The SHORT-WAVE MAGAZINE

6D

Exclusively for the Short-Wave Listener, Experimenter and Transmitting Amateur

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Reprieve!

THESE LINES are being written in the shadow of the Crisis, on the day after the fateful emergency session of Parliament, with its totally unexpected *dénouement* bringing new hope when our worst fears seemed to be on the point of realisation.

In common with all right-thinking men and women the world over, our heartfelt wish is that by the time this issue reaches your hands, Europe will once more have found herself in the sunshine of a lasting peace.

It is no part of our business to express opinions on matters of high policy, nor to comment on the incomprehensibilities of a situation which involved even the possibility of England being plunged in war when no part of the country or our Empire was threatened, and when our potential enemy had repeatedly declared that she wanted no quarrel with us.

Rather, as Mr. Chamberlain said in his moving speech on the previous Tuesday night, we must trust our leaders to make the wisest decisions, and if at any time the call should come, our plain duty is to respond by every means in our power.

During these last few weeks, many of our readers must have asked themselves what their part could be. Once before, amateurs were able to put their specialised knowledge and ability at the service of their country, and the younger generation of amateur transmitters should know, and look with pride on, what their predecessors achieved in 1914-18.

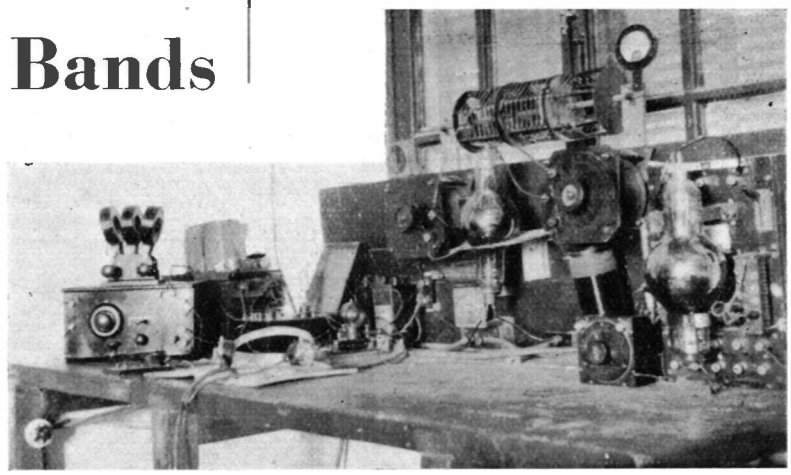
We know that those who may have to answer the next time will carry on the great tradition, and that the authorities will make every effort to give competent holders of transmitting licences the work for which they are best fitted. In fact, the necessary plans for this have already been made.

We can only conclude these remarks by reiterating the earnest hope that we shall meet you next month under happier circumstances which, at the moment of writing, seems probable—till then, 73.

AUSTIN FORSYTH, G6FO.

On The Amateur Bands

By Old Timer



A photograph of TJ-CRJ, the first amateur station in Transjordania. WAC was achieved in 1925 on the 30-metre band. This should bring back memories to the old "30-metre brigade."

LAST MONTH we talked about the "ham spirit," that elusive quality which binds all amateurs together in a bond of friendliness based on their common interest. The chief manifestation of this spirit, at its best, is the assistance and support amateurs give one another, irrespective of class or creed.

We must say that our thoughts were prompted by a desire to try and make every amateur realise that this spirit is really worth while if we are all to obtain the maximum enjoyment from our hobby; we were thinking, too, of British amateurs, and not of Amateur Radio throughout the world. It is true that a visiting amateur from abroad will always be treated with the greatest friendliness in this country, and the same will apply if a G takes a trip through Europe, but we are not prepared to say that such a fine spirit could last if we were at war with a country. It is even doubtful if any of us would be prepared to have a friendly chat via radio with an amateur in an enemy country, supposing it to be possible to make such a QSO.

In view of the uncertain times in which we are now living, the following extracts from a letter from N. P. Spooner (G2NS), will be of interest.

● The so-called Ham Spirit

"I agree with you that there undoubtedly exists a genuine freemasonry among amateurs of the same nationality, but when it comes to a question of international relationships there is a totally different feeling. The ham spirit then exists only so long as the hand grasps a key and not a rifle. There are people who imagine that Amateur Radio can point the way to a better understanding of the foreigner and his problems. The fact so often ignored is that the very countries to be appeased (if there is an international upset) do not encourage Amateur Radio, and even in those countries where it is officially recognised, as in our own, very few people outside the movement know that it exists.

"The ostriches who have metaphorically buried their heads in the sands of brotherly love conveniently forget that the racial and religious hatreds that make men fight sprang into existence with the very birth of Time itself. The day is therefore very far distant when the exchanging of a sacred RST formula with some foreigner will pledge both parties of the fleeting contact never to take up arms against each other. These ostriches, when spoken to about A.R.P. or the R.A.F. Civilian Wireless Reserve, swear they will never allow their knowledge or stations to be used as a 'tool' by their country. I'm afraid these birds have never had to face a concentration of chlorine with no other protection than a shirt sleeve soaked in blood, or have been machine-gunned from a diving 'plane."

We sincerely hope that Amateur Radio will not be called upon to do the impossible, but we feel that perhaps one day the spirit of friendliness that does exist in our hobby will prevail throughout the whole world of humanity.

● QRP in India

There is no doubt that our remarks of the last few months have awakened a great deal of interest in genuine QRP working. Some cynics have openly stated that the number of WAC certificates earned with a real 10 watts or less can be counted on the fingers of one or both hands. We know, however, that a great deal of noteworthy DX is being done with power in the neighbourhood of 10 watts, and we shall continue to champion the cause of these low-power operators.

An interesting letter has come in from VU2EC of Meerut, U.P., India. Up to the end of July he used the call VU2CR, with an input that never rose above 9 watts. The PA was a '48 in a MOPA or CO-FD-PA transmitter, and with both these he WAC'd with an average report of 559, the lowest recorded being 449 from PY. Finally, the '48 burnt out, leaving him the CO-FD only and with this, and an input of 6 watts, all continents except N. America were worked, with an average report of 449.

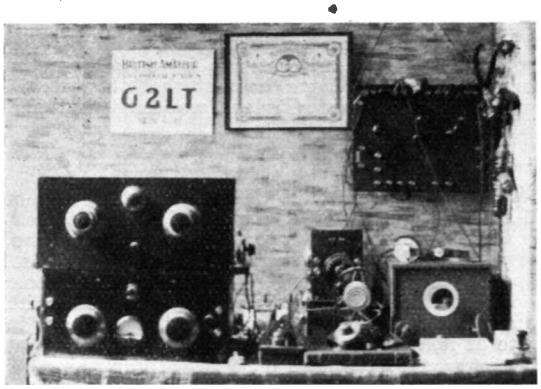
He now has a new transmitter on 14,380 kc, using a pair of 25L6's with 20 watts input supplied from 220 v. DC mains. The only difference noted is that QSB is not so pronounced with this higher power—which is usually the case.

Mrs. Myler, G3GH, using a strict 10 watts fed into a "2BI" aerial, commenced DX in earnest as soon as it was put up a few months ago. Contacts with SU, VU, VE, VK2-5, YV, LU, VP2 and K5 were made and she WAC'd in 19 days. Mrs. Myler gives the following "2BI" data as used at her station: Top 34 feet, tapped 12 feet 3 inches from centre; feeder 45 feet 3 inches; long arm and feeder, 67 feet. The direction, accurate to within 5 degrees is, 348° (N. 12° W.) or 168° (S. 12° E.).

We have always maintained that if a station were to commence operations with 3-5 watts input on a lonely island in the middle of any ocean, and use a good receiver, he could work the whole world in a few days, providing conditions were normal. To have a G or W prefix is not such an attraction to the outside world as for instance, "ZD9," and therefore an S3 signal with a G prefix would probably be ignored entirely, and therein lies only one of the difficulties of low-power DX. For a G to attain success he must have a flair for knowing when to call, how long to call, and on what frequency to call. To shout "Test" is usually abortive (except for replies from U.S.A.!).

● An early amateur station

We show here a very interesting photograph of a real early station—TJ-CRJ. If you refer to the call book and look under G2ZV you will see two mystifying calls, PE6ZK and TJ-CRJ. We will quote from G2ZV's letter and allow him to explain:—"I originally commenced operating in Palestine as PE6ZK in 1924 and later as TJ-CRJ in Transjordania. Activities ceased in December 1926, and by that time I had WAC'd on the old 30-metre band. After being in England some time I started up as G2ZV and most of my work is now on 28 and 56 Mc, 'phone and CW. At the present moment, my aerial is a rotary beam supported by a lattice mast 29 feet high, but for general coverage a 132 ft. wire, end-on to a tuned circuit, is used."



G2LT of Sheffield is typical of hundreds of to-day's 10-watt stations. The compact layout shown in the photograph consists of a 59 tritet and a PX25 PA with two 6F6's as modulators, which are in turn driven by a 6C5 pre-amplifier fed into a 6C5 sub-amplifier. The aerial is a 66 feet end-fed pointing E-W and is fed at the west end, a throw-over switch being inserted for receiving on his Eddystone "All World Two." We are pleased to give these details as newcomers will do well to look over this arrangement. G2LT's activity has been confined to 7 Mc, but a real endeavour is to be made to work some DX on 14 Mc with a poor location and screening. We shall be interested to learn the results obtained on this latter frequency with 10 watts.

● A Word from a "Young Timer"

It is interesting to get some reactions from a newcomer. The older hands are always telling him what to do and how to behave when he comes on the air, and 2FIK of Chelsea writes:—"Although a 'Young Timer' myself, I very much appreciate the necessity of maintaining a high standard of ethics and good manners in a movement where so many of us sacrifice a good share of our spare time and spare cash."

He hopes that those who ignore the accepted standards of operation and use their stations as "baby broadcasters" will mend their ways, or else . . . .

● Notice to Transmitters

We are always glad to receive from amateur transmitters views and opinions on topical problems and methods of bettering this hobby of ours. Address your letters to The Old Timer. We shall also be pleased to have good clear photographs of amateur stations for publication in this page.

1.7 Mc Trans-Atlantic Tests

A preliminary announcement regarding the above appeared in our last issue, and it will be remembered that the Tests are scheduled to take place during the first fortnight in February, between 0430 and 0730 GMT.

We are already in touch with those looking after the arrangements on the other side, and though many entries have lately been received, there is room for plenty more. The only reason for asking for entries at all is to enable us to post final details, with times, calls, frequencies, etc., to all those taking part. You may think that because February is a few months away you needn't bother just yet, but a postcard to us *now* will be a great deal more helpful than a letter at the last moment.

Transmitters should note that in order to give themselves the best chance, they should use a frequency between 1720 and 1800 kc to avoid the 1800-2000 kc American 'phone band, which around midnight EST is a babel on the East Coast.

Hivac Valve Prices Down

No less than twenty different types in the Hivac range have been reduced in price for the new season. Some of the cuts are considerable. For instance, the QP240 is now 12/6 from 17/6, the AC/Q 12/- (previously 18/6) and the UU120/500 rectifier has been reduced to 9/- only.

Unfortunately, we cannot list them all here, but full information is available from Messrs. The High Vacuum Valve Co., Ltd., 111-117, Farringdon Road, London, E.C.1, and we are glad to have this opportunity of drawing attention to a series of high-grade British valves, many of which are particularly suitable for short-wave reception and low-power transmission.

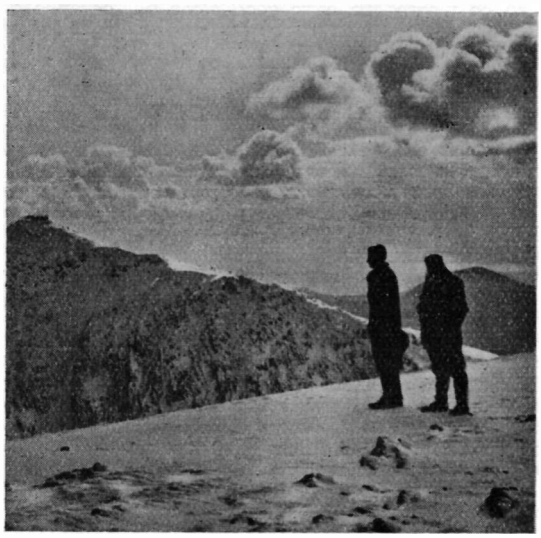
56 Mc Goes Far!

Snowdon Tests — GW Trophy — Fixed Station DX'ing — Activity over Period Sept. 9-11 Reviewed

By A. J. Devon

OUR EXPECTATIONS of having something interesting to talk about this month have been fully realised, though the real DX has yet to show up on this side of the Atlantic.

First, our thanks are due to those who responded so readily to our request for reports. No fewer than 27 transmitting and 19 receiving station operators have written, many of the logs containing very valuable information and much data deduced from individual results, to which, alas, it is quite impossible to do full justice in the space at our disposal



What GW6AAP's pitch looks like in winter! The summit of Snowdon, from which signals were heard by G6OT, London, and at other DX locations.

this month. However, these reports are being carefully preserved, and will be drawn on for material for future notes under this heading; due credit will of course be given the readers concerned.

Just a word on the presentation of the report following. It is now generally agreed that 56 Mc contacts, even when QRA-to-QRA, are of little value as news items when the distances involved are less than about 50 miles. Under certain circumstances, however—as when QSO is effected after having been attempted under a variety of conditions, or when special aerial tests yield unusual results—these contacts may be of interest even if the distance is considerably less than 50 miles. In other words, we are always glad to have all and any reports on 56 Mc working.

● Portable Operation

We have remarked once before in these columns that the "real future of 56 Mc depends not upon spasmodic fine-weather outside work, but on its development as a communication band in the same way that 28 Mc is being used"—*vide* p. 15, March 1938.

Though the portable stations did extremely well in these Tests, it is already well known that working over reasonably long distances can be expected when the two sides of a QSO are sufficiently elevated to bring them within, or nearly within, visual range. But it is not possible to get high enough above the horizon to bring, say, the east coast of America to eye-level, and since we may look forward at some time or other to 56 Mc QSOs which are really DX, it follows that the man operating from his home QRA has just as great a chance of working DX when conditions are right (as in the recent case of G5MQ) as a portable station five miles up in the air.

These remarks are in no way derogatory to the excellent work done under portable conditions by many operators, who usually have to overcome considerable difficulties and put themselves to much trouble and discomfort to get at the spot they want.

But we do seriously put forward the suggestion that rather than packing up the 56 Mc gear for the winter owing to the inclemency of the weather, it is the time of year for getting a CC rig going on the band to find out what can be done from the home QRA, apart from the fact that this winter, with the increasing activity, we may find DX showing up.

● Squish

This may be called the definition of that type of 56 Mc operation involving the use of modulated self-oscillators working to super-regenerative receivers. Now, squish has given startling results in the past, especially at visual ranges, or under exceptional conditions. But we can safely say that DX with squish has not resulted because of the gear, but in spite of it, i.e., conditions have been so good, that contact would have been possible with anything.

The only value of a super-regenerative receiver can be for short-range working, or where the field strength from the required transmitter is high. Then, a quench Rx will make the received signal louder than it can ever be on a straight set having the same number of valves. No super-regenerative receiver will make anything of a carrier which is only about R3 or R4, say, on a straight 0-v-1. It will not even find these signals. But weak 'phone carriers are constantly being reported on 56 Mc by users of straight receivers; if keyed, they would give Q4-5 CW signals, and thus many chances of noteworthy QSOs are lost.

One of our correspondents argues, quite fallaciously in our opinion, that because he never hears "weak 'phone carriers" on his quench set, the receiver is resolving all the 'phone which reaches his aerial. But few super-regenerative receivers will respond to anything less than an R6 carrier, the modulation on which is then built up to good strength by the quench action. He further remarks that a certain northern police force using USW (and in our band, where they have no business to be) have tried straight superhets against super-regenerative receivers, and find the straight inferior. Of course they do! They are working 'phone at short ranges with high field intensity, where the quench always scores. But it may surprise the policemen in question to know that their speech transmissions are regularly heard in the south of England on ordinary straight receivers, but that these transmissions are seldom, if ever, reported by owners of quench sets.

After all, when one comes to think about it, there is no justification whatever for using anything but crystal-controlled transmitters and stabilised receivers on what is to all intents and purposes our highest frequency band. Furthermore, under average conditions, it has already been proved time and again that CC CW is without doubt infinitely more effective than squish of several times the power. *The only exception to this is where the stations are well elevated*, so as to be within visual range. Then, as we know, the tremendous penetrative ability of the direct ray comes into its own.

The whole basis of the discussion above is to suggest the idea that while squish will have its uses in certain USW applications for some time to come, the development of the 56 Mc band for communication outside the area of local influence demands most imperatively that CC transmission be used in conjunction with receivers of high stability and sensitivity, capable of taking CW.

● Aerials

All types of aerial were used during the Tests, from dipoles both horizontal and vertical, with or without reflectors (G2ZVP, G8JVP, GW6OKP, EI2J, G5RD, G2HQ, G8LY, GI8TS and many others) to stacked arrays with anything up to eight elements (GW6AAP), a W8JK beam (G5JU), a multi-wave diamond focussed on the States (G5BY), 8 ½-wave Zepp (G2XC and G6XM), 10 ½-wave end-on (G6FO), a ½-wave matched impedance vertical with 66-foot feeders (ON4DJ), and G6LI's Sterba, a complicated affair with eight phased vertical half-waves and ten supressed ditto, the whole warmed up with 250 watts at the business end of a 600-ohm feeder line; though incorrectly terminated, the voltage appears to exhibit a flat characteristic all along this line.

These variegated systems all gave results, but on the whole (and excluding portable locations) the long-wire aerials came out best, chiefly owing to the improved coverage obtained with a multi-wave arrangement.

All short aerials, such as ½-wave dipoles, have very marked directional effects on 56 Mc; moreover, they do not appear to radiate (nor does theory suggest that they will) at those indeterminate angles which, due to scattering effects, often bring the signal down again at long distances. This appears to be a pronounced characteristic of the long-wire types.

Properly erected beams, with correctly terminated feeder systems, perform very well and according to theory, but there is the obvious disadvantage in any such highly directional type of aerial on a band which at present can only be explored that much effective activity is lost by pushing signals in the direction of one station only, or along a line on which it cannot be known for certain if there are any stations working regularly.

Taking it all in all, we incline to the belief that where the main idea in the operator's mind is to find out where his 56 Mc signals are going, he cannot do better than use a long-wire arrangement, such as 10, 15 or even 20 ½-wave aerial, either end-on or Zepp fed. If again this can be run in various directions, and both vertical and horizontal in some sections, almost omni-directional coverage will be obtained, with "solid" radiation at many different angles.

This apparently fantastic idea has already given surprisingly good results in at least one case, though it is well realised that field intensity is low in all directions. The disadvantage of this is offset by the fact that the signals are "sprayed" well round, and many reports, from what is DX for 56 Mc, have been received from unexpected directions and distances.

The aerial system referred to is that now being used at G6FO (Newport, Mon.). It consists of a 10 ½-wave wire, one-third nearly vertical, one-third horizontal NW-SE, and the remaining section horizontal SW-NE. The known coverage subtends an angle of over 180° with Newport as centre, the radius of the arc being about 130 miles, as checked by reception reports and QSOs both during the Test Period in September and for nearly six months previously. This aerial is energised by taking one end to a single-turn loop, i.e., part of it is indoors, and the location is an average one which happens to be screened more in the direction in which most QSOs are effected and reports received than in any other. Results are fairly consistent, though conditions often bring the range down to 50 miles or so, and the fact that both horizontal and vertically polarised waves are being radiated and that reflected wave action is taking place is suggested by the QSB on "DX" contacts and reports of reception in London suburbs (120 miles) using both types of aerial, and in daylight or dark!

● Power

As on any other band, when conditions are fairly good, input is of secondary importance. The following stations all made two-way contacts at distances over 70 and up to 130 miles, when working from their *home* QRAs, the figures in brackets being the power used: G2XC(30), G6XM(10), G5RD(25), G5BY(160), G3HW(9), G6FO(24).

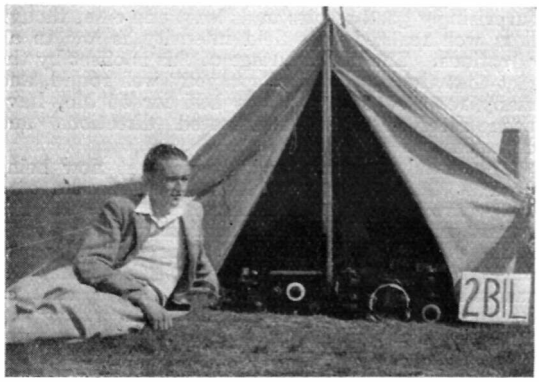
Many correspondents are under the impression that some of these stations used QRO. The above figures are proof that while 100 watts or so is a very useful input and will give greater consistency than QRP and a marked freedom from QSB (just as on any other band), it is not by any means necessary.

● Receivers

Practically all stations, whether transmitting or only interested in reception, used the homely 0-v-1 in some form or another. In case of there being any squish about, several operators had an optional quench unit, or else provided themselves with a separate super-regenerative receiver.

There is quite obviously considerable scope for improvement on the receiving side—in fact, with such an increase in CC transmission as is now evident on 56 Mc, it is probable that receiving technique is beginning to lag behind. The 0-v-1 with 'phones will, however, find almost any signal that is audible on what appears to be a really efficient superhet, the main trouble with the latter being creep and noise-level, both of which are more or less absent on the simpler receiver. With the special valves now available, a good 56 Mc straight receiver, stable enough for taking weak CW, is not nearly as difficult a proposition as it was two years ago.

G6LI, who was reported at DX by a large number of stations, asks us to apologise to those who called



The winning set-up in our receiving entry. Manned by G. F. Keen, 2BIL, and N. D. Mattock, 2DFG, the station was in continuous operation for nearly 60 hours. From a portable location at Dytchling Beacon, near Brighton, they heard 35 different 56 Mc stations at distances up to 150 miles. Best DX was G6LI (Mansfield) and G6FO (Newport, Mon.)

him for his inability to give them QSOs. The reason was that he was using a certain well-known make of American communication receiver which is supposed to be good for five metres—he actually heard nothing, though he had a receiving aerial 27 ½-waves long, with a special matching system to couple it to the set. G6LI is now wisely building himself something involving Acorns.

● Individual Reports

David Mitchell, GW6AAP, must take first place, not only for the excellent work he did, but also for the detailed and interesting report sent in. It is one of those which we can only touch on here. 29 amateur stations were heard on the summit of Snowdon, 27 of which were contacted. The best QSOs in terms of distance were with EI2J (118 miles), while those with G5ML, GI8TSP, G5TO and G3FAP were all over 100. Reports of reception came in from G6XN (178 miles) and G6OT (208 miles), both in the London area, and in the right direction for GW6AAP's main beam. Two transmitters were taken up, a CC rig using 6J5G (28 Mc)-807(56 Mc)-35T(56 Mc), the input being 10 watts only from a 400-volt rotary converter, in spite of the large valve in the final; this set was Class-B modulated for 'phone. A self-excited oscillator was kept as a stand-by, and to test for the resonant frequencies of aerials—a good tip and a bright idea.

Receivers were a National 1-10 modified for CW reception, a superhet (not used), and a quench set.

While he had the opportunity, GW6AAP carried out some most useful aerial tests, as the shelter for the three days' activity was some distance from the only suitable site for the aerials. This involved feeder lines 150 feet long piping the RF to four totally different types of aerial: (1) A directional array of eight half-waves in phase, vertically stacked, set along the line Sligo-North Foreland, and fed with 160 feet of 600-ohm line; (2) A ½-wave horizontal dipole, matched with Johnson bars and running out 180 feet of 200-ohm line; (3) A ½-wave vertical wire, fed by 130 feet of 600-ohm, with ¼-wave matching stubs; (4) A ½-wave vertical dipole fed with 150 feet of low-impedance (75 ohm) line.

The beam gave by far the best results, in both transmission and reception, and on the receiver a test was also made of the relative efficiency of 75- and 600-ohm line, using ½-wave vertical aerials. The high-impedance feeder system was two R's up on the 75-ohm one, and it is interesting to note that David Mitchell also got similar results on the transmitting side. His general reception reports indicate that transmissions from a ½-wave horizontal wire can be received on both vertical and horizontal aerials, but vertically polarised signals are better on an aerial in the same plane.

G2HQP (portable near Sheffield) used a National 1-10, with a transceiver, input 3 watts, and his best QSO was with GW6AAP (96 miles), who reported 2HQ's signals the loudest on the band. The aerial was a vertical doublet and fourteen other stations were worked or heard.

GI8TSP (Mourne Mts.) had an RK.34 in TPTG, modulated with a 6L6. His one and only QSO was with GW6AAP (113 miles), which was a good performance with the QRP he had. Receiver was a quench, and the aerial a ½-wave dipole with reflector.

EI8L (portable near Dublin) and using a 2-valve 1½ watt transceiver with a ½-wave vertical aerial and reflector, worked GW6AAP (103 miles) for his only DX.

ON4DJ (Knocke) was on with 100 watts in the final of a 6L6-6L6-6L6-802-P/P 809 rig, and was heard in England by G6DH, G2ZVP and several listeners on the south-east coast. 4DJ suffers from intense local QRM and a very high noise-level, so can never hear weak signals. His receiver is a 7-valve superhet.

GW2NF (Colwyn Bay) did well with a stabilised oscillator using a 6L6, 8 watts input, and a ½-wave vertical end-fed aerial. He heard or worked 6 stations, best DX being 70 miles in the Lancashire direction, while his signals were reported from Bolton by 2ABF and 2CKC. Of interest is the fact that neither GW6AAP or GW6OKP, each only about 30 miles away, were heard! 2NF's receiver was a 2-stage super-regen.

G2ZVP (near Arundel), assisted by 2DDD and 2CDL, worked eight stations within 50 miles and heard G6DH, G6GO and ON4DJ. The transmitter was a 6L6 ECO-6L6, and their receivers 0-v-1 straights. Aerials were a ½-wave dipole with reflector and director, and a 135 foot end-on. 2ZVP was heard by G6FO (115 miles).

● Squish—New Angle

G5MQP (Brecon Beacons) used a 6L6 as a triode oscillator, with another 6L6 as modulator; the aerial was a ½-wave dipole and the input 10 watts. He worked GW6AAP (75 miles), and heard one or two northern stations. 5MQ is another of those who

raises the question of squish *v.* straight, and makes some most interesting observations. He finds that a given CC carrier may be R5 on a straight set, R8 on a semi-quench, i.e., when the regeneration is advanced but below the "roar" position, the same signal then knocking a hole in the band when the receiver starts quenching properly. The disadvantage of the semi-quench setting is that more than one note is heard—the reception being similar to squiggers from a local oscillator. On these grounds, 5MQ maintains that the whole question is still open for discussion and experiment.

Here we might mention that GW6AAP, in his comments on results generally, remarks that "the reports received are a splendid proof of the superiority of CC CW in conjunction with straight or superhet receivers for really reliable communication."

So there are evidently at least two schools of thought on this subject!

EI2JP (Carlingford Mt.), using a 1-watt transceiver, QSO'd GW6AAP (112 miles) and EI8L (55 miles), both of which were fine contacts in view of the QRPP and, in the second case, the transceiver at the other end, too. The aerial was a ½-wave vertical dipole and reflector.

G6LI (Mansfield) who was very well heard but, as previously mentioned, had no contacts, uses a 5-stage transmitter: 6E6 (7 Mc)-6A6-807-807-P/P RK.37, with about 250 watts in the PA, into the Sterba beam. Certainly, his signal at G6FO (122 miles) was a joy to copy, and had very little QSB.

G8JVP (near Leek, Staffs) had an RK.34 twin-triode, one half 28 Mc CO, the other doubling to 56 Mc; input 8 watts. His aerial was a vertical dipole. 8JV, who describes himself as a straight receiver fan, was well received in the south of England, also at Newport (113 miles). Stations near or over 100 miles away heard at G8JVP were G5JU, G6OT, GW6AAP and G6FO. The receiver used by 8JV was 1-v-0 (954 HF pen, 6K7 det.) with optional quench and LF.

G2AO (Eastbourne), using 20 watts to a power doubler, heard ON4AP and was received by G6DH (74 miles). This was QRA-to-QRA.

GW6OKP (Llechrhydan), assisted by GW6YQ, had a stabilised oscillator with 8 watts input, and his best DX was G5MQP (58 miles). About a dozen stations were received, on either of two sets, a straight or a quench. Aerials: 2 ½-wave vertical or horizontal, as required. 6OK comments on the very fine signal put out on 56 Mc by G2VG (Newcastle, Staffs).

● Fixed Stations

G2XC (Portsmouth) had 30 watts to a power doubler, with an 8 ½-wave Zepp and 0-v-1 straight receiver. He heard or worked nine stations, best DX being G6FO (96 miles) and G6VF (75 miles). These contacts were QRA-to-QRA, abbreviated "Q-Q" below.

G6XM (Farnborough), using a 4-stage transmitter with 10 watts to an Eimac 35T as power doubler and a 66-foot Zepp, worked G6FO as his best DX at 96 miles, Q-Q. 6XM has tried several of the doublet types of aerial, but none have given results at all comparable with the 7 Mc Zepp.

G5BY (Croydon), using 100-160 watts to a 5-stage transmitter feeding into his diamond, beamed west, heard a number of short-range signals, and worked G6FO (126 miles) Q-Q. The signal was very consistent at Newport for three consecutive evenings, but it is interesting to note that 5BY could only hear 6FO when using the beam.

G5RD (Abbots Langley) also with a 5-stage transmitter but only 25 watts input, was another who worked G6FO, Newport (113 miles), this Q-Q contact being held for an hour during the late evening of Sept. 9. The aerial at 5RD was a ½-wave horizontal with reflector, and the receiver a superhet. On Sept. 11, portable tests (G2GG assisting), were made from Britwell Hill, Oxon., and GW6AAP was heard on this superhet at R9 when using CC, distance 165 miles.

G3HW (Teignmouth) also used an RK.34, but in TPTG, 9 watts, with an 0-v-1 straight, and had both vertical and horizontal dipoles. He worked G6FO Q-Q (76 miles) for his only contact.

G6VF (Bristol), with 10 watts to a power doubler, an 0-v-1 straight receiver, and a 33-ft. end-on aerial, QSO'd G2XC (75 miles) for his best DX.

G6FO (Newport) made in all five Q-Q contacts at distances from 70 to 130 miles. The 3-stage transmitter was exactly as described in recent issues, and the input 24 watts to the RK.34 final. Many reports were received, some of consistent reception at over 100 miles during both daylight and dark. The aerial is mentioned in these notes, and the 0-v-1 receiver is illustrated on p. 31.

Among many other stations known to be active were G8LY, G5JU, G2QY, GW3GL and G6FU, who made local and semi-local QSO's only, so far as we know, though G5JU was heard at DX.

● GW Trophy

This being a private contest, the result of which will not be out till later, the only scores known at the moment are GW6AAP (630), G2XC (106), G8JV (146), G6VF (41), and G6FO (125).

● The Magazine Awards

These go to G. F. Keen, 2BIL, for his Receiving Entry and to E. J. Williams, G2XC, for his work from the home QRA at Portsmouth. The conditions for these awards were given on p. 41 of our last issue.

● Receiving Results

As many of the listener logs are extremely interesting, we propose holding them over until the November issue, when there will be space to do them justice.

VK2NO heard at DX

Early in August, SWL P. A. Morrison of Wellington, New Zealand, received for the third time 5-metre CC CW signals from VK2NO, Sydney. The distance is about 1,800 miles, and reception was solid for an hour, at RST-579. VK2NO also tells us that Mr. Morrison heard W6ENC on 56 Mc 'phone, the first W across the Pacific on this band.

The "RADIO" 56 Mc Tests

We are informed by E. H. Conklin, W9FM, associate editor of RADIO, that Trans-Atlantic Tests are scheduled for the four week-ends of November, between 1500-1600 GMT each Saturday and Sunday. European stations should transmit only during 1500-1510, 1520-1530 and 1540-1550, when American stations will be QRX. In the 10-minute periods intervening, W stations will transmit and G's should listen. We shall be very glad to have any reports on this activity.

Transmission for Beginners—8

By A. A. Mawse

EDITORIAL NOTE.

This month's article brings us to the completion of the design, layout, construction, tuning and operation of a simple but very effective two-stage CO-PA transmitter, which will suit the requirements not only of the beginner, but also of the average low-power operator; in a bigger station, it would be useful as a stand-by or for portable working, and can be adapted for all frequencies from 1.7 to 28 Mc.

The set has been air-tested in an average location with excellent results, and can be recommended with every confidence.

Readers of this series will not have failed to observe that our contributor has himself been treading the path of the beginner. Since the commencement, he has been up against just those problems with which the new hand finds himself confronted, and his difficulties and mistakes have been allowed to appear as they arose, in the knowledge that the subsequent correction of them would be the best help we could give readers.

Previous articles under this heading have not only covered the ground thoroughly, but have also described essential auxiliary apparatus: A power pack, speech amplifier, absorption wavemeter, artificial aerial, 'phone monitor, etc., each of which has been fully discussed.

Future articles in the series, which will appear monthly as before, will cover all the many aspects of Amateur Radio which the beginner, as he ceases to be a beginner, will want to explore.

COMPARISON WITH last month's pictures will reveal further changes, but, to be frank, little improvement was noticed in the general handling of the transmitter. The reason for this final re-build is to establish what we might call a standard CO-PA transmitter design, both electrically and constructionally, which any reader can follow with absolute confidence.

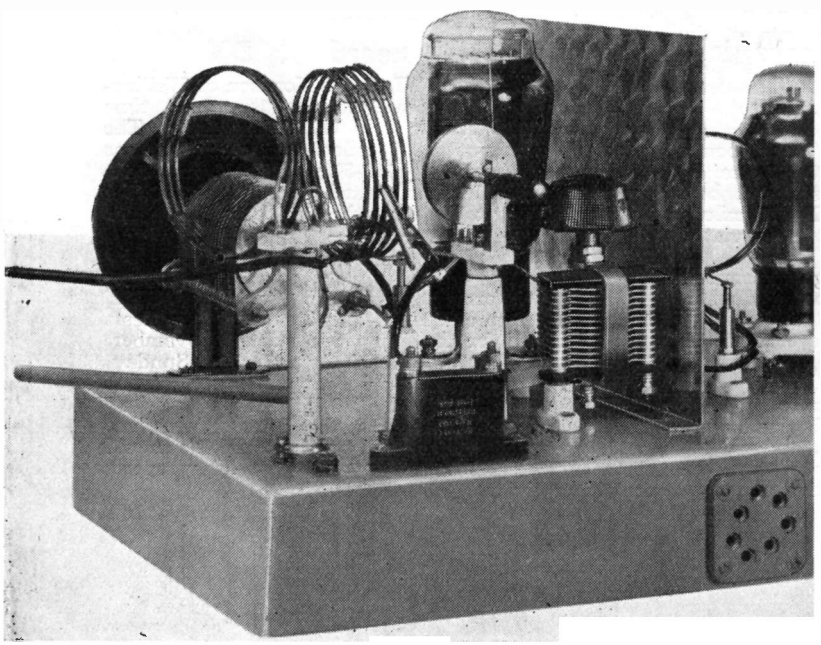
The time and labour involved have been worth while, for much useful experience has been gained. The operation and capabilities of the whole circuit have been thoroughly absorbed, and there is the fortifying assurance that the rig is also quite a nice job from the point of view of appearance.

● Re-Construction!

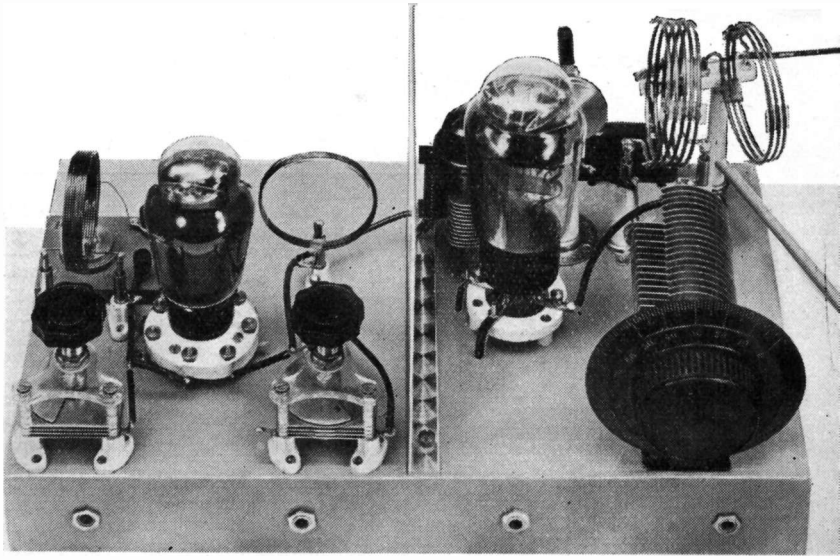
Coming to points of detail, a back strip has been added to the chassis for the purpose of taking the supply leads to a 7-pin valve socket, into which is inserted an old valve base used as a multi-way plug to bring in HT, LT and bias supplies. The woodwork has been given a coat of lacquer (from the same tin as that used for the speech amplifier, page 27, June issue). After an aluminium screen had been mounted in the centre of the chassis the task of re-arrangement was set about. It was commenced by detaching everything and re-arranging the parts so that all RF leads were made as short as possible; when the very best position was found (with of course a little judicious compromise here and there) the circuit was wired up once more. One illustration of the improvement in layout is the grid lead in the CO stage; notice how in September a long wire was involved which is now half the length, with the fuse-holder clear of the baseboard. A point to emphasise is that there must be no sharp bends in the RF wiring, which should all be above the baseboard and in the clear.

On the PA side, the .0001 mF coupling condenser (C4 on p. 13 of the Sept. issue) has been changed to a variable (notes appear on the next page); the neutralising condenser is moved to the rear; HT decoupling is placed in a new position corresponding to the new place for the PA coil.

We might pause here to draw attention to what many readers will have noticed for themselves. The layout now follows that of the circuit diagram itself. In fact, it can be taken as a general rule that in arranging the components of any type of transmitter, one cannot go far wrong by



A view of the PA end from the rear, showing the method adopted in mounting the AA coil. Note also the condenser (C4) near the screen.



The complete transmitter is here viewed with controls set for 14 Mc. operation.

placing each part in a position relative to that in which its symbol is shown in the theoretical circuit. There are exceptions to this (coils should be mounted so that their fields are at right angles—see photograph here) but layout is always made easier if this simple rule is followed.

All circuits given in the Magazine are actually drawn to suggest the best general layout.

Continuing, the AA coil now appears mounted on a built-up stand made with Eddystone parts 1028 (2½-inch pillar) and 1051 (USW coil base, the sockets of which are just right to receive the coil ends, which are 14 SWG). All this is clear from the photograph on previous page. The swivelling device is also obvious; a piece of ¼-inch wood dowel is forced into a drilling in the pillar and forms the handle.

Naturally, under-chassis wiring is changed, and it is to be hoped that the general run can be followed with the circuit given last month—there has been no alteration whatever in the theoretical drawing.

● Coils

The previous method of coil mounting left much to be desired for quick change from band to band, so with the aid of some Bulgin valve pins and sockets, simple plug-in coils have been devised. The sockets are tapped 4BA for half their depth, and thus may be screwed straight on to the Eddystone stand-offs, although it is recommended that heavier connecting tags (Bulgin 42) be used.

A photograph of the actual coil assembly gives a good idea of the finished appearance and will save further explanation of the mechanical design. As details of the making of the coils themselves were given in the July issue (page 28) those wishing to make their own can refer back. If plug-in ones are to be used, as shown in the next page, it is only necessary to solder the valve pins to the wire ends. The best way to do this is by using a wooden template with two holes, say 2 inches apart, to hold the pins in position while soldering.

● Getting Ten Watts

It will be remembered that we finished last month's notes with an indication that the ten-watt limit had been exceeded in the initial stages for CW experiments and that this article was to explain a method for decreasing power. Reducing drive from the CO to PA will bring this about, so if C4 (page 13, September) is made variable, PA input can be controlled within very wide limits—a J.B. .0001 mF midget variable performs this function and is to be seen behind the PA valve, near the screen.

Procedure is to couple the AA link and tune the output circuit until the PA is fully loaded, irrespective of input, i.e., the whole transmitter is tuned up for maximum output, as indicated by a rise on the PA plate meter, and brighest glow—or highest ammeter reading—in the AA. Note that too close coupling "kills" the PA output as shown by a *decrease* in RF indication in the AA, together with a big rise in PA plate current.

Now, if more than ten watts are being obtained, decrease the capacity of the variable condenser between CO and PA C4 (by using a screwdriver in a slot cut in the knob) which will pull the PA plate meter reading down, due to decreased drive. Next, re-tune CO tank to a new highest reading in the meter, i.e., variation of the feed condenser will upset the tune of the CO tank. Finally, check PA input and repeat the process until the required wattage is obtained. Notice that the meter has to be in the PA plate circuit all the time; there is no adjustment necessary to PA tank or CO cathode circuits; and AA coupling must be left untouched in the best position, as any movement here will upset things, as will be seen from the table following.

The point to grasp is that the transmitter is first tuned for maximum output—CO and PA tanks at resonance, AA circuit showing best RF indication, and everything steady—then the drive is reduced by variation of the feed condenser till the required PA input is obtained, the only other adjustment required being a touch to the CO tank condenser. Another small but important point is that as the AA is coupled up and tuned at the beginning, so the tune of the PA tank circuit is slightly affected, and this should always be adjusted to give *minimum* PA plate meter reading, during the time the AA is being tuned to produce a rise. In other words, the PA tank is tuned for minimum mA while the AA must be tuned for maximum PA plate current consistent with the best RF output, as shown by bulb glow or meter reading.

All this may sound contradictory—but it isn't, and will be better understood when you get your hands on the knobs!

The following figures will show variations that will help to check your readings while adjusting for ten watts; although this data was compiled from the model, many factors will contribute towards different readings and the reason for their inclusion is to give a general idea, by comparison, of what may be noticed.

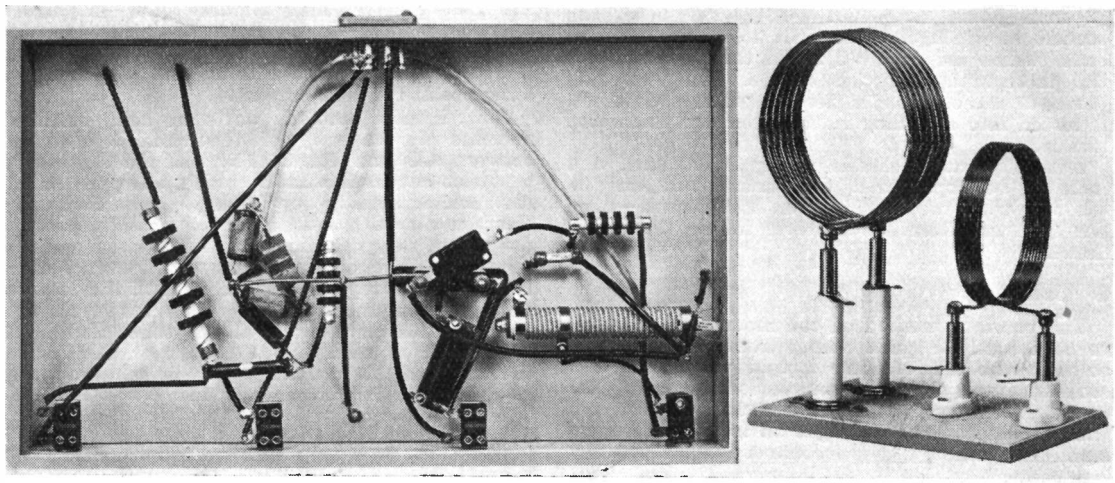
The top row of figures was obtained with the AA coil *removed*, i.e., not just swivelled off a few inches, but taken right away; the final readings for 10.08 watts are shown by (2); and the third group

	CO			*PA*	
	Plate		*Screen*		
	mA	v	v	mA	v
(1)	26	260	190	12	485
(2)	30	305	200	21	480
(3)	32	315	215	40	440

was read when the PA tank was detuned. No-load efficiency is indicated by low PA plate current—8 mA would be good; a 0-50 mA meter will be the choice when fitting a special instrument; the power pack regulation, as shown by these figures, is satisfactory.

Then we were asked why capacity coupling is used between stages instead of a link arrangement. The latter is only necessary where the layout involves the two stages being some distance apart physically. For instance, if the CO was on one shelf of a rack while the PA reposed on another tier. It is best to obviate the necessity of link coupling here if possible, for another tuned circuit has to be fitted and adjusted! Due to the compact layout and screening of the transmitter as shown here, there would be no point in link coupling CO and PA.

So we leave you once again to unravel another month's work and now look forward to adapting the rig to 'phone operation, using the amplifier already described. Do not hesitate to write if anything is not quite clear or if there is any doubt concerning the choice of components already on hand. We are here to help with any problems that assail you.



Under-chassis wiring is easily followed and on the right is a pattern of the PA and cathode coils.

● Correspondence

We have to thank G5RK for some very useful notes. He was interested in our circuit because he has operated a similar tritet for some years, and offers for consideration his arrangement of quick change to ECO.

This will shortly be arranged between the two CO condensers with, be it hoped, the same good results obtained by 5RK. However, it is not recommended that the driver stage be tried as an ECO on any frequency above 7 Mc, and a frequency meter and absorption wavemeter are absolutely essential for correct tuning. We shall discuss all this later.

● Some Notes

While testing the rig as illustrated, under a full call, a local 56 Mc listener was unwittingly led astray by hearing the harmonic on that band. He had an idea that the signal was from a pirate so wrote hoping such was not the case. Sorry, OM, our only DX recently has been a QSO with ZS6EJ on 14 Mc CW!

New Parts Required this Month.

.0001 mF variable condenser to replace fixed coupling condenser. (J. B. "Midget").
Midget Stand-off Insulator for mounting above. (Eddystone 1019).
Quantity of Valve pins and sockets for coils. (Bulgin 711 and 1421).
Soldering tags. (Bulgin 42).
2½-inch Insulating Pillar and USW coil Base. (Eddystone 1028 and 1051). For AA Coil.
Rubber grommet for protecting lead through screen. (Bulgin).
Aluminium Screen, 6 x 8 inches. (E. Paroussi).
Wire for Coils. (Bulgin 16SWG, No. 160).
7-pin valve holder for supply leads. (Webbs).
7-pin valve base; piece of ¼-inch wood dowel.

Summary of Cost.	£	s.	d.
CO Stage	2	13	4
PA Stage	2	11	8
Miscellaneous Parts, Wood, Screen, etc.	0	3	0
Total Cost of CO-PA Transmitter, as shown	£5	8	0

Short-Wave Radio at the Berlin Exhibition

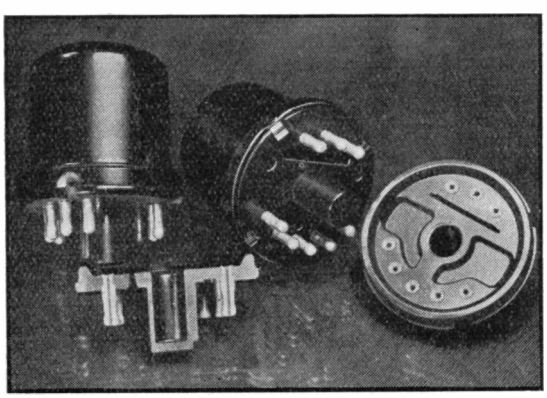
A brief survey by Mander Barnet

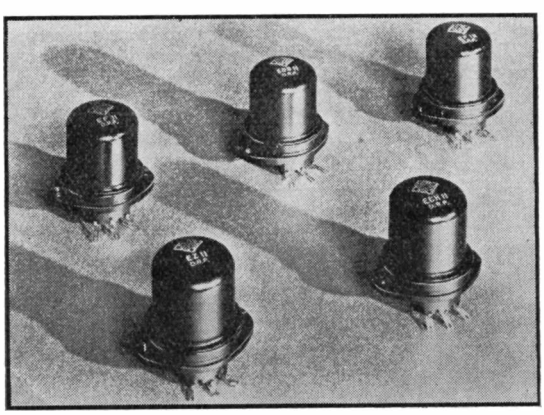
A REFRESHING FEATURE of the Berlin radio exhibition which opened recently in the middle of a heat-wave was, that unlike the average Radiolympia effort of recent years, a considerable proportion of the exhibits consisted of components—including some very interesting material for use in short-wave reception. Whilst the "radio furniture" side of the industry was by no means neglected at this exhibition, the show catered very well indeed for the listener or experimenter who still has a genuine interest in the technical side of radio.

Very few complete short-wave receivers were to be seen, although some good all-wave sets specially designed for the overseas market and having no long-wave band were exhibited.

● New Valves

One of the most interesting developments in the German radio field is the introduction, for the first time in that country, of a range of metal valves—so-called "steel valves." These are somewhat different from the standard American types of metal valves as we know them and their most prominent features are that they use a new type of low-loss octal base and *all* connections are brought out to base pins—there are no cap connections in the case of HF pentodes and SG valves. The elements in these valves lie horizontally across the base, with the anode and grid leads taken out at opposite ends to pins widely spaced on either side of the centre-key. As cap connections are eliminated, so is receiver construction simplified and efficiency increased. Owing to the very small electrode construction and low inter-electrode capacity, these valves are very suitable for short-wave work. Moreover, they have the further feature that the filaments are rated at 6.3 volts with a consumption of only .2 amps (1.26 watts); particularly attractive in the case of AC/DC receivers, where the total consumption can be kept down. Mechanically, the valves are slightly bigger than the equivalent American types but they appear to be very robust and have an extremely neat and attractive appearance on a chassis.





The Telefunken Steel Valves with their sockets and the new German octal base types.

● Components

Amongst short-wave components, some useful items were to be seen on the Görler stand. This firm produces a very interesting type of coil for amateur use. It is wound on a small moulded ribbed former having an iron core. Over the coil is fitted a metal shell and the coil connections are brought out to a standard side-contact base having eight pins. The whole coil has a very similar appearance to a metal valve and is certainly efficient, neat and practical, permitting the use of two or more stages incorporating plug-in coils without the necessity of separate screens, which in many cases have to be removed every time a coil is changed. Despite the metal shell, the coils are not large and a convenient knob-shaped top makes them easy to insert and remove.

This firm also produces a very complete range of inductances, switches and other components suitable for amateur use, too numerous to mention here in detail.

Actual short-wave receivers were not very conspicuous at the show, but mention must be made of a very neat and compact design produced by the firm of Shaleco-Radio. This is a small three-valve battery set housed in a very smart metal case. Plug-in coils are used but they have large ring handles and are inserted in the socket from the front of the receiver without the necessity of opening the case. Also, the spare coils not in use are held

(*Continued on p.* 19.)

The Signal-Strength Meter

A discussion on an important subject

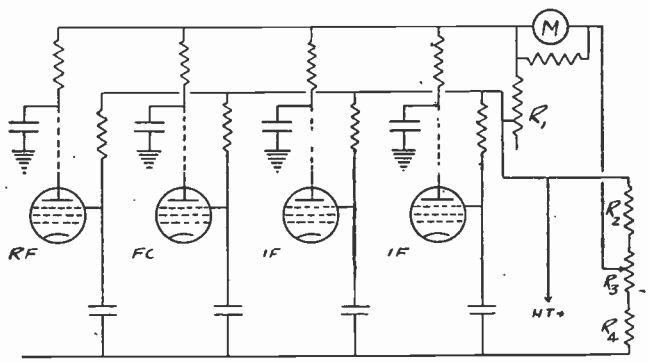
by D. A. Pike

AMONG THE universally accepted abbreviations in radio communication which originally arose owing to the necessity for saving time on the key, one of the first and most important to be used was the "R" code, which is the immediate subject of this article.

Should there be any reader not familiar with this scale it is given below:—

R1 Faint signals; just perceptible.
R2 Very weak signals; barely readable.
R3 Weak signals; but can be copied.
R4 Fair signals; easily readable.
R5 Fairly good signals.
R6 Good signals.
R7 Moderately strong signals.
R8 Very strong signals.
R9 Extremely strong signals.

Now, while there is no objection to an amateur telling his contact that his signals are being received at R8, it will be pertinent to enquire if the use of the "R" code is justified without a signal strength meter. These meters are included in nearly all of the new communication receivers, and it is thought that a description of how they can be connected and calibrated may be of interest. Also, since some confusion exists as to the correct use of the "R" scale, we will see if any other method is superior.



Skeleton Circuit showing position of an R-meter as described in the text

● Possible Standards

The idea that immediately suggests itself is to give the actual figures in microvolts that appear between the aerial and earth terminals of the receiver. If we do this, we must make the strength indicator operate from the actual RF being received, for an indicator working at the LF end of the receiver would read self-generated noise as well as the signal; it would be also influenced by variations in modulation. This point, however, applies to whatever units we use and must be remembered.

Actual microvolts will tell the operator of the transmitter practically nothing, as this will depend on the efficiency of the receiving aerial in use. With the transmitter working at the same efficiency he may be given very different figures from two receivers in the same locality. Moreover, two different receivers, connected in turn to the same aerial would give the same figure, but this really is a disadvantage, as will be seen later.

If we really wish to help the operator of the transmitter the correct figure to give him is the field strength in microvolts per metre. This is the number of microvolts that would be induced in an aerial with an effective height of one metre. Thus, if the field strength was 100 microvolts per metre, 400 microvolts would be induced in an aerial with an effective height of four metres.* Accurate measurement of field strength is quite difficult, and to describe the methods here would be to digress. But, as can be seen, if a manufacturer placed on the market receivers which were to give some idea of the *field strength*, then each set would have to be adjusted to the aerial with which it was to be used.

The methods so far suggested do not fulfil the main purpose. *They give no indication of how the signal is actually being received.* We could log the relative efficiency of different transmitters to give us a signal, but not the receiver efficiency—and this is really just as important. We shall do much better if we make our meter read "R1" when a signal is being received that is only just audible, and so on up to "R9" when an extremely strong signal is being obtained.

Let us see how this can be done.

Since the meter is to read high frequency voltage, it might be thought best to construct a valve voltmeter, and connect it to one of the IF stages where the signal variations would be within its range. This would mean an extra valve. Remembering that the DC component in the diode load is proportional to the HF voltage applied, the use of a microammeter connected in series with the earthy end of the load might be considered. Such instruments are expensive, and so we arrive at the more usual method of making use of the AVC action.

● Circuit Considerations

As the input signal is increased, the bias at the controlled valves is increased, so that the steady anode current in each valve decreases in value.

*[*And this would not necessarily be the case under practical conditions.*—ED.]

This means that a milliammeter connected in series with one of the controlled valves will give an indication of the input signal strength. As we are interested only in current *change* it will be better to balance out the steady anode current, as then a more sensitive instrument can be used. Also, since the current change in all valves will be much greater than from one alone, it will again be better to use all the controlled valves. To balance out the steady current we can use the Wheatstone network, and reference should now be made to the circuit diagram.

It will be seen that while the screens are taken to the main HT line as usual, the anodes are connected, after suitable decoupling, to one side of the meter. The decoupling components can be of the usual value, and mounted as near as possible to the end of each anode load. Each condenser could be 0.1 mF, and the resistance about 1,000 ohms. The anode circuits form one arm of the bridge, the resistance of which will vary and so cause a meter reading when the static anode resistance increases because of the bias applied from the AVC diode. Naturally, only a non-delayed AVC circuit can be used, otherwise the meter will not read for low "R" values.

R1 is to provide the voltage drop to operate the meter and may be about 1,000 to 5,000 ohms. We must not make the value too high or excessive volts will be dropped at the anodes. R2, R3 and R4 provide the neutralising voltage. The deflections will be more sensitive if low values are used here, but excessive current will be taken, and resistances of large wattage required. The actual values must be obtained, by trial or error, to get zero reading on the meter when the set is not tuned to any station. If there is a crystal filter unit, then the switch must be placed to put the crystal in series. Fine adjustment can be carried out with the potentiometer, as shown, or by making R1 variable.

The instrument should be a 0-1 DC milliammeter, shunted as shown until it reads four-fifths of its scale on an R9 signal. This resistance will probably be between 20 and 100 ohms.

● Calibration

To calibrate the meter correctly a signal generator should be employed. A carrier, modulated as usual with a 400-cycle note at 30%, should be connected through an artificial aerial, to the receiver, and its value increased until the LS is fully loaded. This would be the R9 position for the meter. The smallest signal possible to give a faint note should be found, to show a meter reading of R1. The change in db between the input for R1 and R9 should be calculated. If we divide this figure by eight, we shall know the db change to make between each input carrier value to obtain other values of "R" on the meter.

The difference between any "R" value will be about 6 db, or a change of 2:1 in signal voltage. A signal of R5 would, therefore, be twice as strong as one at R4, and eight times as strong as R2. Positions of R9 + can be obtained by injecting still stronger signals, each 6 db up on the last.

The meter can easily be calibrated without apparatus if a little trouble is taken. The position of R9 can be found from a station that fully loads the set, and other values can be obtained by actually listening to a number of signals. The scale can finally be symmetrically divided, and marked in ink.

We now have a meter that will indicate comparative values of field strength, aerial efficiency, etc., and two receivers may be directly compared. For a receiver giving a value of R9 on a given signal would be much better than one showing R6!

Farewell

It is with the deepest regret that we turn aside for a moment to offer our tribute to the memory of Ross A. Hull, Editor of the well-known American amateur magazine "QST."

Ross Hull died on September 13th, electrocuted on the 6,000-volt power supply at his own station.

At once an amateur and a brilliant professional, he played a large part in making "QST," of which he was at first associate editor and latterly Editor, not only an amateur paper read wherever English is spoken, but also one of the world's leading technical periodicals. There can be few engineers in the realm of radio communication who would not acknowledge what they owe to "QST" and to Ross Hull himself, and it may be some consolation to his family and the ARRL Headquarters staff to know that he is sincerely mourned the world over by those who appreciate his many valuable contributions to the science of Radio.

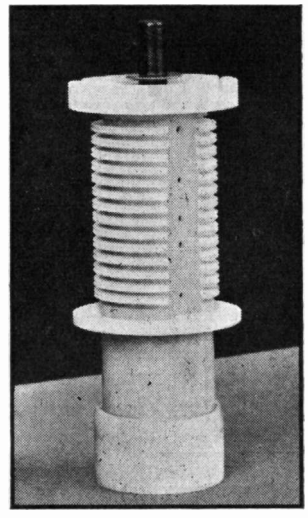
If any lesson is to be drawn from the melancholy circumstances of the death in such a manner of a man still young, it is that all of us who handle high-voltage apparatus should see to it that the same thing cannot happen again, as this is by no means the first time such a tragic accident has occurred.

A.F.

"THE BERLIN EXHIBITION"—(*see page* 17).

in dummy sockets at the front of the set so that coil changing becomes a very simple matter. The receiver is equipped with coils for 13 to 95 metres and sells without batteries for the equivalent of £7 10s.

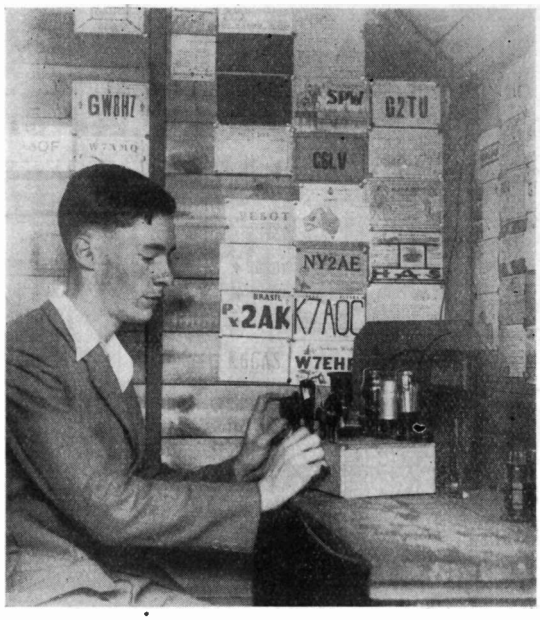
Other interesting short-wave exhibits included displays of commercial transmitting equipment and large scale model of a commercial beam aerial network. The German amateur organisation, the D.A.S.D. had two stands and the display of cards, including some from G and W stations, made the foreign visitor feel quite at home!



Gorler SW coil former (iron-cored)

Listeners' DX Corner

By The DX Scribe



Our picture this month shows the real "DX Den" of J. Hunt, 2 Parkill Road, Chingford, London, E.4. The receiver is a battery 0-v-2.

ONE THING that appeals to us about the Corner is that it is a general meeting ground for the large and ever-growing body of listeners to the transmissions on the amateur bands. It has been expressed to us many times that the newcomer to the hobby of Amateur Radio begins by listening to SW broadcast and then graduates, via intensified listening to the broadcasters, to the amateur bands, and we think that the majority come into the game this way.

We are not only prepared to answer questions on QRAs and to give details of stations heard, but also to deal with the small pitfalls that one comes up against in SW listening, both technical and practical. Please bear in mind, however, that there will obviously be some delay in replying to any such query, in that it will apear in print in this column.

General queries, technical and otherwise, to which a quick answer by post is required, should be written on *separate sheets* and addressed to the Editorial Department. These must also comply with the rules regarding the sending of a query coupon and a stamped adressed envelope.

We commence this month in this vein, because we feel that we can cover adequately the full needs of the short-wave listener; your problem is our interest, and we want to give you all the help we can from every aspect of your hobby.

● Shack Photos

In answer to the last request, we have received a large number of photographs, and we will try to use as many of them as possible, so please hold that snap of yours until we ask again. If some of you who have sent one in have not yet seen it here, please understand that a photograph published in twelve months' time would be a bit out-of-date as the gear would undoubtedly be changed by then!

J. Hunt, whose picture you see on this page, listens to both 'phone and CW with a home-made 0-v-2 and has 64 cards from 31 countries, some of the latest being W7AMQ, 7EHR, K7AOC, VE5OT and LU9BV. The receiver covers the whole range from 28 to 1.7 Mc, and many 160-metre CW stations have been heard on Sunday mornings outside the normal daylight range. He remarks on the excellent conditions during the early evenings in July, August and September, with such DX as XU6AW, CR7AU, FB8AH, 8AB, J2JJ, 5CC, VQ2PL, ZC6AQ, and ZE's. It is true that more countries are likely to be heard between 1800 and 2100 GMT than any other period in the 24 hours, but nearly all of it is on CW, and those who only listen to 'phone may be under the impression that conditions are bad; the reverse is probably the case, and the three continents Europe, Africa and Asia usually come through at this time, with occasional oceanic signals.

We are grateful to G6YL for sending us the QRA of TG9AA. She gives it as copied over the air, and is the only reader who seems to have been successful. Here it is:—TG9AA, 7th Avenue South, No. 94, Guatemala City. Incidentally, he is licensed —the only one at present in that country, but we hear that TG5 is awaiting his call, and will probably be TG9AB. W. J. McClune, Model School, Londonderry, N.I., asks if we know anything about OY1AA, who was logged on Sept. 5 at 0750 BST on 14 Mc. Apart from knowing that this call is on the air, we have no details, but we should be surprised if he proved genuine! An authentic station in the Faroes was OZ7JO, who packed up his gear about 1929, but none of the "OY" stations heard since has sent any confirmation. So we feel justified in putting them among the large amount of "garbage" to be heard on 14 Mc to-day. The only way to send a card to the Faroe Islands, unless you have a full QRA, is via the E.D.R., Box 79, Copenhagen.

The other strange call submitted by Mr. McClune is "KX7AY," received on 14 Mc at 0747 BST on Sept. 12; he wonders if he misread the call and suggests it might be OX7AY. This should read YU7AY, the bad spacing (very frequent on ham bands) of YU making "KX."

Many amateurs are also ship's operators, and either use the ship's transmitter, or a small one of their own, and have great fun on the amateur bands signing unusual calls; it is generally hopeless trying to QSL them, however. Mr. McClune has taken our tip, and intends to QSL the East Coast W's by receiving them on 7 Mc CW. He has had cards from CO6OM, W6OI, 6EJC, and SP1ZK, who is operating from the Radio Exhibition in Warsaw and puts through a beautiful 'phone signal.

● Skill in SW Listening

Douglas Chatt (BSWL 959), 23 North View, Sherburn Hill, Co. Durham feels that C. Stevens' amusement is rather out of place when he says that there is no credit due to reception on commercial sets. Douglas asks if it is not true that the design of aerial is all-important in determining our results; choice of listening times, patience and skill must inevitably play a large part, otherwise two listeners using identical receivers in different locations would obtain the same results and hear the same stations, which of course they do not. Douglas is striving to learn CW and asks us if we know of the whereabouts of the following:—TAK, TAG, TAI, VQV, FZS3 and XDA? The last call comes from Mexico City, and FSZ3 originates, we believe from St. Assise, France; the first three would be Turkish, but we have no further details.

● News from Scotland

The fact that your Scribe said he was a Scotsman does not seem to have advertised him very well up there, as we have only had one report from Scotland—Charles Ross, The Braes, Kincardine, Fife. Charles sends a three-day log of reception on 14 and 28 Mc, and it is interesting to note that on Sept. 9 he received 14 W 'phones on 28 Mc, including W5's and W7ESK, between 1900 and 2115 BST. 14 Mc yielded HC2HC (who is a portable station), PK's 1VY and 4DG, XZ2DY, YU7AY and VQ2HC, who has been very active on 14300 kc 'phone and has had a new batch of cards printed; so you SWL's may be lucky.

● And now South Africa

J. I. Malherbe, P.O. Box 44, Robertson, S. Africa, wishes to be put in touch with other enthusiasts, preferably in the South African Union, to discuss radio and water sports. He is 19 and is studying at the University of Stellenbosch. He believes in trying for stations that others have heard (*vide* our Calls Heard section) and finds that he has not been unsuccessful in hearing them. He has only sent one QSL, and that was for reception of Alexandra Palace telephony on 7.2 metres, heard during the period Nov. 1936-April 1937. It is interesting to note that the receiver was an 0-v-1.

● Calls Heard—Australian view

Geo. Downer, 13 Coleman Avenue, Homebush, N.S.W., Australia, is another listener in the Dominions to report, and he champions "Calls Heard" by saying, "even if this page does not interest some people, it does them no harm, and gives an interesting cross reference on receiver performance." That is exactly why we continue to publish at least two general reception logs, with 'phone and CW calls. George asks everyone to include details of their aerial system when submitting lists.

We are very anxious to see more logs under the "Overseas" heading from readers in any country outside the British Isles. Those who can read CW as well should be able to compile some interesting lists of British calls, and attention to reception on bands other than 14 Mc will be greatly appreciated by British amateurs. Our idea is to endeavour to make your results also of interest to the amateur transmitters who read the DX Corner.

● Those Ghost Signals on 1.7 Mc

We wonder how many have noticed the mess of unmodulated and unkeyed carriers in the middle of the 1.7 Mc band. Some have possibly passed them and just wondered, but P. F. Clifton, 99 Nowell Road, Barnes, London, S.W.13 raises the matter. These are generally to be heard during daylight hours as well as after dark, and one suggestion put forward is that they are spurious oscillations from the Radio Normandie transmitter, radiated on the second harmonic. Opinions from readers on this point will be appreciated.

● VR6AY

Many of you may be wondering what has become of VR6AY in recent months. A gale blew down their wind-generating plant and reduced them to QRP, but they have now been equipped with a petrol-driven generator, which should put the station on the full power of 600 watts again. Schedules have been kept with W2IXY and occasional W's have been contacted, but no general amateur work has been done otherwise. It is most interesting to note that one of our sea-going readers has actually visited Pitcairn in recent months, and writes to tell us that the station will be on 24 metres at 2030 GMT on the first three days of October, presumably operating as a BC station. The frequency used for contacting shipping is 491 kc. Our correspondent (who is a ship's operator) tells us that Andrew Young informed him that he would look for amateurs on the 14 Mc band at 2030 GMT at the beginning of October, but that he very rarely worked British stations.

N. J. Rutter of Swindon sends an excellent log which we are publishing, and some of his remarks are of interest. He draws attention to the wonderful conditions existing recently for the West Coast of U.S.A., especially the increase in the number of W7's heard on 'phone, notably W7EOI in Montana, W6DTB in Utah, and W6NYB, working portable in Hawaii. J5CC was logged on 'phone at RS45 at 0800 GMT on Sept. 7, calling CQ in English. Mr. Rutter thinks our DX Forecast is very accurate, for which we make a bow! J. W. Massey (BSWL 826), 9 Ash Grove, Wembley, Mddx., would like to get in touch with other SWLs in the Wembley district as he finds he is ploughing a lone furrow. He has noticed that the operating procedure on 7 Mc has improved very considerably since last winter. He did hear one G8 finish off by saying, "Come in old man, K, dit dit dah dit dah," which he describes as a waste of time; we think it just plumb foolish! He refers us to the query about the number of turns required for 56 Mc on a 6-pin Eddystone former, which we gave as two, and asks what number would find this frequency on a 4-pin former. The answer is still two, as the diameter of both types is the same, i.e., 1½-in. taken on the outside of the ribs.

● Queries

And here we have a sticky one! G. H. Meara, 85, Desmond Avenue, Hull, would like our opinion on VQ1PA, heard at 1910 BST on Sept. 11, but he is not sure of the prefix. We'll make a wild guess at CT1PA and put it to the vote! There are no amateurs in Zanzibar, which is the reason we do not mention it in the Forecast. Gilbert Read, 33, Caldecott Gardens, Abingdon, Berks queries VN1AF, but we assure him the call should be

DX CORNER

CN1AF; the QRA was given last month. Gilbert is a real SW experimenter and having tried most aerial systems, finds the inverted-L, 75-ft. long by 42-ft. high, running E-W and used in conjunction with a half-wave doublet, lying N-S, brings all the world to his ears. It may be of interest to remark here that a half-wave doublet can be suspended right underneath an inverted-L in the same direction and will receive signals broadside to itself, whereas a long inverted-L will receive best off its ends—a perfect omni-directional arrangement. Gilbert Reed confirms that the QRA of TG5 is as published last month.

Trevor Franklin, 47, Belvoir Drive, Aylestone, Leicester, listens from his bed, which he says is most comfortable for late night working, and sends a snap which unfortunately we cannot publish. He wishes to correspond with any other enthusiast of his own age, i.e., nearly 16. B. H. C. Sykes, Ardnagowan, Aldeburgh, Suffolk requests QRA of VP3MM, but as we have had no other reports of such a call we suggest that this may have been misread and should be VP3AA.

● Transmitters, please note

R. Franklin (2DGJ), 114, Capworth Street, Leyton, E.10, is anxious to get in touch with a nearby ham who will help him to learn the code; furthermore, he offers his help to any transmitter in reception tests on 56 or 1.7 Mc We hope that he will not be let down on either count.

Eric Otty, "Fairfield," Norton, Doncaster, claims to be one of those who "amuse" Mr. C. Stevens; he asks if he makes his condensers from salmon tins and winds his own transformers, because very little skill is required to build a simple 2-valve receiver with bought components. Anyway, on a commercial receiver he has logged such items as W9UJF (n.Dak.), W9GFK (Neb.), W6BLE (Utah), and W6FUO in Nevada, on 'phone.

● The Magazine 1.7 Mc Tests

R. J. Stevens, 43, Pettits Lane, Romford, Essex, says he intends to participate in the 1.7 Mc Trans-Atlantic tests in February next. We hope that all who read CW will endeavour to join in on the listening side, as your DX Scribe can testify that there are very few thrills greater than to hear W or VE signals on 1.7 Mc. Mr. Stevens is another who is willing to stand by for any transmitter on this frequency or 56 Mc.

● Images

No, we don't mean what you see when you look in a mirror, but image reception on superhet receivers. Wm. Chant, Holly Bank, Berwick Road, Shrewsbury, draws our attention to the *apparent* reception of an Australian broadcast on 14 Mc. This would probably be caused by the image being thrown into this band from the 19-metre BC channel. An image (or second-channel signal) is separated from its fundamental frequency by the IF (intermediate frequency) of the receiver, therefore if the IF of a receiver is tuned to say, 450 kc, a BC station operating on 14750 kc will be received again on 14300 kc, inside the amateur band. The usual method of preventing this extra interference is to employ one or more stages of high-frequency ampli-

DX FORECAST FOR OCTOBER 1938

(All Times GMT)

	7 Mc	14 Mc	28 Mc
North America.			
Eastern States of U.S.A., VE1, 2, 3, VO, K4 and West Indies	0000-0700	1900-0900	1500-2000
Western States of U.S.A., K6, 7, VE4, 5 and XE	0500-0600	0600-0900 2200-2400	1700-2000
Central America	0000-0700	2100-0900	1400-2100
South America.			
All (Note:— S. America is frequently heard when U.S.A. signals are absent)	2200-0700	2100-0900	0900-1100 1500-2100
Africa.			
ZS, CR7	2000-0000	1700-1900	0700-1200 1400-1800
VQ2, 3, 4, OQ, ZE, ZD2, 4, FB, etc.	2000-0000	1500-2100	0900-1100 1300-1600
FA, FT, CN, SU, ST	1900-0800	All day	0800-2000
Asia.			
J, XU, VS1, 2, 3, 6, 7, UO, FI, HS, etc.	2000-2100	1500-1900	0800-1100
J, XU	2000-2100	0700-0900	0800-1200
YI, ZC6, VU (north), U8, 9	2000-0300	1300-1900	
Oceania.			
VK, VK9	1930-2030	0600-1000 1500-2100	0700-1100
ZL, VR2, 4, 6	0700-0800 1930-2030	0700-1000 1600-2100	0900-1000
PK, KA, Guam.	2000-2100	1600-1900 0800-0900	1000-1200 1400-1600

fication, known as pre-selection stages. The cheaper the set, the greater the possiblity of no HF amplifier, with the result that the image will be received as strongly as the fundamental. Incidentally, Wm. Chant is willing to stand by for any tests on 7 or 14 Mc on weekdays until the middle of October.

● 28 Mc

S. B. Osborn, 51, Eversleigh Road, London, N.3, sent a year's log which proves that he can hear the stuff! He admits that his list of "1.7 Mc" stations recently published was in reality a 3.5 log, as he made a mistake in the number of turns—well, we all do that at times, don't we? He remarks too, about 28 Mc conditions on Sept. 4; he received ZS6EG, ZE1JZ on 'phone and ZE1JN, 1JI, ZS1CN, 6DY and LU7AZ on CW, while on August 28 he logged PY2CK, VP3AA and HC1GW on 'phone and LU9AX on the key. Mr. Osborn has been forced into action by our articles on 56 Mc and, having built himself a simple two valver, encloses his first log. It shows what can be done when one tries! S. F. M. Edwards, Birklands, Hornsea, Yorks says that he received W5, 6 and 7 and ZE1JR on the week-end of Sept. 11 on "10," and during the same period reports the return of S. African 'phones on 14 Mc, having heard ZS2AY, 2N, 3F and 4H as well as XU8ET in Shanghai..

● Yorkshire, note

We learn from A. Kuhnel, 53, Dalton Avenue, Beeston, Leeds, 11, that Leonard Harbin, Chaguanas, Trinidad, B.W.I. would very much like to correspond with enthusiasts in Yorkshire, the necessary qualification being that their other interest besides radio should be cricket, and if they bowl right-arm spin stuff—so much the better! Mr. Kuhnel has received a card from VP4TK and one from HI6Q. Still in Yorkshire, we have another interesting letter from our old friend H. Sugden of Bradford who has logged W7's FRS and BJS, both in Montana, and W9KQX in Nebraska. You will remember that K. Holyland of Harrogate heard W7BVO say he had received over 500 reports during June; Mr. Sugden now tells us that W7BVO has had some special SWL cards printed, which only require addressing, to enable him to cope with the flock of reports he has been getting, but he can only send one of these cards on prepaid postage terms! W7AMQ also obliged with the remark, "thanks a million for the very accurate reports." It pays to send detailed reports! W7EGV and VE5OT were both heard to say that they expected to receive hundreds of reports from England,—they believe that everyone in England must listen to them every time they come on. The moral of this is, of course, —never QSL a station you hear consistently; it is doubtful whether he wants your report, and it is doubly doubtful if you will receive any reply.

● Cards from China

Queries reach us as to the best method of sending cards to the many XU calls heard recently. There is only one way, unless you get the full QRA, and that is QSL via Box 625, Shanghai. XU8RJ was received on 'phone by W. Nicholson, Briscoe Road, Carlisle, on approximately 14220 kc, but "Shanghai" was the only part of the QRA heard. All XU8's are in Shanghai, and XU6's in Canton. China is divided into radio districts, like many other countries.

Len Wright, 6, Hughestead Grove, Garston, Liverpool, 19, informs us that ZK1AA is quite genuine, but we should like to ask from where he obtained this information? We strongly believe that he is guessing, as he found a QRA for ZK1AA in the Call Book; but that does not prove that the "ZK1AA" recently heard at the "wrong" hour of 2330 BST is genuine. Many a hoax is played nightly on the ham bands, and it is our business to tell you when we think one has been perpetrated. It is most noticeable that this signal has not been reported again, which is the usual end of all the practical jokers. Len wants some information on CN1CR in Tangier, heard several months ago on the HF end of 14 Mc. This station used the call CN1CR with a self-excited rig until the beginning of the summer, when he built a crystal-controlled transmitter and changed the call to CN1AA. He is to be found c/o The Italian Consulate, Tangier, I.Z. At the moment there are only two stations there, 1AA and 1AF, and we cannot say whether they have official licences, thought it would appear that they have.

● The 40 Radio Zones

K. E. Roberts, 2, Chestnut Close, Southgate, London, N.14, requires information on where he can obtain the Zone Map of the world. This can be purchased direct from Radio, Ltd., 7,460 Beverly Boulevard, Los Angeles, California, by enclosing a British P.O. for 1/- or sending two I.R.C.'s. The journal RADIO instituted this "Zone" method of computing DX working, and these zones are clearly marked and numbered on their map.

You may remember that E. A. Crowe of Hampstead reported in our last Corner that he received two signals on 56 Mc,—W1APA and G2GC, and was mystified as to which was calling which, but the snag was that G2GC was in Co. Durham—too far for probable reception on this frequency. However, G2QY of Mill Hill has the best solution. He thinks that Mr. Crowe heard G3GC calling W1APA on 14 Mc, and as G3GC is in Finchley, it would almost certainly be reception of the fourth harmonic. After all, there is only a dot in it!

● Those "accurate" frequencies

Please be careful when reporting the approximate frequency of a station. We have been publishing some from Mr. Fletcher of Bexleyheath, who averred they were accurate within 8 kc, which was good enough for us, but now we have a letter from VU2EU in Meerut, India, who writes as follows:—"I feel I must correct Mr. Fletcher regarding a large number of these frequencies. I operated under the call VU2CR for some months with crystal control on 14380 kc, which is also my present frequency. Mr. Fletcher lists me as 14355." Here are some accurate frequencies logged by VU2EU: J5CC, 14378 and 14394, VQ2HC 14384, J2KG 14386, VU2DR 14100 and ST6KR 14355. Now it is a peculiar thing, but if you had asked your DX Scribe to give the frequencies of two of the above he would have written:—J5CC, 14285 and 14400, VQ2HC 14300 and the other three he would have agreed! So maybe we're all wrong!

● News from India

Some interesting information comes from VU2EU. He tells us VU2FO is now licensed on 14380 kc and is operated by J. Drudge-Coates, Signal Train-

DX CORNER

ing Centre, Jubbulpore, C.P., India. It is worth recalling that Mr. Drudge-Coates used to operate in India many years ago under the call Y-DCR, before international prefixes were thought of; later he used the call VU2BG, and was then transferred to British Somaliland, but was unable to transmit, although he received many amateur signals in that country. In England he was well known as G2DC at Southampton and later at Liverpool, and now he is VU2FO. VU2ED is another new one to be found on 14074 kc and should be QSL'd c/o 3rd Cav. Bde. Signal Troop, Meerut, U.P. VU2EU has had an experience similar to F. G. H. Macrae in receiving an SWL card from U.S.A. requesting his card (the SWL had not heard him) as a collection was being made of QSL cards from different countries!*

* [*Most of these ideas seem to originate in the States.*—ED.].

Needless to say, the request went into the WPB pronto. By the way, VU2EU will QSL all accurate reports, direct if IRC is enclosed, or via the BSWL if no coupon is sent. His address is:—W. H. G. Metcalfe, 3rd Indian Divn. Signals, Meerut, U.P.

● Rueda del Oeste

G2NS (you know, the Op.), tells us that there is a very keen British delegate for the "Western Association," who will gladly send particulars to those who are interested. This is Mr. H. O. Crisp, Elstowe House, Tranby Road, Itchen, Southampton. This organisation was started by Felix Gunther, LU8AB, who is a Frenchman by birth, with about six other hams living on the Western Railway track at Buenos Aires. Politics, religion and business are strictly barred, and the "your enemies are my enemies" clause should be translated to mean pirates, power flaunters, intentional

(*please turn to foot of next page*)

G Calls Heard Overseas.

GEO. DOWNER, 13 Colman Avenue, Homebush, N.S.W., Australia. Heard during July. 0-v-1 (twin triode); aerial 65 ft. overall.

G2TR, HK, JM, 5TS, LU, BJ, MU, ZG, ZJ, 6WU, DL, DT, 8NJ, SB, MX.

1.7 Mc.

2BVN, 43 Pettits Lane, Romford, Essex. 14.8.38 to 13.9.38. Battery 0-v-Pen with inverted "L" aerial.

ON4XXP. **PA0**FJ, XP. **GW2**BG. **G2**KT, CD, DQ, TN, XG, XP, 3CQ, GW, OA, 5OA, MM, QKP, VT, 6GC, GO, KV, PO, UT, VT, 8BR, DS, NL, TL, VR.

P. F. CLIFTON, 99 Nowell Road, Barnes, S.W.13. 0-v-1. Aerial, 18 ft. high, 30 ft. long.

G3DQ, GW, CQ, AV, 5WW, OA, VB, 6KV, YP, GO, 8SM, JM, KO, AB, CV, NV.

14 Mc.

N. J. RUTTER, 23 Bouverie Avenue, Swindon, Wilts. 0-v-2, LS. 10.8.38–10.9.38. Phone.

CE3AT, BH, CH. **CO**2GY, WM. **CX**1AH, 2CO. **HC**1FG, JW, 2HP. **HK**3LC. **HR**5C. I5CC. **K4**ENY, EVC, FKC, 6NZQ, OJI, OQE. **KA7**EF. **LU1**ET, HI, 4AW, BC, CZ, FG, 5CZ, 7AG. **NY2**AE. **OA4**AW. **PK1**MX. **PY1**FN, GI, GQ, GU, MU, 2BH, CY, DU, EW, HS, IT, JC, KC, KR, KT, MI, 3AD, EN, 4BU, CB, CP, CT, 5AQ, BJ, 6AG. **SP1**ZK. **SU1**MW. **TI3**AV.

VE3AFD, IX, KF, QL, 4BD, SS, 5ABD, ACN, JK, NY, OT, 9AT. **VK2**ABC, ACL, ADE, ADK, AGJ, AHA, AIB, AQ, BK, BX, BZ, DI, HF, HS, HV, NO, NQ, NS, NY, OJ, OQ, TI, TO, TR, UC, VA, VB, VV, XS, YL, YQ, ZC, 3BM, BZ, ED, EH, HG, KX, OI, PE, VU, WA, XJ, ZL, ZX, 4AP. BB, JP, JU, KO, 5BF, SW. **VP3**AA, 6FO, LN, 9L. **VQ2**HC, 4KTB. **VR6**AY.

W5EHM. EPB, FVDI, FKG, FSS, GGX, 6AH, AM, BWG, COF, CQS, DTB, EJC, FC, FPU, FTT, FTU, FUO, GCT, GRL, HV, IBS, IKQ, JFU, KW, LEN, LYY, NHB, NLP, NTX, NYB (portable, Honolulu), OI, OJZ, RK, SZ, 7APD, BVO, CAM, CPG, EGV, EKA, EOI, ESK, EYD, FAQ, FEZ, GGG, GPY, 9GGS (Col.), RVZ (Nebr.), UJS, WJJ (Col.). **XE1**CQ, GK, 2IK. **YU7**AY. **YV1**AQ, 4AE, 5AQ, 6AM. **ZB1**R. **ZE1**JA.

CON. G. TILLY (BSWL319), 95 Chesterfield Road, Bristol, 6, Glos. Eddystone "Everyman Four." Indoor beam aerial, NSE, 27 x 40 ft. high "vee." 4.8.38–7.9.38.

'Phone—**CE1**AO, 2BX, 3AT, BH, BK. **CN1**AF. **CO2**CO, GY, WM. **CX1**AA, 2AK, AU, CO. **HC1**FG, JW. **HH5**PA. **HI3**N, 6Q. **HK3**LC. **K4**EVC, FAY. **KA1**BH, CS, JM, 7EF. **LU1**QA, 2EC, 3AT, 4AW, BC, 5CZ, 7AG, BK, 8AB, AC, 9BV, FB. **NY2**AE. **OA4**C. **PK1**MX, VY, 2WL. **PY1**BC, BJ, FN, FR, GQ, GR, 2BA, CK, DA, DU, GC, JC, KT, LM, MH, 3EN, 4BI, BK, BU, 5BJ. **SU1**AX, GP, KG, 8MA. **TF3**C. **TI3**AV. **U3**BC. **VE3**AFD, NF, 5ABD, ACN, EF, OT.

VK2ABC, ABD, AHA, AIB, BK, BZ, DI, EC, EQ, HS, NF, NO, NQ, TO, TI, XS, 3BM, HG, KX, OI, PE, WA, ZL, ZX, 4JP, VD, 5SW. **VP3AA**, 5IS, 6YB, 9L. **VQ2**HC, 4KTB. **VU2**CQ. **W5**DEW. GGX (N. Mex.), 6AH, COF, CQS, EJC, FTU, GRL, IKQ, JFU, LEN, LYY, NMI, NNR, OI, 7APD, AXS, BVO, EGV, EKA, EYD, FEZ, GPY, 9UJS (Col.), WJJ (Col.). **XE1**GK, 2IX. **XU8**RG. **YU7**AY. **YV1**AP, 5ABQ, ABY, 6AM. **ZE1**JA, JR. **ZB1**R. **ZL3**KX.

28 Mc.

K. SLY. 27.8.38–11.9.38. 0-v(pen)-1(pen). Aerial Zeppelin dipole, 66 ft. top, tuned feeders, LS.

'Phone—**HI7**G. **W5**EHM.

CW—**PY1**AJ. **U9**ML. **VS7**MB. **VQ3**TOM. **W5**CUA, FRD, 6FSJ, NNN, NYA, POZ. **ZS1**CN, 2J, 6DY.

56 Mc.

K. SLY (2FAU), 16 Buckland Avenue, Slough, Bucks. 5.6.38 to 11.9.38. 0-v-1; acrial inverted "L," 66 ft. top.

'Phone—**G2**NHP, MC, MV, OD, 5KH, LU, MAP, OJ, RD, 6LK, 8KZ, MG, SD, ZY.

CW—**G2**JK, MC, OD, QY, ZVP, 5BY, OJ, NF, 6LK, PK, XM, 8IX, MG.

ICW—**G2**MC, NHP, OC.

Harmonics: CW—**G3**GZ, 5LY, 6PR.

'Phone—**G5**CM (RX on Leith Hill).

G. F. KEEN (2BIL), 20 St. Leonards Rd., West Hove, Sussex. Sept. 9 to 11. QRA: The Ditchling Beacon, Sussex Downs. 0-v-1 (straight), aerial 135 ft. horiz. wire.

CW—**G2**MV, QY, ZVP, KI, HG, XC, UJP, JK, AO, XD, 5NF, BY, RF, RD, CD, JU, 6FI, XM, OT, LI, FO, KY, CY, FU, GR, 8KZ, OS, OQ.

Mod. CW—**G2**XIP, NHP, 5MA, MAP.

'Phone—**G2**XIP, ZVP, NHP, 5BY, MAP, CD, 8OS, KZ (also Liverpool Police).

C. T. FAIRCHILD (2DGR), 1a Dover Rd., Brighton, 6, Sussex. August.

CW—**G2**AO, JK, KI, LC, MR, OD, QY, RD, UJP, XIP, XC, ZV, ZVP, 5CD, OJ, RF, 6CY, FO, FU, XM, 8DF, KZ, MR, OQ, OS.

Mod. CW—**G2**MR, NHP, 5JZ, MAP.

'Phone—**G2**AW, NHP, ZV, ZVP, 5MAP, 6LK, 8OQ, OS, KZ.

Harmonics—**G2**RU, 3JF, KJ, 6CY, RM, 8AC, OQ.

S. B. OSBORN, 51 Eversleigh Road, N.3. Electron-coupled 0-v-1. Aerials: ½-wave doublet, 20 ft. vert., 80 ft. horiz. 28.8.38–11.9.38. CW, ICW and 'phone.

G2JK, MC, QY, NHP, XC, ZVP, 3OO, 5BY, CD, FG, KH, NF, RD, RF, VG, VT, 6BM(?), FO, FU, OT, PK, QP(?), XM, 8KZ.

During Test Period, Sept. 9-11 (56 Mc)

(Figures in brackets are distances in each case)

R. HOLMES, Camp **Bungalow**, Cheltenham Road, **Painswick**, Glos. 0-v-1, Y-matched vertical dipole aerial.

G2AK(50), 5BM(10), 5ML(46), 5BY(96), 5JU(26), 5MQ(52), 6AA(118), 6FO(36), 6LI(102), 6OT(88), 6VF(26), 6XM(71), 8KZ(90). **W1**WG(??RST-599 for few seconds, 11.9.38, 1043 GMT).

G6FO, Newport, Mon. 0-v-1, 10 ½-wave end on aerial. Stations marked (′) were worked.

G2XC(96)′, 2ZVP(115), 3HW(76)′, 5BY (126)′, 5JU(23)′, 5RD(113)′, 6LI(126), 6VF(21)′, 6XM(96)′. 8JV(122).

G5BY, HILTON O'HEFFERNAN, 2 Chepstow Road, Croydon.

G2HG, JK, LW, MR, OD, ZVP, 3OO, 5MA, RD, RF, 6FO, OT, SM, XM, 8MG.

2AAH, W. F. MILLER, 60 Spitalfields Lane, Chichester, Sussex.

G2XC, ZVP, 5BY, NF, RD, XY, 6FO, LI, VF, XM, 8LY, OS.

General logs were also sent in by:

P. V. JACOBS, Goodmayes, Essex.

S. B. OSBORN, London, N.3. (Heard during past year).

J. MARCH, Finchley, N.3.

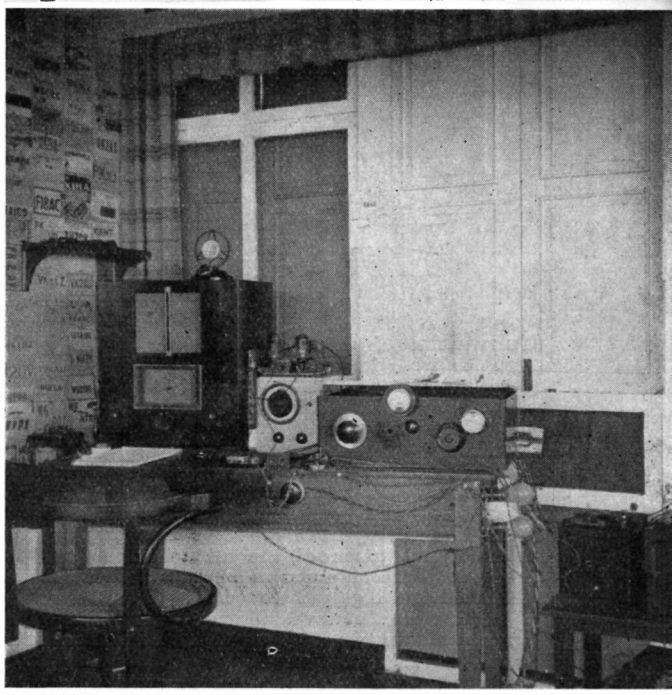
G. E. REED, Abingdon, Berks.

L. WRIGHT, Garston, Liverpool.

V. G. GLASBY, Huthwaite, Notts.

The Other Man's Station

VS2AL



THIS TIME we present a QRP DX station of exceptional interest. Owned by E. Blomfield, Ladang Geddes, Bahau N.S., Federated Malay States, VS2AL is situated on a small hill in the middle of a 13,000 acre rubber estate surrounded by jungle.

At this back-of-beyond location there are of course no mains, so that VS2AL is a low-power battery-operated station. The transmitter is a 14 Mc CO-FD-PA, based on the battery design which appeared in the May, 1937, issue of the Magazine, this first giving VS2AL the notion that he could get on the air at all without mains! A Milnes Unit runs the receiver, modulator, and CO-FD, a genemotor giving 60 mA at 285 volts supplying the RK-25 in the PA. The latter is suppressor-grid modulated by an LP2 with an HL2 as speech amplifier; the input for 'phone is 5½ watts, and for CW 11 watts maximum. VS2AL remarks that he is licensed for 30 watts "if only he could raise them."

In the photograph, from left to right, we see the GEC S/W receiver, modified by the addition of a BFO and a two-stage regenerative pre-selector, standing alongside, the speech amplifier-modulator on top of the pre-selector, the transmitter in its cabinet with the two meters, a lamp load for the key, and part of the power supply.

Two half-wave doublet aerials are normally used, with twisted line feeders, and set up so as to give coverage over the main land areas of the world. A recent addition is a full-wave aerial, erected for the purpose of poking a signal into PY for WAC, which has been duly achieved on CW; in his seven or eights months on the air, VS2AL has contacted 27 countries, by far the greater proportion of which are, naturally, DX to Malaya. 'Phone has been worked to W6, W7, VK6, K6, KA, VU, XZ and locals like PK1-4. European CW QSOs include U3, PA, HB and four G stations, with reports varying from RST-349 to 569.

In sending us these details, he modestly remarks that his station is all junk, adducing in support the fact that he was given the RK-25 because it had gone soft and that his modulation transformer was a present marked "faulty."

To this we can only reply that VS2AL, in his lonely bungalow in the heart of a Malayan rubber forest, has hoisted the flag of Amateur Radio in a manner of which many of us would be justifiably proud.

"LISTENERS' DX CORNER"—*continued.*

QRM merchants and all those who are no advertisement to amateur radio in their own countries. It is not intended that the Association should compete with other national organisations, but membership usually calls for a knowledge of the French, Spanish and other Latin tongues; transmitters and listeners are eligible for membership.

● Record H.A.C.

Here's a chance for some of the record breakers. P. V. Jacobs, 63 Douglas Road, Goodmayes, Essex, heard all continents in 17 minutes, between 2037 and 2054 GMT on August 10. Stations heard in order, were JZK, PY2CK, CN8AU, G5ZG, KA7EF and U.S.A. He finds CW is useful for the greater degree of accuracy in deciphering calls. We have no doubt that the HAC record will be lowered next month!

● Set Listening Periods

There are no SLP logs published this time, as we changed the dates to the end of the month, and the results of those periods set for September will appear in our November issue. Here are the times for October listening:—

1.	Oct. 23	0700-0830 (1½ hr.)—14 Mc.	*All Times GMT.*
2.	Oct. 23	1600-1800 (2 hr.)—28 Mc.	
3.	Oct. 26	2200-2330 (1½ hr.)— 7 Mc.	
4.	Oct. 29	2300-2400 (1 hr.)—1.7 Mc.	

The best ten logs for each band will be chosen. (If there is room!—ED.).

Readers' Smalls

Over fifty insertions appear this month in the Readers' Small Advertisement section in the back pages of the Magazine. As the number has steadily increased since the inception of this service in May last, it would appear to have become established as a cheap and effective Exchange and Mart.

New Call

A. J. Hill, Robin Hood, Catsfield, Battle, Sussex, has recently been issued with the call G3RC. He is ex-5AP, and was 1XU in 1912-14.

HAVE YOU HEARD . . . ?

Compiled and Presented by F. A. Beane, 2CUB

THE VALUE of short-wave radio is well demonstrated during these critical days of international dispute, the inevitable "crisis," and the suspense of awaiting momentous decisions that determine the destiny of nations. All important developments are made available to the wondering world by this means, though it is very obvious to the most unsuspecting listener that much of the material radiated, particularly that contained in news bulletins, is sadly distorted and highly disconcerting to the hearer.

Great praise, however, is due to the Czech broadcasting authorities for their daily English bulletins over OLR4A (25.34 m at 1445) which are extraordinarily calm and dignified in comparison with those of many other European countries. Unfortunately, most foreign broadcast news is inflammatory and nothing but irresponsible propaganda, distasteful to the listener and a grave impediment to peace.

The day that short-wave radio was first used for political propaganda was indeed a bad one. Now we are confronted with broadcast bands that are, with receivers of average selectivity, almost ruined by political warmongers, who, not content with polluting these outlets intended for entertainment and enlightenment, spend a great deal of time in counter attacking the noxious utterings of their opponents by using a system of ruthless jamming that not only succeeds in obliterating the offender but many of the unoffending neighbours as well.

It is a pity indeed that listeners cannot collaborate to extinguish this abuse and misuse of radio, but we can only tolerate it and hope for better conditions in the future. The 7 Mc amateur band is a veritable nightmare, the chaotic etheric battleground of Spanish war stations; a cleanout would be a God-send.

However, the listener has one consolation; he is able to obtain first-hand information from either side, to hear the impartial views of countries indirectly concerned, and it is, perhaps, interesting to record that the writer secured "crisis" news from such countries as India, Canada, U.S.A., Venezuela, Br. Guiana, Italy, and, of course, practically every other European transmitter.

I must add that is indeed a relief in these days of uncertainty to turn to PCJ, "The Happy Station," for diversion that is untainted by politics or national "flag-wagging"—even if one is greeted with the coming "second national anthem"—The Lambeth Walk!

● The News—Europe

Italian broadcasters. A. G. K. Leonard (Maidstone) seeks identity of the Italian on 25.65 m, which he observes closing at 1915 after transmitting Arabic music simultaneously with 2RO4, the 16 and 19 stations. Actually it is on 25.7 m, 11,676 kc, and is the IQY that until recently could be heard nearer 25 m. Listen for him during the Arabic transmission and the special Russian news bulletin radiated daily 2000-2030. Incidentally, this is also taken by IRF (30.52 m, 9,830 kc) and ICC (47.2 m, 6,355 kc) at the same time (2000-2030) but you will observe that the Russians are also quite efficient in the art of obliterating the propaganda of which they disapprove! A Yugo-slavian Hour, including Italian lessons three times a week, is also to be heard from IQY 1837-1914.

SP19 and SP25, Warsaw, Poland. Two new transmitters are now broadcasting simultaneously with SPW (22 m) and SPD (26.01 m) (see station list for schedules), the former being in the 19 m band and the latter on 25.55 m, where it interferes with COCX. Reports are requested to "Polskie Radjo, Warsaw, Poland."

Moscow. Considerable interest has been shown in the new transmitter on 31.51 m, but the choice of wavelength is not a good one, interference being severe. This station signs off at 2100 with the familiar Kremlin chimes and "Internationale."

EA?1, "Radio Zaragosa," Saragossa, Spain, an insurgent station, may be heard near 47.8 m around 2030 with announcers of both sexes. A. G. K. Leonard reports the so-called "Nationalist" station on 25.1 m at 0830 and 2025-2130, and this is, of course, RR6, "Radio Vitoria."

● The Americas and West Indies

COCA, Havana, Cuba, 9,100 kc, 32.9 m, is at last testing, according to A. G. K. Leonard, and may be heard until 0530 relaying CMCA (1,350 kc). English is used frequently around 0500 and reports requested to "Avenida Galiano 102, Havana." COCD, "La Voz del Aire," has apparently terminated its official sojourn on 32.08 m for it is now listed in Cuba as being back on its former wavelength of 48.92 m.

TI2XD, new 600-watter on 11,920 kc, of San Jose, has sent a letter-verification to A. G. K. Leonard, giving, in addition to the data already published and derived from my QSL, the schedule as 1600-1830 and 2200-0400. Transmissions are opened with the march "Don Quixote" and concluded with the rumba "El Manicero" (or Manicuro?).

HP5G, Panama City, formerly on 25.47 m, has moved to "a temporary frequency of 11,885 kc" according to the English announcer. This corresponds to about 25.22 m, where it is sandwiched between CD1190 (25.21 m) and TPB7 (25.24 m); reports are requested to Apartado 1121 and are verified by QSL.

OAX4J, Lima, Peru, relay of OAX4I (272.7 m), sends third QSL for report, giving the schedule as 0700-0500 daily.

LRA, Buenos Aires, 30.94 m, 9,690 kc, now officially known as LRA1, sends a programme booklet giving their schedule as shown in our Station List on the back cover.

"Radio Martinique," Fort-de-France, 9,700 kc, heard relaying the French Government station Paris-Mondial once around 0245. This station often

announces in English as "The French Voice from the West Indies" and broadcasts Mondays and Wednesdays 2300-0100 (the next day) for English and American listeners, Tuesdays 2300-0100 for Spanish, other days 2300-0100 and 1900-0100, according to a recent announcement. Reports are requested and should be accompanied by Reply Coupons. Recently observed near 30.5 m.

● Demise of VP3MR

Many readers will regret the passing of an old stand-by, VP3MR, the station that literally put British Guiana on the map as we DX'ers know it. "The Voice of Guiana" first went on 7,080 kc in 1935 and was particularly interesting during that winter. Now they have amalgamated with VP3BG under the title "British Guiana United Broadcasting Co.," transmissions taking place on 48.94 m under the call VP3BG. Incidentally the latter radiates "tropical Indian music" occasionally around 0125, and care should be taken to avoid confusion with Eastern stations. VP3BG's second transmission terminates at 0145 with the studio clock striking 10 p.m., survey of the morrow's programmes, a good-night song, "God Save the King" and the greeting "Goodnight and pleasant dreams; good-night from British Guiana." Sunday programmes are commenced at 1245 GMT.

XEUZ, Mexico City, 40.02 m, 6,120 kc, is well heard before close down at 0700 or earlier.

● From the East

W. S. Murray reports XGJ, Hankow, 25.66 m, operating 1200-1230, announcing as "The Official Voice of China" with news in German, French and English, also that the call of HS8PJ is to be changed to HS6PJ, according to station announcements.

NIROM Transmissions. YDC, Bandoeng, 19 m, has been observed at good strength as early as 0930 when signing on with studio clock chimes and usual march. PMH, 44.6 m, may be heard broadcasting a programme of native music daily 1430-1530 simultaneously with PMN, but reception is usually R2-3 only. A newcomer to the 49 m. band is a relay of the 2300-0030 NIROM physical-jerk gramophone session, on approximately 49.67 m. This may be YDB which occupied this wavelength a few years ago. Strength is excellent.

VUD3, Delhi, India, adhering to the published schdule, is extremely well heard on 31.28 m from 1500 or earlier, until close at 1730.

● From Africa and Australia

Listeners who have yet to log one of the new South African Broadcasting Company's transmitters should tune to ZRK, Klipheuvel, 49.2 m (slightly above YUA in wavelength, but heterodyned by it) where they should have little difficulty in logging him if the attempt is made around 2030. Close down is heralded by the eleven chimes of the Johannesburg City Hall at 2100 and the playing of the South African and British National Anthems.

Propaganda that sickens—Readers' news—Highlights from the logs—Programmes of the future

Announces often as "Radio Nacional," using a sequence of five chimes frequently during announcements, and an occasional bugle call. "Hora de Republica" heard from 0600. XEWW, Mexico City, 31.58 m, also well heard with news at 0450, message in Morse and chimes at 0500.

Other news from Latin-America. TIEP, "La Voz de Tropico," San Jose, 44.8 m, heard with recordings, three-chime signal, and sign off at 0500; OAX4Z, Lima, 49.32 m, signing on with greeting "Buenas Dia" at 2330; CXA2, Montevideo, 50 m, announcing often in English as "This is CXA2, Continental Radio, Montevideo" around 2300; YV1RH, Maracaibo, 47.17 m, signing off at 0330; HI1L, Santiago de Cabelleros, 46.30 m, very strong while closing at 0240; YV3RD, "Radio Barquisimeto," 46.30 m, off at 0230 with studio clock striking 10 p.m., and good signals from the mystery CB on 25.1 m, logged frequently around 2300 with three-chime signal.

W2XE, Wayne, mentions a 31.2 m, 9,590 kc channel on its latest QSL, according to A. G. K. Leonard, while another reader, W. S. Murray (Milngavie), states that W9XUP, St. Paul, has been heard around 1900 near 11 m, relaying KSTP, and announcing that reports would be appreciated. On or shortly after November 1, W2XAD-2XAF, Schenectady, will have a radio-frequency power amplifier with a carrier output of 100 kw available for use on any of their assigned frequencies (GEC, Schenectady).

● Special Broadcast from Mozambique

Members of the British Short-Wave League will be specially interested in a programme dedicated to them on November 28, 1500-1600, over stations CR7BH (25.6 m), CR7AA (48.8 m) and the new CR7AB on 85.92 m. Reports should be sent to P.O. Box 954, Lourenco Marques, and a coupon sent to prepay postage. CR7BH is the most favourable channel for reception at the time of writing.

● Late News Item

Station TAQ, Ankara, is now heard daily with experimental transmissions which commence at 1030, the first half of the programme being devoted to Eastern music and the latter to recordings of popular or classical music. Broadcasts are concluded at 1200 with announcements in various languages, including English, the call being "This is Radio Ankara." Another wavelength (presumably long-wave) is used simultaneously, but the frequency was not definitely logged. Wavelength of TAQ is given as 19.74 m, and the announcer is a woman. Turkish time is three hours ahead of GMT. Reception is excellent, being R8-9.

I understand that a TAP will shortly make its debut on 31.6 m, 9,465 kc.

● Programmes of the future

As the U.S.A. has reverted to Eastern Standard Time, this change necessitates revision of schedules and programmes as broadcast from the General Electric's International broadcast stations W2XAD and W2XAF in Schenectady, and the other popular American broadcasters, but as we too have changed to GMT the change will not affect the timing of the programmes and special items to which we make a point of listening.

Of special interest to technically-minded listeners is W1XAL's announcement to the effect that among other unique educational features to be radiated by them this winter, a full course of instruction in radio technique, under the supervision of Dr. C. Davis Belcher, well-known radio engineer, will begin on the first Friday in October and continue for thirty-two successive Fridays thereafter, at 2200 on 25.45 m. Further novelty is introduced by the course in that the listener-student may apply to W1XAL for his "homework papers"—supplementary literature which will assist him in following the lecturer as the course progresses. The booklets are supplied at cost price. A series of introductory lectures by guest radio engineers was broadcast during September. And so the listener can now receive useful training in Modern Radio Theory and Practice for next to nothing!

Another educational feature is the CBS "American School of the Air," which will start its tenth consecutive season over the WABC—Columbia network on October 10, and will be heard 1930-2000, presumably via the 19.64 m W2XE. Monday programmes will be entitled "Frontiers of Democracy," Tuesday "The Music of America" (with Bernard Hermann directing the Columbia Broadcasting Symphony), Wednesday "The Lives Between the Lines" (literature feature, including dramatizations of American literature and a series of guest speakers from the ranks of America's best writers), Thursday "This Living World" (discussions on current domestic and international life), Friday "New Horizons" (originating in the American Museum of Natural History).

For the less seriously-minded listener there will be the usual abundance of light and dance music—and swing!

The BC Station List

Many readers have complained that the list of broadcast stations usually printed inside the back cover of each issue is neither complete nor sufficiently detailed.

We are therefore presenting this feature rather differently in future. In order to get space for detail, the normal wave-range of 13 to 60 metres is being divided into two parts.

The first section appears this month, and in November will be given all known stations in the lower-frequency range. Thus, one month we cover the 13-31 metre section, and the next from 31 to 60 metres, the two lists therefore appearing alternately.

CLUB HISTORY—VI.

BRADFORD SHORT-WAVE CLUB

DURING the year 1935, a few amateurs in the Thornbury district of Bradford decided to try to form a club for radio enthusiasts interested especially in the short waves. The result was that these pioneers, meeting at one another's homes in turn, eventually became the "Sphere Short-Wave Club."

Great efforts were made to ensure the success of the project, but for a long time the difficulties were too great. Eventually, on Friday, November 8, 1935, Mr. G. Walker was elected secretary.

On November 15 of the same year momentous decisions were taken. It was decided to put a lock on the cellar door at 66, New Lane. The club now had its own headquarters. A reunion of members was arranged to be held at the Godwin Hotel on November 28. Things were beginning to move briskly, and on Friday, February 14, 1936, at a special meeting held at 66, New Lane, the name of the society was changed to "The Bradford Short-Wave Club."

Thus it came into being.

But progress did not stop there, and on February 28, 1936, the club took over the new headquarters at Bradford Moor Council Schools. Since that time the club's address has remained unchanged.

When this more suitable accommodation became available, it was possible to invite co-operation from various people, such as a number of knowledgeable amateurs, and eventually nationally known manufacturers were asked to lecture. To-day, the club is on very friendly terms with all the radio world with which it has been associated.

All this happened in 1936, and the club obtained its own receiving licence too, so that it was possible to do considerable DX'ing on the premises.

In 1937 further developments took place, for the club applied for and was granted an AA transmitting licence, Mr. K. Abbott conducted Morse classes and was appointed technical adviser, a field day was held, an annual social was inaugurated, a huge programme of lectures was arranged for the winter, and fifty per cent. of the members achieved AA transmitting licences.

On Friday, October 1, 1937, at the second Annual General Meeting, Mr. G. Walker refused the position of secretary which he had held so long. He had done sterling service in building up the club to its present position, and it was with regret that his resignation was accepted. Thus the present secretary took over the job.

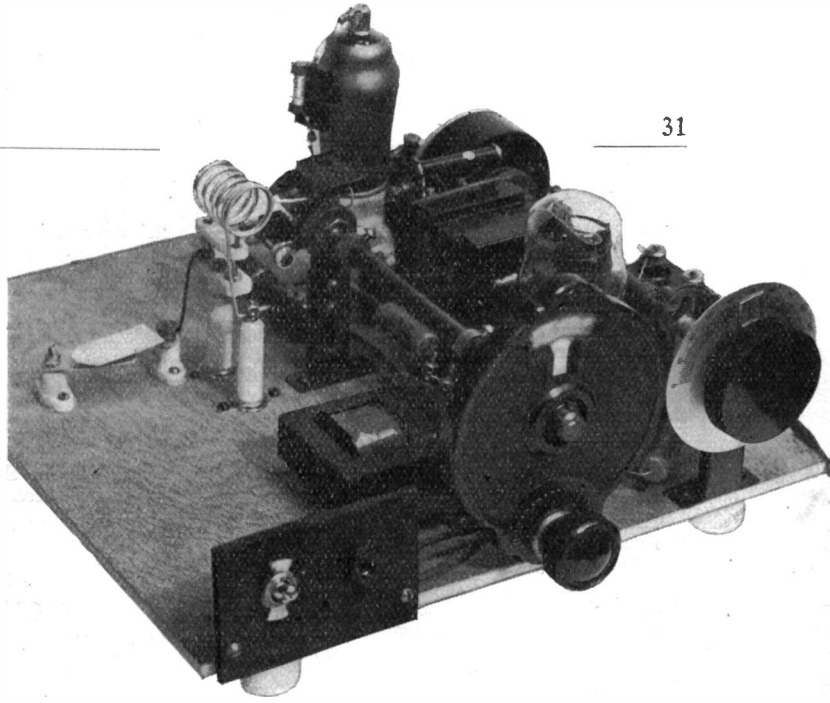
The year just concluded has seen further advances, for the club now owns a full G call (G3NN), and four of the members also have two-letter "tickets." There is no standing still at the Bradford Short-Wave Club, there is always something to do, and any member selected is prepared to do it.

The Bradford Short-Wave Club is established as a permanent institution!

Further Brief Notes on the

56 Mc Receiver

as described last month by "Tester"



This particular model performed very well during the recent Tests (see Calls Heard section and 56 Mc notes elsewhere), and has been in use at the Editor's station for some months.

READERS who join this contributor in his struggles will have seen the two circuit diagrams, and the discussions thereon, which appeared in the Sept. issue. Owing to the pressure on space last month, we said we would show photographs of the Class B HF stage and 56 Mc receiver this time, but once more we are baulked for space, and the Editor decrees the 5-metre set only.

An illustration is given herewith, and the circuit was discussed on p. 29 of last month's issue. The photograph shows the general layout quite well, and the arrangement of the grid and reaction circuits is clearly visible. The 4-turn Eddystone grid coil mounts on a frequentite holder, which is in turn carried on an insulating pillar. The tuning condenser is between this coil and the valve, and the home-made variable aerial series condenser appears on the baseboard to the left of the grid coil. This was also described last month.

The three-turn close-spaced winding is for reaction, one end supported on the front insulating pillar and the other going to one side of the .0001 mF fixed reaction condenser. This appears immediately above the tuning condenser mounting bracket.

To the right of the Hivac D.210SW detector valve—the grid leak and condenser can be seen connected to the top cap—is the 50,000-ohm reaction control resistor, with slow-motion drive, and controlled by the right-hand dial assembly (Eddystone). Just in front of the tuning dial is the ontput choke, lying close to the baseboard. This happens to be a midget type, and of indeterminate breed, but anything similar—such as the Bulgin LF.40 or Varley DP.24—will do. The Hivac Y.220 output valve is behind the dials, and between it and the detector is the coupling impedance, marked LFC in the diagram on p. 29 of the September issue. This should be rated 100-henry at something like 10 mA; the Bulgin LF.34S would do admirably.

The condensers, resistors, RF chokes, etc., are mounted in the run of the wiring, with the 'phone jack and on-off switch on the small panel at the front. Three stand-off insulators of the type used by electricians to mount switch-boards and to carry LT wiring are fixed under the baseboard, which is a Venesta flooring block 12-ins. square, to hold it off the table.

Further reference should be made to the previous article for operating notes and any points not covered above.

Mullards Reduce C.R. Tube Prices

A new 1-in. cathode-ray tube at 30/- only is now available from Messrs. Mullard, and we are also very pleased to announce that their 3-in. type E.40-G3, an article on the practical application of which appeared in our January, 1938, issue, has been considerably reduced; it is now 55/- from £3 10s. 0d.

These tubes are well suited to amateur requirements—obtaining curves, making measurements of all kinds, and determining accurately the depth of modulation. The increasing realisation of this among amateurs has made these low-cost tubes worth while, and Mullards are doing all they can to meet the market on price. We shall also be publishing shortly some authoritative articles on oscillagraphy.

Write the Cathode-Ray Tube Dept., Messrs. Mullard Wireless Service Co., Ltd., 225 Tottenham Court Road, London, W.1 for further particulars, and ask for the 32-page catalogue-booklet on the use of C.R. tubes.

Telling World Time

One of the most awkward and annoying calculations regularly confronting the short-wave worker is that of computing time in different parts of the world. Though we in Great Britain can complacently put GMT on our cards and leave the other man to work it out, a better way is to have a World Time Indicator handy, of the type now available at 2/8 post free from Messrs. Holiday and Hemmerdinger, Holmer Works, 74-78, Hardman Street, Deansgate, Manchester, 3. It is a simple gadget which gives the required information by setting a rotating disc.

CORRESPONDENCE

1.7 Mc Reports, Please

I would welcome reports on my 160-metre 'phone or CW signals from anywhere outside Lancashire, Cheshire and North Wales, and I am quite willing to co-operate in any tests. I wish you all success in your campaign for better SWL reporting.—H. FENTON, G8GG, 25 Abbey Road, Blackpool, S.S., Lancs.

Some Suggestions

There must be many of your readers who are in the same position as myself—on DC mains. Could you help us by describing a small AC/DC Rx, with American valves. In your issue of October last year there appeared some discussion about the use of American valves, and you asked for comments on this point. I should like to see the matter revived.

I notice that you are giving more space to 56 Mc. I think that if you could cut down the DX Corner to about three pages and use what you save for further 56 Mc news, stations wanting reports, transmitting schedules, etc., it would be of more value. —L. J. ROFFEY, 135 Hertford Road, Dalston, London, N.1.

1.7 Mc DX

As a point of interest, I heard OK1AW calling CQ on 1.7 Mc at 2300 BST on Sept. 9, and there was apparently a contest on. He called and worked several G stations and was RST-359 with me; unfortunately, I could not raise him.—L W. LEWIS, G8ML, 117 Fairview Road, Cheltenham.

[GW5BI, Cardiff, reports to the same effect, and says he was QSO an OK on Sept. 4 at 2300 BST. Europeans can be worked fairly easily on 1.7 Mc. The trouble is that they only come on very rarely, as most European countries refuse to licence their amateurs for this band. —ED.].

Comment on Amateur Operating

With regard to your correspondent who mentions the poor operating ability of many G's, I consider the standard of the Morse Test is not sufficiently high, and that it could be improved by increasing the passing-out speed, while a thorough knowledge of the Q Code and some message handling ability should also be required.

I can truthfully say that I have never yet heard a W with a poor fist. However slow the sending, the spacing is good. The American amateur never hesitates, break signs are few, and he knows just what he is going to say.—J. R. SEAGER, 2AUK, The Laurels, Park Wood, Doddinghurst, Brentwood, Essex.

[We doubt whether raising the standard of the Morse Test would improve the new operator's performance on the air. If he is really keen, he soon learns by example and precept. Message handling as such is not allowed in this country, as G licences are granted solely for experimental working. In America, amateur stations are established primarily for communication purposes. This illustrates the essential difference between G and W amateurs.—ED.].

From W2IXY

I wonder if you would be interested in my reactions to some of the discussions which have been raging in the Magazine recently. For instance—Calls Heard. I think you have done a splendid job in that department by eliminating the east coast W's.

About the 10-watt situation—there will always be law breakers and although I have worked many legitimate 10-watters, even I a woman can easily compute the power input when the tube line-up is given! If some of these boys must emphasise the fact that they only claim ten watts "pray forget to say what you are using"! This condition is not peculiar to G; even with our own W regulations permitting 1,000 watts maximum to all and sundry, some just have to go over it. If you can't get there with 1 Kw, then scrap the junk, seems to be the motto.

I deeply appreciate your many comments on W2IXY, and in regard to listener QSLs, what you said in July is perfectly correct. I have always tried to play fair with the SWL, as I used to be one myself, and I can still remember the thrill of receiving cards.—DOROTHY HALL, W2IXY, 186-18, Williamson Avenue, Springfield, L.I., New York, U.S.A.

Wired Wireless in Switzerland

The household where I am staying possesses a "tele-diffusion" receiver, the stations all being received via the telephone line. Five different stations can be brought in by turning one knob, and another receiver on the same line can select a different station. There is only one telephone connection to the house, and to crown everything, the 'phone itself works quite normally and without any interference!

As an English AA licence holder, I am in touch with the HB amateurs and am a member of the local club. Swiss hams are very friendly, and here I would like to say that I shall always be glad to act as an intermediary between G's and HB's, and that letters addressed to me will have prompt attention for any help that I am able to give.—PHILIP SMITH, 2DMX, 51 Evole, Neuchatel, Switzerland.

CW without a BFO

Here is a tip for the man struggling to read CW by the "bumps" on his superhet. As you are aware, the pentode IF stage of an ordinary superhet is kept from self-oscillating merely by the highly efficient screening grid. If the screen-grid by-pass condenser is disconnected on the earthy side and left floating, the IF stage will oscillate uncontrollably.

A 50,000-ohm variable resistor inserted between this condenser and the earth line (chassis) will give perfect control of regeneration, and the IF valve can be made to go in and out of oscillation quite smoothly. A potentiometer-type resistor with switch incorporated can easily be adapted to bring in the

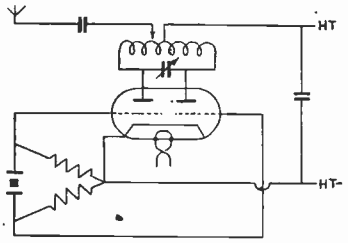
condenser again when CW reception is not required. I can vouch for the success of this idea, as several friends have made the alteration with entirely satisfactory results.—W. JONES, GW6OK, 14 Station Road, Colwyn Bay, North Wales.

Any Support?

I have long been waiting for you to describe a small superhet for home-construction, along the lines of those briefly mentioned in your December and September issues, with a reactive second detector or IF stage. I wonder if we can look forward to something like this in the near future?—S. A. W. PAINT, 14 Pulteney Street, Barnsbury, London, N.1.

Not Advisable—

I have just built the transmitter described in your issue of March, 1937, using a 6A6 as a push-pull CO. I would now like to modulate this with a 6L6 in a single stage, and would be glad if you would give me the necessary circuit and method of coupling.—C. E. COOK, 2CFR, 42 Hazel Bank, Tolworth, Surbiton, Surrey.



—Why

The circuit to which 2CFR refers is shown above. Though a twin-triode is used, the arrangement is still of course essentially nothing but a crystal oscillator.

We have several times lately had occasion to answer similar queries, pointing out that while it is possible to modulate a CO, it is neither advisable, good practice, nor efficient; moreover, full modulation cannot be obtained if the resulting transmission is to be reasonably stable.

Briefly, the reasons are that in a CO with the crystal taking full control and therefore giving maximum stability, it is not possible to modulate—or swing—the plate current more than a few per cent. owing to the locking effect of the crystal. If the crystal lock is weakened by tuning the tank further away from resonance, and fairly full modulation then applied, say 50-60 per cent, the immediate result is instability, i.e., frequency modulation, because the large variations in plate current due to heavy audio modulation tend to vary the frequency.

A. A. Mawse discussed methods of checking for frequency modulation in his "Transmission for Beginners" article in the June, 1938, issue.

Apart from all the considerations mentioned above, there is the fact that de-tuning a CO reduces RF output and increases plate current.

BOOK REVIEWS

We hear much of the cathode-ray tube, and everyone agrees that it has revolutionised radio and electrical measurement and investigation. But it is surprising how few people there are who really understand the operation and setting up of an oscilloscope, while those who can interpret what they see on the screen are fewer still.

A useful little book on the subject, which covers the ground in an easily understood way and will be invaluable to amateurs and servicemen, is "How to Use the Cathode-Ray Tube," by J. H. Reyner, B.Sc., A.M.I.E.E., the well-known consulting engineer.

It is obtainable, price 1/-, from Messrs. The High Vacuum Valve Co., Ltd., 111-117 Farringdon Road, London, E.C.1, from whose stand at the Show many copies were sold.

Messrs. Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2, send us two publications for review which will be of interest to the general reader.

"Broadcasting From Within" is a well-illustrated 100-page book covering the programme activities and services of the B.B.C., and there is a very good chapter on Technical Hitches and Breakdowns, which the B.B.C. know how to deal with so effectively. Though the book is very light reading and in no sense technical, it will interest even those who only listen to the Third News. By S. W. Smithers, it costs 2/6.

"A Simple Guide to Television," by Sydney A. Mosley and H. J. Barton-Chapple, is a shilling booklet dealing in what is known as the popular manner with the history, development and present state of television. It will tell the viewer enough to give him a working idea of how he gets his picture, while those with a more enquiring mind will be induced to delve further into the subject.

The souvenir booklet of the Technological Institute of Great Britain contains appreciations of the Institute's 21 years of activity by students, employers and the technical press. It is obtainable free on request, together with the "Engineer's Guide to Success," by application to the T.I.G.B. at Temple Bar House, London, E.C.4.

Goodmans Speakers

The high-fidelity instruments produced by Messrs. Goodmans Industries, Ltd., Lancelot Road, Wembley, Middlesex, who specialise in the design and manufacture of loud-speakers and have done a great deal of original research work on them, are fittingly described in a new booklet which is one of the best-produced of its kind that we have seen.

Not only are the speakers catalogued, but a great deal of useful engineering information is given connected with the design and testing of Goodmans' instruments, together with some interesting response curves. Readers can get a copy by enclosing 1½d. with their request.

Band-Switching Receivers

Some Notes on Home-Constructor Possibilities

By The Editor

ALL RECEIVERS described as "communication," and most of even the simplest commercial designs of short-wave set, incorporate a wave-range switch, by which the desired band is selected.

In amateur practice, on the other hand, plug-in coils are largely used, and there must be very few home-built receivers which have either a manufactured or amateur-designed coil-switching assembly. There are reasons for this, apart from the obvious ones of expense and mechanical difficulty in either buying or making an efficient unit.

On the short waves, and particularly the higher frequencies, both theory and experience indicate that having unused windings where they might conceivably interact with the fields of the coils actually in circuit is bad practice, in that it leads to avoidable losses, high minima, and tracking troubles. It is therefore safe to say it is still better to use plug-in coils than almost any type of switching arrangement, and some of the best American receiver designs are those in which the whole "family" of coils in the circuit are changed as a whole and in one operation.

● Compromise

However, there are other factors to be considered besides electrical efficiency pure and simple; convenience, ease of operation, accuracy of calibration and the improvement in the general "handlability" of any receiver using switched band-changing.

Hence, it becomes a matter of sacrificing a little in one direction to make up for advantages in another, and so we find ourselves making the usual compromise between the ultimate in efficiency and reasonable convenience. It also follows that any such switching system should be arranged so that the unused windings are left as much as possible "in the air," to avoid the losses and difficulties already mentioned.

There is now available in the Bulgin range a particularly neat, well finished and efficient coil-switching assembly, illustrated herewith. Sizes, with the five coils in place, are 4½-ins. high, 5½-ins. wide and 6-ins. long. The cost of the complete unit, with coils covering 10-200 metres in five bands, is 27/9. If less coverage is required, involving fewer coils, the cost is reduced by three shillings each.

The coils are provided with four pins and three windings, i.e., one pin is common to all, and represents the earthy end of each coil. On the cradle, in addition to the coil-mounting sockets, is a central shaft carrying a positive-contact rotary switch in three parts, mutually insulated, this connecting the windings required to the terminals of the unit, which is wired to the rest of the circuit.

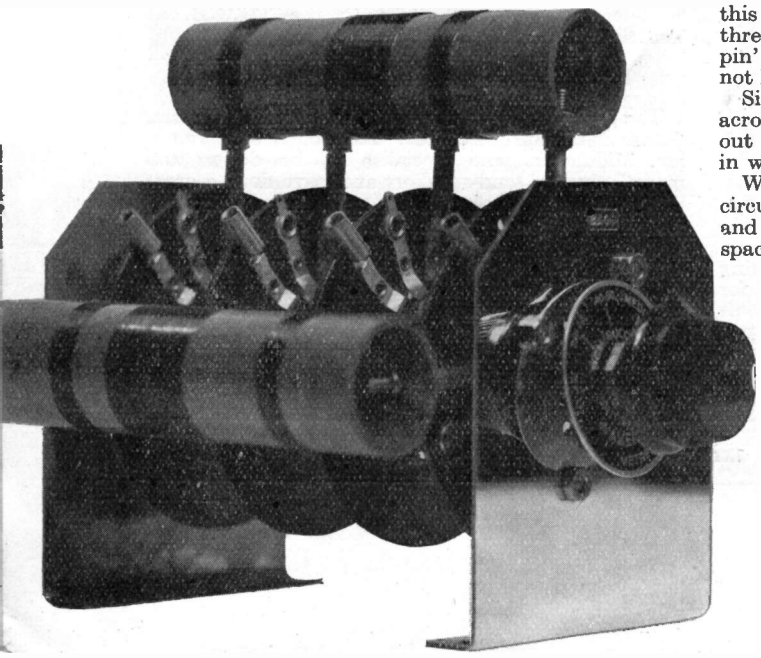
It should be noted from this description that the coils themselves do not move—the only motion is in the switch itself—and as their positions relative to one another and the other parts of the receiver do not alter, any possible interacting effect which has to be allowed for in ganging or trimming, once set, is not thrown out by the action of switching.

● Applications

Many uses for this unit will now be evident, from the simple "straight three" circuit, with or without band-spread, to more complex superhet designs. With one further set of contacts, or an alteration to the coil connections as at present arranged, it would be possible to get equal electrical band-spread by taking out the necessary tap on the grid windings, this going to the pin now common to each. These three ends could in turn be taken off the "common pin" and wired independently, since the coils do not have to be moved.

Simple band-spread—with the condenser right across the main tuning capacity—is obtainable without any changes being required, and this is the way in which most people will use this unit.

We are at present experimenting with various circuits using the Bulgin coil-switching assembly, and in due course "Tester" will probably get some space to talk about them.



The Bulgin switched coil assembly discussed in the text. Some very good band-switching receiver circuits can be worked out using this chassis, which can take five three-winding coils, giving a coverage of 10-200 metres.

CLUB ACTIVITIES

"DEAR MR. SECRETARY . . ."

With a view to covering every report sent in we have found it necessary to confine notes to one paragraph, length depending upon general interest of the material supplied. Please note that we desire to include in each heading your Club's title, HQ, secretary's name and address, meeting nights and annual or other subscription rates.

BRADFORD RADIO SOCIETY, Cambridge House, 66 Little Horton Lane; S. Hartley, 7 Blakehill Avenue, Fagley; 2s. 6d.—Commencing seventeenth year, next three meetings are Oct. 11, Marconiphone Co., "Latest developments in Television"; 26th, Mr. Heaviside on "High-efficiency aerials"; Nov. 8 (provisional), Lissen, Ltd. Demonstrations at each meeting.

BRADFORD S.-W. CLUB, Bradford Moor School, Killinghall Road; S. Fischer (2BMO), Edenbank, 10 Highfield Avenue, Idle.—Third annual meeting Oct. 7, 8.30. Members are hoping to surpass any previous efforts during the coming session.

BRIGHTON BRANCH W.F.S.R.A., 2 Cheapside, F. R. Jupp (2FAD), 35 Brading Road.—The past year's activities were discussed on Sept. 2. AA permit is awaited, meanwhile members are interested in "Transmission for Beginners."

CANNOCK AND DISTRICT RADIO SOCIETY; D. M. Whitehouse (G2YV), Trumwyne House; first Sunday each month; 6d. each meeting.—First meeting Aug. 21, when T. Ball (G6SW) was elected chairman, K. Greenaway (2FAH) treasurer. Clubroom and gear under consideration, ready for AA call. A junk sale, to assist funds, was held Sept. 4.

DOLLIS HILL RADIO COMMUNICATION SOCIETY, Braintcroft Schools, Warren Road, N.W.2; E. Eldridge, 79 Oxgate Gardens, N.W.2; fortnightly; 2s. 6d.—Sept. 6, President (G5SK) lectured on "Aerials and their design," when many pointers not generally understood were raised with detailed explanation. A. Turner, M.I.R.E. (G2XO) dealt with "SW transmitters and receivers" at the Oct. 4 meeting. J. H. Walters (Belling and Lee) will lecture on and demonstrate the causes of interference, suppression at the source and receiver end, and proposed legislation.

DULWICH RADIO CLUB, W. J. Bird, 55, Upland Road, E. Dulwich, S.E.22.—Contact has been made with Peckham with a view to future co-operation. Members report "busy" but found time to fit in an enjoyable Radiolympia visit.

EASTBOURNE AND DISTRICT RADIO SOCIETY, Science Room, Cavendish Senior School; T. G. R. Dowsett, 48 Grove Road.—56 Mc is finding favour among members in field-day proposals; the club's transmitter is 6A6 in push-pull, TPTG osc, choke modulated with 6L6G in class A.

EAST DORSET AND WEST HANTS RADIO CLUB, Lintlaw Lodge, Wimborne Road, Poole; R. P. Heatley, 26 The Triangle, Bournemouth ('phone 2023); 5s.—This club has been re-formed and the next three meetings are: Oct. 6, lecture by Mr. Wills, "Superheterodyne Design"; Oct. 19, exhibition by members; Nov. 2, demonstration of Eddystone SW equipment. Club news will be made over the air by G5OH on Sundays at 10 a.m. on 40 metres.

EDGWARE S.-W. SOCIETY, Constitutional Club; Wednesdays, 8 p.m.; F. Bell, 118 Colin Crescent, Hendon, N.W.8.—Recent meetings have included demonstrations by Messrs. Cossor and Webbs' and an "Enquiry Evening," when members anonymously submitted problems for general discussion, proving beneficial to many. Sunday meetings, with Morse, commenced on the 4th, 11 to 1 p.m. The first annual dinner is scheduled for Nov. 26 at Slater's, Oxford Street, at which innovation J. Clarricoats (Secretary, R.S.G.B.) will be the guest of the evening.

ENFIELD RADIO SOCIETY; L. Fenn, 47, Cecil Avenue (Enfield 1572).—A cup has been presented to the Society for competition among members for the most efficient piece of apparatus constructed before the closing date in November. The winner will hold the cup for one year and is also to be presented with a quantity of apparatus. Members are already working hard for this. The roll includes six new friends.

EXETER AND DISTRICT W. SOCIETY, Y.W.C.A., [illegible]s Field, Southernhay; Mondays, 8 p.m.; 5s., Juniors (under 17) 2s. 6d.; W. J. Ching, 9 Sivell Place, Heavitree.—Oct. meetings: 10th, test of the Society's amplifier; 17th, visit to the showrooms at Electricity House, Fore Street; 24th, demonstration of the season's sets by F. J. Thorn; 31st, "Pioneers of Radio," by V. Searle, M.Sc.

IRISH AMATEUR RADIO SOCIETY; F. Butler, 92 South Circular Road, Portobello.—Membership increasing steadily. A power supply and receiver is now installed and a library fitted. A receiver-design competition is well to the fore.

LONDON TRANSMITTING SOCIETY, 40 Raeburn Road, Edgware; Sundays, 11 a.m., Thursday, 8 p.m.; G. Yale (2DWM), as above.—Open to licence holders only. Interest lies chiefly in C.W.R. discussion, whilst a full call is under consideration.

MAIDSTONE AMATEUR RADIO SOCIETY, The Clubroom, 244 Upper Fant Road; P. M. S. Hedgeland (2DBA), 8 Hayle Road (Maidstone 4142); alternate Tuesdays.—Outside speakers are supplying the following meetings, on other dates members will themselves provide discussion, etc. Oct. 18, "Condensers for the Amateur," Dr. F. C. Stepham (T.C.C.); Nov. 1, S. R. Wilkins of "Avo" on "Measuring Instruments." A booklet setting out details of membership is available to prospectives.

NEWBURY AND DISTRICT S.-W. CLUB; L. Harden, 44 Chandos Road.—Weathering many difficulties during the past two years general satisfaction pervaded the birthday meeting last month when the receiver competition was judged by a G.P.O. inspector; the winner of three certificates may claim a cup. A new call is 2FGK, who shortly expects a "full." Field work is being planned, a nearby Berkshire village of SW repute providing the centre. An aim to make membership 100 per cent. technical is being pursued.

OXFORD UNIVERSITY WIRELESS SOCIETY, Electrical Laboratory; Martin Ryle of Christ Church.—Recently formed to encourage interest in Amateur Radio amongst members of the University. Station G3MM has been installed.

PECKHAM DISTRICT S.-W. CLUB, The Windsor Castle, Cator Street; Thursday, 8 p.m.; L. J.

Orange, 11 Grenard Road.—J. D. Burgess (VS7JB) met the members and spoke on "Ham Radio in Ceylon" during which he proved an adherent of QRP, pointing out the opportunity so offered to others by not "spreading" whilst in local QSO; he often worked with 2½ watts input and hoped one day to contact the club over the air. G6AQ (Secretary, W.F.S.R.A.) is always in attendance, teaching Morse, etc., and looks forward to meeting W.F. members. L. S. Davies (2DTN) is explaining the rudiments of transmission in a series of talks and demonstrations.

ROMFORD & DIST. AMATEUR RADIO SOCIETY, Red Triangle Club, North Street; Tuesdays, 8 p.m.; R. Beardow (G3FT), 3 Geneva Gardens, Chadwell Heath.—Very active lately with DF. G3CQ and G8PL have both constructed DF receivers. G8TV has demonstrated an oscilloscope and gave a talk with the aid of a BCL receiver and blackboard. 2DVA, 2BDT and G8PP have all constructed 6L6G tri-tets. G3FT is being pirated on 7 Mc CW (QRA is given as Aston, near Birmingham, about 7145 kc). Morse practice is given by members holding G calls.

SOUTH HANTS RADIO TRANSMITTING SOCIETY, Civil Service Sports Ground Hut, Copnor Road, Hilsea, Portsmouth; first Thursday; E. J. Williams, B.Sc. (G2XC), "Rochdale," London Road, Purbrook.—October meeting: C. Shearston (G3LV) will lecture on "Microwaves," while the topic for November will be "Sunspots" with R. Baldwin (2CBL) as lecturer. It is hoped that Mr. Pirie will be able to talk on "Electrolytic Condensers" in December. At the September meeting G2XC spoke on "The Propagation of Wireless Waves"; this included a brief description of the Earth's magnetism and numerous graphs were shown.

SOUTH LONDON AND DIST. RADIO TRANSMITTER SOCIETY, Brotherhood Hall, West Norwood; first Wed.; H. D. Cullen (G5KH), 164 West Hill, S.W.15. —The summer season caused no falling off in activity. Recent lectures included Mr. Nixon (G.E.C.) on "Modern Valve Manufacture," the Chairman (G2NH) on "A Portable CC Transmitter for 56 Mc," and "A day in my life" by the radio editor of a London daily paper. An interesting winter programme has been arranged which commenced with a talk by ZS1AH on October 3.

SOUTHPORT AMATEUR TRANSMITTERS' ASSOCIATION; R. Rogers (G6YR), 21 Chester Avenue; licence holders only eligible.—The season's first meeting, held at G2IN, proved an interesting lecture and demonstration by G5ZI on "The Creed Automatic Sender and Recorder." The chairman outlined the C.W.R. scheme; all eligible members have applied for membership. A scheme for a new clubroom was put forward; plans for it were entrusted to G8QG. The work will be carried out immediately and a control tower will surmount the building, giving an effective height of forty feet for 56 Mc. All members report considerable activity, G2IN and G5ZI are on 56 Mc CC and ask for skeds; G2LM is using mobile 56 Mc and seeks reports; G2XU, G8DQ and G5KX want reports on 7 Mc 'phone from distances over 100 miles. G6YR now has 78 countries verified. G2IN, G2LM, G5KX and G8QG are using 1.7 Mc.

SURREY RADIO CONTACT CLUB, "The Alhambra," Wellesley Road, W. Croydon; first Tuesday, 8 p.m.; A. B. Willsher (G3IG), 14 Lytton Gardens, Wallington:—The opening winter meeting consisted of a lecture by Mr. Stuart Davis on "High Fidelity Recording and Reproduction," as used at the Davis Theatre, before a company of 49. The apparatus consists of the WIRELESS WORLD pre-tuned quality receiver feeding into a 30w class AB push-pull power amplifier (6C5 phase-reverser using a grid-choke instead of the usual transformer coupled into two 6L6's in class AB low-loading push-pull); a Hartley Turner Duode completed the amplifier. After listening, all present were convinced of the inadequacy of their present receivers! After a recording demonstration Mr. Davis explained the details of his ribbon-velocity type microphone and pre-amplifier. VK6JH, the chairman, G6NF, Mr. Stuart Davis, G3IG and G5AA then made recordings.

SUSSEX SHORT-WAVE AND TELEVISION CLUB; C. J. Rockall (G2ZY), "Aubretia," Seafield Road, Rustington, and E. C. Cosh, "Anslyn," Mill Road, Angmering.—The winter programme will be ready shortly. E. J. Williams, B.Sc. (G2XC) addressed the members on "Propagation, Magnetic Storm, Sunspots, etc." at the Pavilion, Bognor Regis on Sept. 27. Oct. 12, Annual Outing (tour of Murphy Radio Works at Welwyn Garden City), 32 members are making the trip.

THORNTON HEATH, S.-W. RADIO AND TELEVISION SOCIETY OF; St. Paul's Hall, Norfolk Rd.; Tuesdays, 8 p.m.; R. E. Dabbs (G2RD), 4 Nutfield Road.—With the annual general meeting (Sept. 13) the Club entered its 16th year. An active and ambitious committee were elected. "Code can be learned without drudgery" is the opinion of members after trying a new system to be continued and fostered.

WEST HERTS AMATEUR RADIO SOCIETY; A. W. Birt (G3NR), 6 Hempstead Road, Kings Langley. —The September meeting was held at G3PV in Berkhamsted, at which D. G. Martin gave the last talk in his series "Television." After G3PV's gear had been explained and demonstrated the evening concluded with code practice given by G3QT. G3NR and G3PV are conducting tests on 7 Mc each Tuesday and Friday from 0600 GMT till 0630 with a view to comparing skip effects and variations of ground wave intensity between their respective stations. Reports on these CW tests would be appreciated and duly verified.

WEYMOUTH AND DISTRICT S.-W. CLUB; E. Kestin (2DPR), 55 St. Mary Street.—Activity has been divided between experiments, transmissions, talks and visits to the G.P.O. USW radio telephony link with Guernsey, and the Dorchester Beam Station. From HQ many contacts have been made with stations in G, SP, OK, I and TF, while regular skeds are kept with locals on 1.7 Mc, these QSO's reviving interest in the Morse classes. Visitors to "the Shack" include G5UH, G5FN, G3IO, G3KX and 2DUP who were all kept busy until the small hours relating and comparing experiences.

WILLESDEN AND DISTRICT S.-W. SOCIETY, 31 Willesden Lane; every evening (6.30) except Thursday and Sunday; G. H. Talbot, 5 Linden Avenue, Kensal Rise.—On Sept. 3 a party of 14 visited "Radiolympia." Lectures have been given recently by C. Overland and W. Mansfield on such subjects as "Ohms Law" and "Fundamental thermionic valve theory." On Sept. 14 an interesting "query bee" was held. Morse classes Tuesdays and Wednesdays.

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T. H. CAMBUSLANG, "Sky Chief," "Philco 99," writes: "A decided advance on present commercial productions, does all claimed and a lot more." 1½d. stamp, details VARIABLE DIRECTIONAL AERIALS.—62, Costa Street, Middlesbrough.

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FOR SALE—Kodak Film Tank (hardly used) cost £1 1s., offers.—E. Thornberry, Mullaglass, Newry, N. Ireland.

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Eddystone "AMATEUR BANDS TWO," complete with valves, coils. Any reasonable offer.—G2AT, Vicarage, Exminster, Devon.

B.T.S. 4-valver, 9-96 m, cost £9 10s.; Ultra-short 3-valver, 4-8 m, cost £2, less valves, offers?—BSWL 437, 40 Station Road, Wigston, Leicestershire.

Eddystone 6-pin COILS (2), 12-47 m, and Reaction Cond. Total cost 12s. 6d.; 50 "P.W. & A.W.", offers or exch. to H. J. Burton, 19 Astley Road, Birmingham, 21.

4 MIDGET M.C. SPEAKERS. Ideal for small sets or two on baffle for real volume and quality. Cost 17s. 6d. each, new, 7s. 6d.—F. E. Ledger, 27 Cyril Road, Bridgeford, Notts.

For Sale, RAYMART "RF100" RF Chassis. Factory built, complete with 2 sets coils, valves (42, 6L6G, 2-RCA 210's). As new, £6.—G3JS, 10 Holly Road, Handsworth, Birmingham.

Sell small POWER PACK, brand new, 3 taps, 72, 100, 135 v output metal rect., 230 v primary. What offers? 2CIU, 49 Haig Avenue, Whitehaven, Cumb.

RCA VALVES. 43, 47, 78, 6A7, 2525, 77, 2s. 6d. each. HIVAC Z220, 5s.; UX281 (2), UX201, 3s. each. Cl. B. Outp. Ch., 3s. 3-g. Cond., 2s. Paterson, Langtree Av., Whitecraigs, Glasgow.

.0005 variable CONDENSER, 9d.; 20 AH Accumulator, 2s. 9d.; screened AW HF choke (new), 9d. G3LK, 28a Brunswick Square, Hove, Sussex.

5-METRE GEAR. Super-regen., with batteries, valve, in case, 25s. AC Transceiver, 3 valves, £3, or? 2BVZ, 21 Old Bath Road, Cheltenham.

Stanley Gibbons' Improved STAMP ALBUM with 900 stamps for sale. No reasonable offer refused, or exch. H. J. Burton, 19 Astley Road, Birmingham, 21.

Eddystone "HAM BAND 2," as new, with valves and 1 coil, 50s.; or what have you?—2BVZ, 21 Old Bath Road, Chelt'm.

Drill up to three-eighths inch for motor drive, 12s. 6d.; several Baker Loudspeakers, 6v field, 5s.—Hill, Robin Hood, Catsfield, Battle.

Eddystone "ALL-WORLD 2," plus HF unit, coils (15/52 and 70/160 m), acc., phones, £4, or offer.—Gilbanks, 42 The Chase, Clapham Common, S.W.4.

PORTABLE RX or TX, mahogany cabinet 11x9x7. 3s.; 50 recent copies "Practical Wireless," 3s. 6d.—2BZQ, 80 Wyberton West Road, Boston.

TRANSFORMER. 500-0-500, 300 mA, 4v 6a C.T., 4v 5a C.T., 4v 1a C.T. 0.2% reg., 20s. 80m Xtal, meters and other gear, list.—G2WW. 52 Colebourne Road, Birmingham, 14.

WANTED. AC mains amplifier, must be medium power. Cheap. Details to 2DWQ, Elm Lodge, Chelmsford Road, Shenfield.

CRYSTALS WANTED. 7 and 14 Mc, any frequencies, holders not essential. Price, etc. to L. W. Bazley, 2FIF, 66 Warwick Street, Daventry.

RELIABLE RELAYS. Any working current down to 2 mA at 1,000 ohms int. res., 3s. 6d. Enquiries N. Wightman, 76 Grange Road, Alloa, Scotland.

Wanted. 40m CRYSTAL; HF choke (Wearite HF35, or). Lowest prices, or would exch. stamps, spec. B. Colonials, Eire.—V. Patterson, Berthywl, Tregolan, Holywell, N. Wales.

ROTARY CONVERTER wanted. 24 (or 30) DC to 230 AC, 150 w.—Hill (G3RC), Robin Hood, Catsfield, Battle, Sussex.

BARGAIN! Eddystone "Everyman 4" (SG-Det-LF Pen), 15/100 m, MC speaker on panel, perfect. £2 10s. complete. Eddystone dial 973, 5s.—Orr, 14 Smalls Lane Dundee.

"Eclex" SW CONVERTOR, AC, 13/55 m, walnut cabinet, excellent condition, 45s. or nearest.—Nicholls, Bush Lodge, Pembroke.

BURNDEPT Needle Armature PICKUP (B.B.C. type). Cost £2, 7s. 6d.—G3LK, 28a Brunswick Square, Hove, Sussex.

BOOKS. For sale, about 24s. worth of assorted "S-W" and "Prac. W.," etc. What offers, cash? J. Plaskett, 31 Yeowart Ville, Workington, Cumberland.

Ferranti .0005 3-gang CONDENSER, calibrated SM dial, 3s. 6d. Pick-up, 3s.—2BZQ, 80 Wyberton West Road, Boston.

Eddystone "ALL-WORLD 2," SM réaction, 12/52 m. Heard 159 countries, N. Pole Expn. V.P.O.L. FB for SWL-Ham, £3.—G3OC, St. Luke's Rectory, Cheetham, Manchester.

Battery 2-v-2 COMMUNICATION RX and parts. Sale or exchange for superhet, covering at least 10/50 m. Johnson, "Maiville," Linksfield Road, Rushmere, Ipswich.

TWO Q.C.C. 7 Mc XTALS and holders, splendid oscillators; cash offers.—Challis, 104 East Hill, South Darenth, Kent.

WHAT OFFERS? 12½-gn. 1937 Emerson 6-valve all-wave superhet. Offers to Campbell, 46 Warsbeck Avenue, Cullercoats, Northumberland.

70 yds. coil red and black FLEX, 3s. 45AH Acc's, 4s. 6d. each. Mullard IW3, PM22, 2s. 6d. each. G3LK, 28a Brunswick Square, Hove, Sussex.

WANTED. 7 Mc mounted CRYSTAL, used but not damaged, what offers at about 6s.? Particulars please to BSWL617, Gaza, Palestine.

Will EXCHANGE all-wave coil and switch (15-200 m) for 7 or 14 Mc Crystal.—D. Wilkie, Jr., 41h Perak Road, Penang, Straits Settlements.

SALE OR EXCHANGE matched Rola Speakers (F6 and F7); twin .0005 Cyldon Extensor and SM dial; valves, meters. List from BMWXH2, 13 Sandringham Road, Bromley, Kent.

FOR SALE, brand new "Radio" Handbook (1938, Jones), 4s. Call Book, Spring 1938, excellent cond., 4s. 6d. (post 6d., please). 69 Tottenham Lane, Hornsey, N.8.

EDDYSTONE COILS (LB, Y, R), 1s. 6d. each; 6LB, CR, 1s. 9d. each. Quench coil (20 kc), 2s. 6d.—F. Harrison, 66 Etwall Road, Hall Green, Birmingham, 28.

FOR SALE, Eddystone SM reaction cond. and Eddystone cabinet No. 1033. WANTED. Eddystone cabinet No. 1034. BRS3344, 1 Aldrich Terrace, London, S.W.18.

Wanted. 1.7 Mc and 7 Mc CRYSTALS and TX gear. Cossor 2-valve, speaker, cabinet, less valves, 4s.—2BZQ, 80 Wyberton West Road, Boston.

ROLA 8-in PM MC SPEAKER, as new, 10s.; also Atlas power pack, AC 200/250, DC 150 25mA, 8 tappings.—2CRJ, "The Laurels," Worrin Road, Shenfield, Essex.

One Carter Genemotor, 12v input, 200v 40mA output, 30s.; one Fay recorder, electric model, 30s.; one 2-valve SW receiver, 13 to 170 m, £1.—Hill, Robin Hood, Catsfield, Battle.

WANTED. Eddystone AW TWO chassis, less valves and tuning condensers (particulars and lowest prices).—J. Jackson, 12 Howard Street, Ancoats, Manchester, 10.

Walnut PORTABLE CABINET, turntable and canvas cover, 25s., exchange. B.T.S. or Eddystone 6-pin coils wanted. GLAdstone 5778.

7-valve MILNES battery all-wave SUPERHET, 4 bands, compl. with Milnes Unit, one 6v and two 2v accs. Perf., £10 or near.—Oatey, 88 Wisbech Road, March, Cambs.

FOR SALE, PHILIPS AW set, tropical finish, 2802. Cost £30; also, large Eliminator; Osram Four. What offers, Bennett, 104 Nottingham Road, Stapleford, Notts.

SW COMPONENTS for sale, including b'spread tuning, reaction cond., aerial cond., HFC and Varley "Niclet" 3.5-1 trans. Lists. Stacey, 325 London Road, Reading.

JB straight line DIAL (illuminated), 2s. 6d.; 3 Ferrocart Coils on base, internal switching, 4s.; UU3 Rect., nearly new, 3s. G3LK, 28a Brunswick Square, Hove, Sussex.

SELL or SWAP 31 copies June '33—Dec. '35 "Bulletin" and 11 1936 "QST's", dozens of articles. Wanted: 200/240 AC 500-0-500, 120mA rect.—G6CB, 7 Caxton Rd., Wimbledon.

SELL. Three .0005 variable conds., 1s. 6d.; Ferranti AF3, 3s. 6d.; Igranic 1:5, 2s.; RI 1:3, 1s.—J. Marriott, 98 Wellington Avenue, Westcliff-on-Sea.

VALVES. PX4, 6L6, 59, 3s. each. 6A8, SP4, MH4, 45, 41MP, 6R7, AC/TP, 2s. each. All O.K.—Hicks, 8 King's Avenue, Muswell Hill, N.10.

For Sale, Two 5-7 m TRANSCEIVERS, port., £3 10s. each; one Interrupter 12 DC up to 250 AC 2 a, 15s.; one W'house Rectifier, 12s. 6d.—Hill, Robin Hood, Catsfield, Battle.

Eddystone EVERYMAN FOUR battery 1-v-2, in black crackle cabinet. New valves and 9-500 m coils. 70s.—2CRJ, "The Laurels," Worrin Road, Shenfield, Essex.

SHORT-WAVE BROADCASTING STATIONS

Abbreviations: S—Sunday; M—Monday; T—Tuesday; W—Wednesday; Th—Thursday; F—Friday; Sa—Saturday.
All times GMT, twenty-four hour system.

M.	KC.	CALL-SIGN, LOCATION, SCHEDULE.
13.92	21,550	.....GST, Daventry.
13.93	21,540	.....W8XK, Pittsburgh, 1100-1300.
13.93	21,530	.....GSJ, Daventry, 1045-1700.
13.94	21,520	.....W2XE, Wayne, Sa, S 1200-1700; weekdays 1130-1400.
13.95	21,500	.....W2XAD, Schenectady, 1300-1700.
13.97	21,470	.....GSH, Daventry, 1045-1350, 1400-1700.
13.99	21,450	.....DJS, Zeesen, 0505-1600.
14.23	21,080	.....PSA, Rio de Janeiro, F 1750-1800; 1st Th of month 1615-1700.
15.77	19,023	.....HS8PJ, Bangkok, M 1300-1500.
16.23	18,480	.....HBH, Radio-Nations, S 1545-1630.
16.84	17,810	.....TPB3, Paris-Mondial, 1330-1500.
16.85	17,800	.....TGWA, Guatemala, not used at present.
16.86	17,790	.....GSG, Daventry, 1045-1350, 1400-0130.
16.87	17,780	.....W3XAL, Boundbrook, 1400-0200.
16.88	17,770	.....PHI2, Huizen, S 1125-1430, M, T, Th and Sa 1225-1430.
16.89	17,760	.....DJE, Zeesen, 0505-1050, 1300-1500, 2150-0350; S 1610-1725.
16.89	17,760	.....W2XE, Wayne, temporarily discontinued.
16.90	17,750	.....ZBW5, Hong Kong, not used at present.
17.33	17,310	.....W2XGB, Hicksville, believed to be discontinued.
19.52	15,370	.....HAS3, Budapest, S 1400-1500.
19.56	15,340	.....DJR, Zeesen, 1300-1400, 2150-0350.
19.56	15,330	.....W2XAD, Schenectady, 1715-2300.
19.60	15,310	.....GSP, Daventry, 2115-0130.
19.61	15,300	.....YDB, Bandoeng, 0030-0700.
19.62	15,280	.....LRU, Buenos Aires, believed temporarily discontinued.
19.63	15,280	.....DJQ, Zeesen, 0505-1600, 2150-0350.
19.64	15,270	.....W2XE, Wayne, 1830-2200.
19.66	15,260	.....GSI, Daventry, 0220-0420, 0600-0815, 1720-2100.
19.67	15,243	.....W1XAL, Boston, 1730-2000 ex. Sa; S 1400-1500.
19.68	15,243	.....TPA2, Paris-Mondial, 0900-1400.
19.70	15,230	.....OLR5A, Prague, Sa, S at 2200, occasionally 1255-1555 and/or 2255-0155.
19.71	15,220	.....PCJ2, Huizen, T 0630-0800; W 1430-1630.
19.72	15,210	.....W8XK, Pittsburgh, 1300-2300.
19.74	15,200	.....DJB, Zeesen, 0505-1600, 2150-0345; S 1610-1725.
19.75	15,190	.....OFE, Lahti, unused at present.
19.75	15,190	.....ZBW4, Hong Kong, not used at present.
19.75	15,190	.....TAQ, Ankara, testing 1030-1300.
19.76	15,180	.....GSO, Daventry, 0600-0815, 2115-0130; Sp. and Port. News 0130-0200.
19.76	15,180	.....RW96, Moscow, mornings and afternoons.
19.78	15,170	.....OZH, Skamleback, afternoons.
19.79	15,170	.....TGWA, Guatemala, weekdays 1745-1845; S 1745-22.15.
19.79	15,165	.....JZK, Tokio, 1930-2100 for Europe.
19.79	15,170	.....SBG, Stockholm, 1600-2200; S 1400-2200.
19.79	15,170	.....XEWW, Mexico, temporarily discontinued.
19.80	15,160	.....VUD3, Delhi, 1230-1730.
19.80	15,150	.....YDC, Bandoeng, weekdays 0330-0700, 0930-1530 (Sa until 1630), 2300-0030; S 0030-0700, 0930-1530.
19.82	15,140	.....GSF, Daventry, 1045-1350, 1400-1700, 2115-2300.
19.83	15,130	.....TPB6, Paris-Mondial, 2300-0115.
19.83	15,130	.....W1XAL, Boston, S 1400-1600.
19.84	15,123	.....HVJ, Vatican City, 1530-1545.
19.85	15,110	.....DJL, Zeesen, 0505-0700, 1300-1400, 1535-2125; S 1100-1300.
19.89	15,080	.....RKI, Moscow, S 1800; 0000 onwards with RW96.
20.04	14,970	.....LZA, Sofia, 1100-1230, 1800-2015; S 0600-2230.
20.08	14,935	.....PSE, Rio de Janeiro, W 2100-2110; Th (ex. 1st of the month) 2000-2030; Sa 2000-2030; 23rd day of the month 2100-2130.
20.38	14,720	.....RWG, Moscow, irregular.
20.64	14,535	.....HBJ, Radio Nations, S 1845-1930; M 0630-0645.
22.00	13,635	.....SPW, Warsaw, 2300-0200.
24.52	12,230	.....TFJ, Reykjavik, S 1840-1930.
25.00	12,000	.....VZSPS, Moscow, between 1100 and 0315.
25.03	11,991	.....RR6, Vitoria, Spain, between 1700 and 2400.
25.08	11,962	.....CB11??, Santiago, between 2200 and 0400.
25.08	11,962	.....HI2X, Trujillo, W and Sa 0100-0315.
25.17	11,920	.....TI2XD, San Jose, 1600-1830, 2200-0400.
25.21	11,900	.....CD1190, Valdivia, 1600-1900, 2100-0000, 0100-0400.
25.22	11,887	.....TPA3, Paris-Mondial, 0600-0900, 1515-2200.
25.24	11,885	.....HP5G, Panama City, 2300-0300.
25.24	11,885	.....TPB7, Paris-Mondial, 0130-0400.
25.26	11,870	.....W8XK, Pittsburgh, 2300-0300.
25.29	11,860	.....GSE, Daventry, 0600-0815.
25.31	11,855	.....DJP, Zeesen, 0015-0350.
25.33	11,840	.....KZRM, Manila, temporarily discontinued.
25.34	11,840	.....OLR4A, Prague, 1855-2130, occasionally 1255-1555 and/or 2255-0155 (this session sometimes taken by OLR5A-OLR5B).
25.34	11,840	.....CSW4, Lisbon, temporarily discontinued.
25.36	11,830	.....W2XE, Wayne, 2230-0300.
25.38	11,820	.....GSN, Daventry, temporarily discontinued.
25.38	11,820	.....XEBR, Hermosillo, 1700-2100, 0200-0400.
25.40	11,810	.....I2RO, Rome, between 0940 and 0200.
25.42	11,800	.....COGF, Matanzas, 1200-0500.
25.42	11,800	.....DJO, Zeesen, not used at present.
25.42	11,800	.....OER3, Vienna, possibly discontinued.
25.42	11,800	.....JZJ, Tokio, see JZK 19.79 m.
25.45	11,790	.....W1XAL, Boston, schedules for Winter not to hand.
25.47	11,780	.....OFE, Lahti, 0605-1705.
25.47	11,780	.....CB1180, Santiago, 2100-0430.
25.49	11,770	.....DJD, Zeesen, 1535-2125, 2150-0350.
25.51	11,760	.....OLR4B, Prague, see OLR4A 25.34 m.
25.51	11,760	.....XETA, Monterrey, 1830-2030.
25.51	11,760	.....TGWA, Guatemala, temporarily discontinued.
25.53	11,750	.....GSD, Daventry, 0600-0815, 1720-2100, 2320-0130, 0220-0420.
25.55	11,740	.....COCX, Havana, 1300-0600 (0500 Mondays).
25.55	11,740	.....HVJ, Vatican City, testing around 1500.
25.55	11,740	.....SP25, Warsaw, see SPW 22 m.
25.57	11,730	.....W1XAL, Boston, Th and Sa 0100-0300 (Pan-American programme).
25.60	11,720	.....CJRX, Winnipeg, 2300-0500; S 1800-0300 (M).
25.60	11,720	.....CR7BH, Lourenco Marques, 1710-2100; S 1500-1900.
25.61	11,718	.....TPA4, Paris-Mondial, 0130-0400, 2300-0115.
25.62	11,710	.....YSM, San Salvador, temporarily discontinued.
25.63	11,700	.....SPB, Motala, 1200 to about 2200.
25.64	11,700	.....HP5A, Panama City, between 1640 and 0300.
25.64	11,700	.....CB1170, Santiago, 1600-2000, 2200-0500.
25.65	11,690	.....“Radio Boy Landry,” Saigon, 0400-0600, 1030-1400.
25.66	11,685	.....XGJ, Hankow, 1200-1230.
25.70	11,676	.....IQY, Rome, 1837-1935, 2000-2030.
26.01	11,530	.....SPD, Warsaw, as SPW 22 m.
26.31	11,400	.....HBO, Radio-Nations, temporarily discontinued.
27.17	11,040	.....CSW2, Lisbon, evenings.
27.27	11,000	.....PLP, Bandoeng, see YDC 19.8 m.
28.30	10,600	.....ZIK2, Belize, S, W, F 0145-0200.
28.48	10,535	.....JIB, Taihoku, around 1400.
28.93	10,370	.....EAJ43, Tenerife, between 1935-0100.
29.04	10,330	.....ORK, Ruysselede, 1830-2000.
29.24	10,260	.....PMN, Bandoeng, as YDC 19.8 m.
29.35	10,220	.....PSH, Rio de Janeiro, M, T, W, Th and Sa, 2300-2400; T 0030-0130; F 2300-0030 (Sa).
30.12	9,980	.....COBC, Havana, S 1155-0500 (M), weekdays 1155-0515.
30.22	9,925	.....JDY, Dairen, Manchuria, 1100-1300.
30.43	9,860	.....EAQ, Madrid, evenings.
30.51	9,833	.....COCM, Havana, S 1300-0200 (M); weekdays 1300-0430.
30.52	9,830	.....IRF, Rome, 1710-1800, 2300-0025, 0030-0200.
30.80	9,740	.....CSW3, Lisbon, evenings.
30.90	9,710	.....COCQ, Havana, S 1155-0530 (M); weekdays 1200-0600.
30.93	9,700	.....“Radio Martinique,” Fort-de-France, 1615-1745, 2300-0100.
30.94	9,690	.....LRA1, Buenos Aires, M to Th 2300-0200; F 2100-2200 and 2300-0200 (Sa); S, M and Holidays 0000-0200.
30.94	9,690	.....TI4NRH, Heredia, 0200-0300.
30.95	9,690	.....ZHP, Singapore, 0940-1440, also Sa 0525-0640; S 0340-0640.
30.95	9,685	.....TGWA, Guatemala, 0300-0430.
31.06	9,660	.....LRX, Buenos Aires, 1430-0330; S until 0430.
31.09	9,650	.....CS2WA, Lisbon, T, Th, S 2000-2300.
31.11	9,645	.....HH3W, Port-au-Prince, 1800-1900, 0000-0200 (or 0230).
31.12	9,640	.....CXA8, Colonia, 2330-0500.
31.13	9,636	.....I2RO3, Rome, used in Winter only.
31.13	9,636	.....JFAK, Taihoku, 0600-0730, 1300-1525; S 1300-1515.
31.15	9,630	.....HJ7ABD, Bucaramanga, 1600-1800, 2300-0330.
31.21	9,612	.....HJ1ABP, Cartagena, between 1200-0330.
31.23	9,607	.....HP5J, Panama City, 1700-1830, 2330-0330.
31.23	9,606	.....ZRK, Klipheuvel, S 0830-0930, 1030-1200, 1400-1645; weekdays 0445-0550, 0820-1220, 1400-1645.
31.25	9,600	.....XEYU, Mexico City, around 0100.
31.25	9,600	.....RW96, Moscow, 2300-0130 (or later).
31.28	9,595	.....PCJ, Hilversum, S 1825-0225 (M); T 0000-0130, 1845-2050; W 0000-0315; Th 0000-0300.
31.28	9,590	.....VUD2, Delhi, 0130-0330, 0630-0830.
31.28	9,590	.....VUD3, Delhi, 1330-1730.
31.28	9,590	.....VK6ME, Perth, M to S 1100-1300.
31.28	9,590	.....VK2ME, Sydney, 0530-0730, 0930-1330, 1430-1630.
31.28	9,590	.....W3XAU, Philadelphia, 1600-2400.
31.32	9,580	.....VLR, Melbourne, S 0500-1230; weekdays 0225-1330; Sa until 1400 and 2200-0330 (S).
31.32	9,580	.....GSC, Daventry, 0220-0420.
31.35	9,570	.....KZRM, Manila, M to F 1000-1400, 2130-2300; Sa 1000-1500, 2130-2300; S 0900-1600.

(See note on page 30)

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