O.N. will put himself in touch with your Hilversum office.—*Ed.*)

MINE SHAFTS

"Protest" on p. 178, May issue—Where *are* these mine shafts!!—*G. H. Heppel*, G2DRB, *c/o District Officer, H.M. Coastguard, Berwick-on-Tweed, Northumberland.*

(We could say, but it would be no use as the headgear has been dismantled.—*Ed.*)

WORD FROM CZECHO-SLOVAKIA

With a joy I see the begin of the issuing of your paper, but if I would be a subscriber I cannot still yet. Why? I don't know the way how to pay or send the subscription to you. If you could kindly wait a little and meantime send me your *Magazine* I shall have the possibility later to send a remittance to you, after our money reform will be finished. We suppose it will be done with the end of May already.

Actually, we have some big uneasiness wishing to get permition for sending some money abroad from our National Bank so I am sure I will not get the allowance to the given purpose indeed.

So, Gentlemen, of you do wait a little, then I will be very obliged to you, having helped to me to get some information about the state of the progress in short wave activity. You don't know how deep is the interwal of seven long years under whose we have had no contact with radio, so we are always very glad to do read some foreign press on radio technical matters.—*H. J. Rakosnik*, OK1AQ, *Sedlec-Kutna Hora*, 112, *Czechoslovakia.*

(We should be pleased to be able to write Czech as understandably as OK1AQ writes English; needless to say, he is getting his copy each month.—*Ed.*)

RESERVE REORGANISATION

Regarding your May Editorial, *Service*, I do not know if you, being aware of the conditions of service in the R.N.W.A.R. intentionally refer to this rather than to the R.N.V.(W.)R., which replaced it on January 1, 1939. However, as a member of the former who transferred to the latter, served at sea as a telegraphist and subsequently had experience of technical administration and planning, I am very interested in the problem you raise.

While I agree any Reserve organisation on the old lines is out of the question, I am inclined to think you have the R.A.F. requirement more in mind than that of the Navy. With the Navy, however, as far as one can see there will always be the necessity for broadcast to ships, at sea for long periods and often far from the transmitter. In spite of the advances in communications

technique, the reliable reception of traffic over long distances still depends largely upon elaborate aerial systems, an impossibility in a ship. There is also likely to be a host of small ships relying for their communications on hand-keying. I feel therefore that in any Reserve connected with the Navy the probable requirement for a knowledge of Morse and experience in ordinary point-to-point working should not be overlooked.

Technical development in peace is much slower than in war and I have not your misgivings that the radio amateur will be unable to tackle the advanced communications technique with which he will be confronted, whether or not he receives adequate training which, as you say, is so important. One only hopes that next time the exceptional ability of some of the personnel in the Reserves will not be wasted for so long, as happened in the early years of this last war.—*Vincent Penfold (Lt/Cdr., R.N.V.R.), G3JZ, King's Head Cottage, Cuckfield, Haywards Heath, Sussex.*

(Our main points were (1) that Reserve organisations are both necessary and desirable, (2) that they will have to provide much better real training facilities than in pre-war years, and (3) that in any case the radio amateur will be able to meet Service requirements better than those without his training and experience. If reserves are formed with these factors in mind, one for each of the three Services in accordance with its own particular needs, then we feel that all will be well, and amateurs will once again be able to play a useful part if any future emergency should arise.—*Ed.*)

COMMUNICATIONS RECEIVER CONSTRUCTION

With regard to your comment on BRS-4384's letter on p.178 of the May issue, I would like to second his request for communications receiver details, as I have just built a short-wave superhet with the idea of getting some experience before adding communications refinements and setting up in permanent form. I have used Mullard "Red E" valves, with separate power pack, and hand-wound coils arrived at partly by calculation and partly by trial and error. But it does work, and as I write, I am listening on 28 mc. So you will see I have reached the "off we go" part of BRS-4384's suggestion.—*B. J. Blount*, BRS-7605, 5 *Priory Crescent, Cheam, Surrey.*

In A. A. Mawse's article in the May issue, I note he considers home construction of a communications-type superhet difficult. I built one myself about a year ago, which has given every satisfaction. Whilst I do not claim HRO performance for it, it can hold its own with sets in a similar price-class with which I have compared it. The valve line is 6K7 RF, 6L7 mixer, 6J5 RF osc., 6K7-6K7 IF, 6Q7 second detector, 6C5 BFO, 6F6 output and 80 rectifier. All the parts were obtained during the war and are now even more readily obtainable. — *Alan B. Wright*, G6FW, 106 *Knowsley Road, St. Helen's, Lancs.*.

I am afraid I do not agree with your foot-note to BRS-4384's letter on p.178 of the May issue, regarding communications-type receivers. I think the *Short Wave Magazine* should *lead*, even if not all can follow. Do not forget the amazing 6-10 valve sets the *ordinary BCL* constructed in the pre-screen grid days, and made to work, with three or more stages of neutralised triodes! I think you are unduly pessimistic!—*Hilton O'Heffernan*, G5BY, *Resthaven Hotel, Thurlestone, Nr. Kingsbridge, S. Devon.*

(We accept the rocket. A design will appear about August.—*Ed.*)

ORIGIN OF "73"

Following G2YI's comment, p. 105, April issue, we have this note from P. Denison, G8OK: "Western Union telegraphists originated '73' and '88,' besides a great many other abbreviations. When, about 1906, wireless went to sea these code-groups went too. United Fruit Company boats on the New York—West Indies run upheld their use, with the American Morse Code, for some years, partly on account of a certain element of secrecy in the traffic between their ships which resulted thereby. The U.S. Navy enlisted many Western Union operators, and somewhere about 1910 published an official code-card which displayed American Morse on the left and Continental Morse on the right, with a complete list of all such abbreviations as '73' and '88,' and all known foreign accented letters and punctuation marks."

Starting with the Western Union operators before wireless was used at sea, this seems to take us right back to the original comment which appeared on p. 23 of the March issue! So the discussion is now moving in circles.

Puzzle Picture (page 236). *The receiver and power unit for the Eddystone mobile radiophone equipment, which can be carried on a police car, a patrol vessel or a fire tender.*

G9BF Calling

(*We just cannot keep this chap out.—Ed.*)

MY articles having such huge success (three letters and one foreign postcard this month) Editor now got to print my photograph, just like in Other Man's Station. This shows G9BF getting somewhere, and that my famous call KZ7LX still worth using.

Have decided contribute real technical article this month, as of course am fully competent deal any problem Amateur Radio, not just DX, for which I am famous.

While recent big rebuild on, decided equip station for break-in, remote control. Do not understand this single-channel, but will come to that later. Fixed lots relays on gear and switches etc with key beside bed in shack. Much complicated wiring necessary for this and cannot recommend for ordinary ham unless very advanced, like me. First tests not too successful.

Switched on Rx, but terrific crack and loud roar when key pressed. Rx not muting of course. Found Tx relay connected lead-in to Rx instead of aerial. Changed few connections and pressed again. Whole station went dead. Diagnosed power off, but could not understand why all Tx meters hard against stops; applied usual technique of first principles first, and discovered bias now shorted and CO not oscillating. Do not recommend back-bias keying unless reader *very* experienced. Went back to old system of keying HT+ PA. No trouble and operation certain, but necessary take special precautions, sitting on rubber mat etc, to avoid fatal shock while keying. Put in keying relay; vicious, sticky arcing across relay contacts every time key approached. System not really quite satisfactory for snappy BK operation.

Still no joy with Rx muting, so decided would switch it independently. Time now two a.m. and 7 mc band full of rare DX, like MO1FFI and GX7EE. Condx just right for useful experimental work with KZ7LX. Got in bed, put key and switches handy and called CQ DX BK. Stopped keying a moment, switched off CO, changed over aerial and switched on Rx, searched band. No joy. Tried again. No result. Another go, third time lucky. Found very loud station signing PX9YL and calling very fast, about 8 w.p.m. Suspicious not genuine PX, as his signal blotting out LF end band. Gave him "Ur sigs RST-333 fb hr in Balkans," just to shake him. He came back "Ur spark S9 plus vy fb hr near Spain sure QSL." This shook me, as do not usually get S9 from DX, and felt sure my note pure CC as usual. Asked him "Pse rept tone hr CC." He replied "Ur note like rock rock crusher crusher om vy fb for DX." As cannot waste time with ops who give phoney reports, gave him "Tnx vy om QRU GN CUL." He signed off "OK om will give u ring in mng!"

Decided I had better QRT. (*What, so soon?—Ed.*)

THE MONTH WITH THE CLUBS

FROM REPORTS

The *Magazine* Club Register now carries details of 35 active organisations, fairly well distributed over the country. However, the London and Home Counties area supports no less than twelve of the thirty-five, so it is quite evident—as stated in our first article under this heading last March—that there is ample scope for the formation of many more local radio societies.

As every experienced secretary will confirm (in his time, your scribe has done the donkey-work for three clubs in different parts of the country), when you get down to it, it is quite surprising how many local people are interested, where they come from and who they are. In one small town we know, it was found that both the Town Clerk and the Police Superintendent were keen amateurs with active callsigns; they are now equally keen members of the local club, the secretary of which is a solicitor.

For this month's survey of activities, we have eight new clubs reporting, out of a new "high" of seventeen societies represented. While not strictly a club report, we are including D2DI's extremely interesting account of the "Hamburg Hamfest," when 25 D2's, with visitors and friends, held a two-day meeting in Hamburg—surely one of the most remarkable gatherings in the history of Amateur Radio, and so far as we know the first one of its kind in a conquered country.

Your earnest scribe would also like to thank club secretaries who met the date this time. As we write, there may be some late reports on the way; if so, they are not included, as the Editor insists, quite rightly, on keeping to the date. Any slipping in that respect merely dislocates the printing schedule, which makes the issue late and leads to trouble and confusion all round.

For this month, June, we must ask for reports by the 17th to ensure appearance in the next (July) issue; this gives secretaries the week-end of June 15-16 to prepare their reports, unless they like to let us have them sooner! The names and addresses of secretaries of all clubs mentioned this month will be found in the panel at the end of this article.

The Hamburg Hamfest.—Held in Hamburg over the period May 11-12, the attendance—which exceeded all expectations—included 25 D2's, with D4ABJ, ex-G8MW and Pte. J. Petrie as the representative of the D2 SWL's. D2TG and D2CW made the local arrangements and the business meeting was opened by D2DI, the organising secretary for Amateur Radio in the British Zone of Germany. He gave an account of the D2 licensing situation and announced the widening of the 28 mc band to 30 mc and the reduction in power on 1·8 mc from 25 to 10 watts; all this to bring the D2's in line with the G's. By the same token, it is expected that 7 and 14 mc will be reopened in Germany under the conditions stated elsewhere in this issue.

Resulting from the discussion which followed D2DI's address, it was decided to organise a QSL service (see "QSL Bureau" in this issue), and also to encourage activity on 58 mc, in the hope of working G on that band during the spell of good conditions expected this season. 1·8 mc will be used as the liaison channel.

The formal proceedings terminated with the presentation to D2AF of the "Most Honourable Order of the Handle," a very superior chromium-plated car door-knob, to be held until the next Hamfest, when it would pass to the member then adjudged most fitted to receive it. D2AF accepted this remarkable trophy, while modestly protesting that there were many more deserving than himself!

A group photograph—which we hope to print here next month—was then taken, and the party went "station visiting" to the British Forces Network studios, under the guidance of D2AF.

We feel that all readers will join us in wishing D2DI, and the whole band of D2's, good fortune and a safe return; in the meantime, it is good to know they are within easy reach *via* Amateur Radio.

Now for the other Club reports:

Surrey Radio Contact Club.—This is a well-known pre-war Amateur Radio organisation, founded in 1935 and based

in the Croydon district. Meetings are held on the second Tuesday of each month at the Blacksmith's Arms, South End, Croydon High Street. The Chairman is G2DN, with G5BT, BRS-3003, G2KU G4NI and G2FWA holding various offices. The programme is a very practical one, and new members will be most welcome.

Bolton and District Radio Society.—Secretary N. Moorcroft remarks that the society is coming along very nicely, though all their members have not yet returned from the Forces. Bolton is negotiating for permanent premises and will instal a transmitter as soon as this has been arranged. They meet monthly at Gaskell House, 9a Churchgate, Bolton, on the first Tuesday. As soon as portable licences are again an issue, they will be organising a field day.

Doncaster and District Amateur Radio Society.—This has re-formed with twenty members and is ready to enrol more. No further information is available for the moment.

Leeds Radio Society.—Formed two years ago, they now have 30 members; activities are somewhat restricted at present, but there are plans for a club transmitting station. Meetings are every Friday at 7 p.m. at Swathmore Settlement, Woodhouse Square, Leeds, and anyone interested in Amateur Radio is very welcome.

St. Pancras Radio Society.—Meetings were held regularly during the war, with an average attendance of 14, despite air raids and damage to the club room—a fine record, and St. Pancras can justifiably look forward to increased activity and membership. Meetings are every Monday and Tuesday at 7 p.m., with a special "Beginners' Class" at 6.30 each Wednesday evening. G2DDK and G2FMJ, in their capacity as technical instructors to the club, have given frequent lectures, and a transmitter is in course of construction. Visits have been arranged to the BBC, Service communication centres and radio manufacturers, while later it is also hoped to have the ever-popular field day events. All interested in becoming members will find the club at the Kentish Town Men's Institute, Holmes Road, Kentish Town, N.W.5.

Woodford and District Radio Society.—Woodford is re-forming, and all pre-war members, as well as new prospectives, are asked to get in touch with the secretary.

Hi-Q Club, Giffnock.—This is a private group with a limited membership, but anxious to participate in tests and Amateur Radio activities of any type, including propagation problems and frequency checks. Other Club secretaries are invited to write GM2FZT for details of what "Hi-Q" have in mind.

Stourbridge and District Radio Society.—G8PR reports that with a present membership of 30, they have a potential of 50 when all the locals return from the Services. The other officers include G2NV, G8GF, G2CLA, G2HAS, G3UK and BRS-4806, with G6OI as President. The present membership between them hold 17 radiating licences, and reports are always welcome. The future programme includes lectures, discussions and brains trusts; meetings are held on the first Tuesday of the month at 8 p.m. The subscription rates are low, with a reduction for junior members, and in its excellent set of rules (forwarded with the report), Rule No. 2 lays it down that "The Society shall have as its aims and objects the maintenance and increase of interest in all matters concerning Amateur Radio."

Grafton Radio Society.—The motto here is "Get Together at the Grafton" and judging from the secretary's current report, with 47 members on the books they are living up to it. An extra meeting night has become necessary, and the society is now in session at the Grafton L.C.C. School, Eburne Road, Holloway, N.7, at 7.30 p.m. every Monday, Thursday and Friday. Go to Nag's Head Junction. Seven AA's are preparing for the Morse Test, and an extra class is being run for absolute beginners on the key. Two new activity sections—Servicing and Propagation—are being very well supported, and the new membership includes ex-Service signals and radar personnel.

It is noteworthy that all this has been achieved since April 12, when Grafton held its first meeting, after the notice appeared in the *Magazine*. The society provides an excellent opportunity for the SWL to make contact with experienced amateurs; membership fees are very low, canteen facilities are available, and everyone with an interest in Amateur Radio is welcome.

Hounslow and District Radio Society.—After the convening notice appeared here last month, Hounslow got away to a good start on May 8, with 21 members present. This inaugural meeting settled the future conduct of the society's affairs and it was decided that the regular evenings should be the second and fourth Wednesdays of each month, 7.30 p.m. at Grove Road School, Hounslow. The programme of talks includes aerials, audio amplifiers, television subjects and the transmitting side. Readers in the district are asked to make contact.

Will those interested in the formation of an Amateur Radio Club in the Grantham district, please write to W. Jarvis, 190 Harrowby Road, Grantham, Lincs.

Bradford Short Wave Club.—The club now meets weekly on Mondays at 7.30 p.m. in the Temperance Rooms, Harewood Street, Bradford. Until permanent headquarters are found, at which transmitting activities can be started, lectures are being arranged; at a recent auction sale, an Avometer was amongst the gear on offer. Morse instruction is being given between 7 and 7.30 p.m. each Monday.

Whitefield and District Radio Society.—Though the club has only been in existence for some three months, Morse classes under G6GV are being well supported, and visits are being arranged to places of interest; close co-operation will be maintained with the local model engineering and model aircraft clubs. Whitefield is endeavouring to cater for all aspects of Amateur Radio, and will welcome new members whether they be licensed operators, listeners or ex-Service personnel from the radio technical trades. Meetings are held every Monday at the Stand Grammar School, Higher Lane, Whitefield.

Reading and District Radio Club.—G6CU of Cocos fame is in the district and on June 29 will be giving a talk on his rig out there, with details of his experiences and the contacts made. G8RS is lecturing on 58 mc work and equipment—his talk on May 11 drew 12 licensed amateurs, among many SWL members. G2BHS has been fortunate enough to obtain for the club at small cost some steel lattice mast sections, which members are busy erecting for the mounting of beams—so it looks as if low-flying aircraft had better keep away from Reading. Anyone interested is welcomed at the meetings; G5TP is being very helpful at the mid-month session for SWL's and home-constructors, assisted by 2DIO.

Swindon and District Short Wave Society.—Recent meetings, held at the Clifton Street Schools, have been well supported, 19 members being present on May 11, including visitors from Oxford, Abingdon and Witney. G3HS gave a talk on SWL reports and what is expected of them, G3JO described his 1·8 mc outfit, and G8VP has discussed crystal grinding. Morse practice is a regular feature of the Swindon meetings.

Birmingham and District Short Wave Society.—The club 'phone contest is to take place on July 6 and 7, with an alternative date, July 10, for those unable to operate on the Saturday. This is an all-band listener competition, and logs have to conform to certain rules and be handed in for scrutiny by July 17. We shall be interested to hear the outcome of this competition, as it is an idea which other clubs, with a large SWL membership, might well try. Morse classes are still going well.

Maidenhead Amateur Radio Club.—2DBF having been transplanted to Bournemouth, the secretaryship has passed to R. F. Woodruff; he, like many other club officials these difficult times, is on the look-out for permanent accommodation for the club, where they can instal equipment and have more frequent meetings. At present, these are held in the Toc H Hall, Marlow Road, Maidenhead, and G6CU has also been visiting here. Membership is promising, there being several fully licensed members who support the club.

Liverpool and District Short Wave Club.—A very meaty report from secretary G4QC, who says that membership is increasing steadily, with Morse classes well attended and four members awaiting news of their fate in the recent Amateur Exam. Talks have been given by G5MQ on 58 mc—they could scarcely have a more experienced lecturer on this subject; ex-VU2EU, who used to be our Far East correspondent in pre-war days, has recently joined. The club transmitting and construction rooms are now fitted up and successful auction sales are held periodically. A library has been started,

from which members can borrow books or magazines. Several visits are planned to places of local radio interest, such as the Liverpool Police Radio station. G4NU is the club chairman, not 4NH as stated last month—sorry, it must have been the writing! G4QC concluded by asking us to thank all those who have done so much to help the club; it is evident that there is a real spirit of co-operation up there, and we are glad to know of yet another centre of Amateur Radio enthusiasm.

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.

BIRMINGHAM. G. Hodgkiss, BSWL-1938, 30 Towyn Road, Moseley, Birmingham, 13.
BOLTON. N. Moorcroft, 3 Beaconsfield Street, Deane, Bolton, Lancs.
BRADFORD. V. W. Sowen, G2BYC, 6 West View, Eldwick, Bingley, Yorks.
DONCASTER. H. Flintham, BRS-193, 50 Burton Avenue, Balby, Doncaster.
GRAFTON. W. H. Jennings, A.M.I.R.E., 82 Craven Park Road, London, N.15 (*Tel.*: Stamford Hill 3891).
"HI-Q CLUB." J. D. Gillies, GM2FZT, 3 Berridale Avenue, Glasgow, S.4.
HOUNSLOW. A. H. Pottle, 11 Abinger Gardens, Isleworth, Middlesex.
LEEDS. J. Stork, BRS-6730, 1 Brudewell View, Leeds, 6.
LIVERPOOL. T. W. Carney, G4QC, 9 Gladeville Road, Aigburth, Liverpool, 17.
MAIDENHEAD. R. F. Woodruff, Oaklands, College Road, Maidenhead, Berks.
READING. R. J. Nash, BRS-4573, 9 Holybrook Road, Reading.
ST. PANCRAS. H Brown, 84 Blenheim Gardens, London, N.W.2. (*Tel.*: GLA 3212).
STOURBRIDGE. D. Rock, G8PR, Sandhurst, Vicarage Road, Amblecote, Stourbridge, Worcs.
SURREY. S. E. Janes, G2FWA, 72 Kimberley Road, Croydon, Surrey. (*Tel.*: Thornton Heath 4552).
SWINDON. P. Greenwood, G2BUJ, 49 Western Street, Swindon, Wilts.
WHITEFIELD. R. Lawton, 10 Dalton Avenue, Whitefield, Manchester. (*Tel.*: Whitefield 2781).
WOODFORD. M. M. D'Arcy, 27 Theydon Grove, Woodford Green, Essex.

THE NEW CALL BOOK

We hear from the publishers, The Radio Amateur Call Book, Inc., 608 South Dearborn Street, Chicago, Illinois, U.S.A. that the first post-war issue is to be ready this month. Readers wishing to obtain single copies for their own use can order through their banks, since the currency regulations are involved and the expenditure of dollars is entailed. It is for this reason that we are not undertaking bulk distribution of this issue, since an import licence is necessary and there is now no time to arrange the matter. Booksellers, such as Heffers of Cambridge or Hill & Churchill of Swanage, who specialise in foreign periodicals, may be able to supply on order. The price of the Call Book is one dollar thirty-five cents, or 6s. 6d.

THANKS AGAIN

The Editor and Staff would like to thank most sincerely all those who have written expressing appreciation of the *Magazine*. They have been very many—well over a thousand to date—and have all been answered.

We need hardly say how much we appreciate such letters, many of which contain well-considered suggestions and useful criticism.

WHEEL TURNS

For years the Americans put communication before experimental work in Amateur Radio. Though this is certainly not to imply that no experimental work was done, their licences were granted for communication purposes, whereas nominally at least ours were for experiment as distinct from communication, which was supposed to be incidental to the experimental work in hand. Now, the experimental twist has been taken out of our licences, which are granted for the straightforward purpose of Amateur Radio communication, which was the reason why most people wanted them anyway.

The curious thing is that the A.R.R.L. has just announced the introduction of a new experimental classification, open to operators above 50 mc, who are League members in U.S.A. and Canada. This is the grading of Official Experimental Station (OES), for which applications are invited from the membership at large.

We are still trying to prise the moral out of all this.

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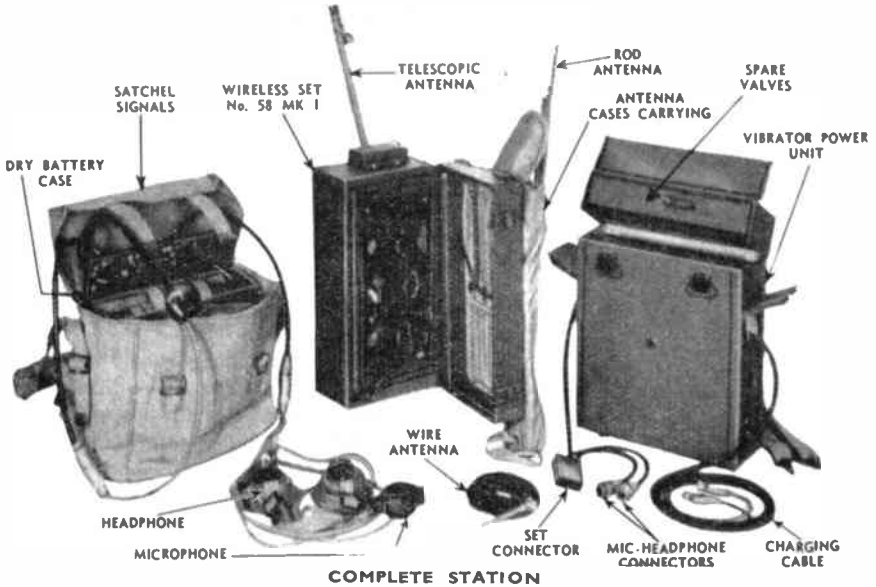

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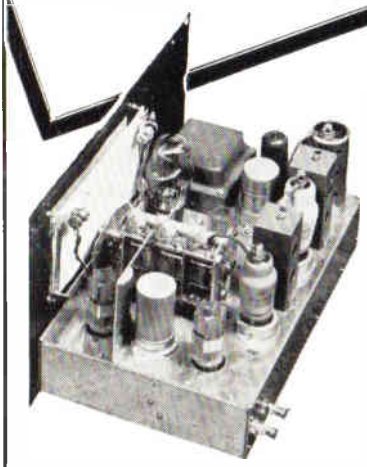

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