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# SHORT-WAVE MAGAZINE

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

NOVEMBER

1938

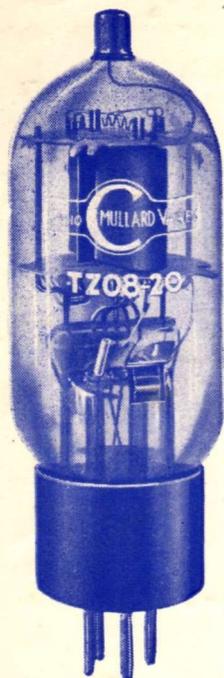
VOLUME II

NUMBER 9

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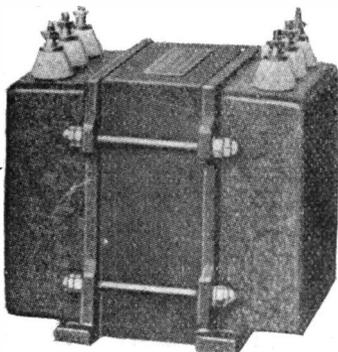
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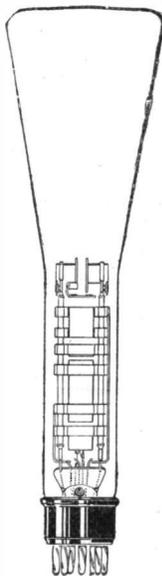
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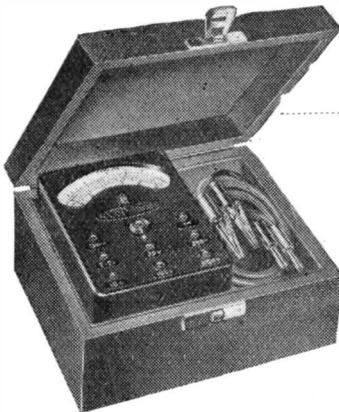
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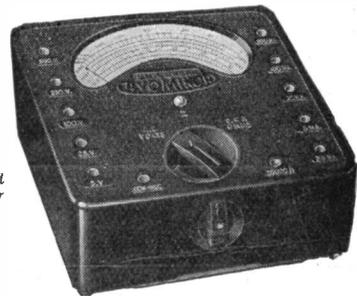
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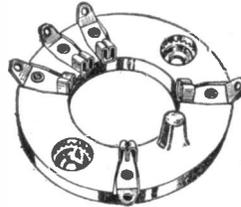
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# THE BRITISH MANUAL OF AMATEUR RADIO

by

AUSTIN FORSYTH, G6FO

(Editor, "The Short-Wave Magazine")

It has now been decided to publish "The British Manual of Amateur Radio" early in the New Year, about the end of February. The date is being deferred to ensure the presentation of some entirely new material, and to bring the book up to date in all respects. Sections for the listener will be added to or enlarged, so that the Manual will be a complete work of reference for all interested in any aspect of Short-Wave Radio.

As reservations have already exceeded the printing order first decided upon, this also is to be increased.

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The  
**Short-Wave Magazine**

No. 9, Vol. II.

NOVEMBER, 1938

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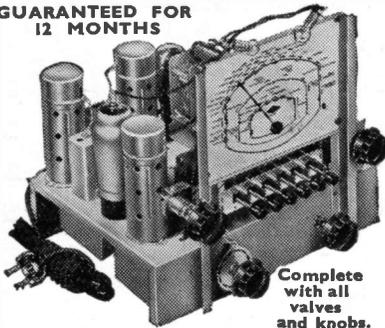
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## Status—and Status Quo

ABLE ONCE MORE to follow the paths of peace, this is an opportune time to look more closely into the position of the radio amateur in relation to National Defence.

It is said that the formation of the C.W.R., as it was on the establishment of the R.N.W.A.R. just six years ago, implies long-awaited official recognition of the amateur. But we have never believed the authorities to be blind to the potential value of the hundreds of very competent amateur transmitters in this country—and there are thousands not so competent—even if at the moment this worth is only assessed at the rate of £2 a year and a free crystal in the case of members of the Civilian Wireless Reserve, and rather less for those who belong to the Naval arm. Luckily for the authorities concerned, amateurs are willing to be trained under these conditions in time of peace in preparation for the demands which would be made on them in war—which speaks very highly both for the patriotism of the amateur and his love of the game of Amateur Radio.

In the misty atmosphere of high official circles, there are two opinions on the transmitting amateur: That he is an infernal nuisance and causes a lot of interference, opposed by the more enlightened view that England cannot have too many young people who become proficient in radio transmission for the sake of it.

Turning to the recent Crisis and the gaps it disclosed in our arrangements for national defence, one direction in which remedy is imperative is in the ordinary telephone service. Trunk lines suddenly became overloaded to the extent that business and private long-distance calls were delayed anything up to twelve hours. As has been said elsewhere, it is this kind of thing which does the greatest damage to the morale of the civil population. It suggests official incompetence and general disorganisation.

We therefore offer the idea of an Emergency Communications System, using radio and amateur operators, by which some of the less important public traffic could be handled, thus to some extent relieving the GPO lines of the heavy burden they would be called upon to carry in conditions similar to those of Sept. 26-30. It is quite certain that the GPO will have to do something to improve internal communications, and in view of the fact that extra lines are expensive and would not normally be necessary, while the whole overhead-line and exchange system is extremely vulnerable, a radio network for "second-class" traffic would not only be cheap but also of obvious strategic value.

\* \* \* \* \*

RECENT ISSUES of our respected contemporary, THE WIRELESS WORLD, have contained comment on the amateur licensing situation with which we must regretfully confess that we are somewhat at variance.

While on certain points we are in full agreement with them—many of those they raise we have, in fact, been discussing for months past—we consider that they have seriously under-estimated the value and importance of the AA Licence as a means of gaining technical knowledge and experience and that, apart from any question of altering the basis on which licences are granted, the existing system of "AA graduation to full permit" cannot be improved upon. We might almost say that the high standard of British Amateur operating and technical ability is due to this very system, unique in the world of Amateur Radio.

THE WIRELESS WORLD in effect demands that licences be issued on a quantity basis. We not only consider that AA facilities are now easily obtainable by any reasonably intelligent person with the merest smattering of knowledge, but also that it is most important in the interests of all concerned that those coming on the air should have served their probationary period with an "Artificial Aerial" licence.

As to the specific point raised by THE WIRELESS WORLD in regard to the experimental value of amateur work, our only comment is that their example is about the least effective they could have chosen. Service and GPO ultra-short-wave links now established, after months of preliminary investigation, are operated over distances which five years ago would have been regarded as "local" by amateurs. Amateur 56 Mc research has long been devoted to the investigation of propagation not over tens but over thousands of miles.

*Arthur Joseph  
C.B.S.*

# Transmission for Beginners—9

By A. A. Mawse

IF ALL EXPERIMENTS have been followed in this series the suggested step to be taken now—conversion of our crystal oscillator/tritet to an electron-coupled oscillator—should prove a simple task. We must, however, stress the first word (the “IF”) because reference to and knowledge of the second article (April last) is most essential.

It may have been possible, while dealing with a crystal-controlled transmitter, to check for frequency by monitoring with a receiver; perhaps reliance has been placed upon the crystal-supplier’s certificate and the fundamental signal discovered by suitable pick-up between transmitter and receiver (or frequency meter). The problem of monitoring and frequency checking is more acute when the finding of harmonics becomes necessary, but by making careful tests, true harmonic working is quite simple.

## ● Important !

To those who have got thus far without calling into use an absorption meter let me once again urge the *real* necessity of constructing one forthwith. The components required can usually be found among the oddments store, and if built along the lines given under the heading “Finding the Band” (page 15, April and page 14, May) it will certainly save much doubt and anxiety.

The heading quoted in the foregoing paragraph applies particularly this month, as we shall see later. How easy it becomes when an absorption wavemeter is available! To find if the fundamental frequency is being obtained, it is only necessary to hold the hand instrument near the circuit under test, rotate the condenser and, after getting a glow in the lamp, gradually withdraw the meter until a point is reached where its tuning is as sharp as possible. From a chart previously prepared by aid of the receiver this reading resolves into a frequency, rough in terms of kc but unerringly accurate in locating the band—and that’s the end of it, for the absorption wavemeter will not respond to its own harmonics. It will only check a circuit in which RF is evident.

## ● ECO, a practical discussion

Although, as has been mentioned, the idea of changing frequency is useful and very interesting, there are a number of points to grasp first. 7 Mc is about the limit for the cathode side of the ECO oscillator, but for the time being 3.5 Mc will be used.

It is, generally speaking, quite impracticable to operate an electron-coupled oscillator with both its cathode and plate circuits tuned to the same frequency. To do so nearly always results in a very bad note, overloading of the valve, and drifting of the frequency, to mention only a few of the most obvious evils. The whole idea of using ECO drive is to provide a source of stable frequency control which, while being variable in terms of kc, is yet absolutely constant when set.

In practice, therefore, it is usual to put the cathode side on, say, 3.5 Mc and take off the required drive on 7 Mc from the tank side. If 3.5 Mc

drive is wanted, then the cathode side goes on 1.7 Mc. In the case of 14 Mc ECO operation, it is usually possible to get enough fourth harmonic output—14 Mc from 3.5 Mc—to excite either a small PA or a buffer amplifier; this is the best thing to do. If a really stable circuit is used, it is sometimes permissible to put the cathode of the ECO on 7 Mc, taking out 14 Mc drive by doubling in the usual way.

The next point to be made clear is that, in the interests of stability, the ECO must always be loaded as lightly as possible, i.e., too much draw, even when it is working “harmonically,” will upset the stability.

Thirdly, ‘phone with ECO. This is, strictly speaking, a pernicious practice, unless the modulated stage is removed at least twice from the ECO driver. That is, modulation on the PA in an ECO-FD-PA rig is permissible on 3.5 Mc, but unwise on 7 Mc. On 14 Mc, it should be illegal. The reason for these strictures is that in amateur working it is usually desired to get deep control (modulation). Under these conditions, the stability of the ECO can be affected by a heavily modulated PA even when there is a buffer amplifier in between. This is, of course, more marked the higher the frequency.

Hence, it is clear that ECO should be used with extreme caution under actual radiating conditions, and, unless the greatest precautions are taken, for CW only. If ‘phone must be used, then there should be at least one stage, and preferably two, between the modulated valve and the drive. Also, the ECO must be very lightly loaded, and it should always be regarded primarily as a source of stable frequency, and nothing more.

The remarks of “Old Timer” in the current issue give point to all the above—read them!

## ● Tuning and Adjustment

As G5RK pointed out when offering the suggestion of switching from CO to ECO “. . . it should not be attempted without using a frequency meter.” This is perfectly true in that off-band signals are very easily produced, but first of all we must be sure that the band actually required is being obtained.

This will become clearer if a brief summary of tuning the ECO is given. (The PA may be disregarded for the time being.) First, short out the cathode coil and run the stage as a 7 Mc CO (page 32, August) and check up with the absorption meter; this part of the circuit will not then have to be touched again for our immediate adjustments, which are to show how the crystal is used to set the tank side in the band before changing over to ECO.

The second operation is to insert a 3.5 Mc coil (17 turns, tapped two turns up from the earth end, same diameter, and construction as before) in the cathode circuit; switch to “ECO” and tune this coil until best RF is indicated by holding a loop against the *tank* or output; there will be very little RF indication in the cathode coil. To make sure that the tank side is in the band, check up with the 7 Mc

Showing the switching circuit of Fig. 1. The control is brought out to the front sub-chassis panel.

reading of the absorption meter. (This cannot be done with a receiver, or frequency meter, in the thirty seconds possible with the absorption instrument!)

Finally, monitor with the frequency meter or by harmonics on the receiver and vary the cathode condenser slightly until the best note is obtained, watching all the while for RF at the plate coil.

One of the main difficulties in ECO operation is the getting of a clean note. The ideal is, of course, a pure DC T9 effect, with the authentic crystal "ring." This may not be quite obtainable, but the output must be pure DC and absolutely steady. It will be found that slight variations of the cathode and tank condensers will affect the quality of the note, and stability will depend largely on the tank

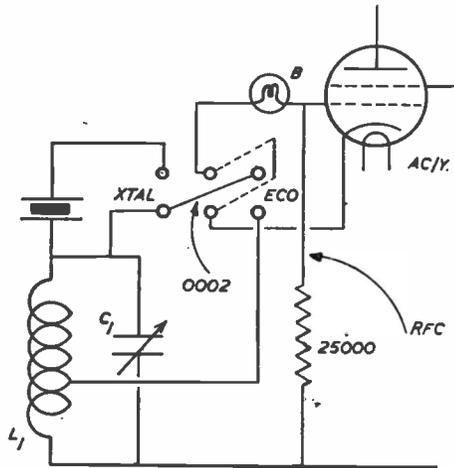


FIG. 1.

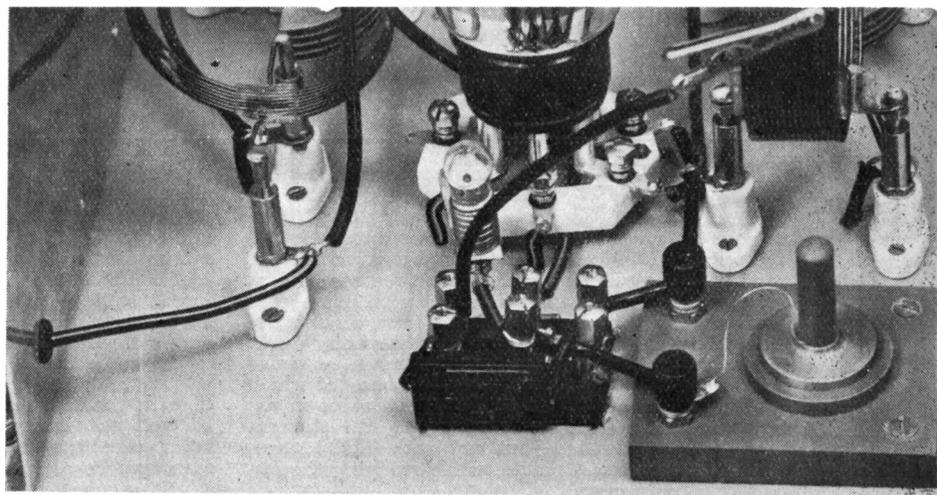
ECO-Tritet change over switching. With some valves, better output and a cleaner note are obtained by inserting a .0002 mF condenser and an RF choke at the points indicated. Either a Hivac AC/Y or AC/Z can be used.

side being lightly loaded. Any roughness in the ECO output, however insignificant on the monitor, will be seized upon by the PA, or other succeeding stage, and gleefully magnified out of all proportion to its true percentage in the ECO signal by itself.

### ● Changing Frequency

We are now able to change frequency within wide limits by moving the cathode condenser and re-tuning on the tank side, if the frequency change exceeds about 50 kc. This figure depends on a number of things, and implies that there is a certain range of variation possible on the cathode tuning which does not affect tank output noticeably. But find out whether you are inside the 7 Mc band first!

It is this *changing of frequency within the band* which makes the provision of an accurately calibrated frequency meter so essential. An absorption



wavemeter only finds the band—the frequency meter sets the transmission on the required spot in terms of kc. The functions of these two instruments are independent and are not interchangeable, as it is not possible to construct an absorption wavemeter which can be calibrated to anything like the accuracy of even a poorly-made frequency meter of the ordinary type. The reason why the latter cannot also be used for checking the band is, of course, because it responds not only to the fundamental but also to harmonics.

Meter indications, with the tank side tuned, show a ten per cent. drop in power at the optimum setting of the cathode circuit, as against a switch-over to straight CO. This can be compensated for because latitude for drive variation to the PA is provided in the coupling method described last month. Another point to remember is that in ECO working a similar effect to CO operation is evident, i.e., maximum glow in a loop-lamp at the tank corresponds with lowest reading on the plate mA meter. Directly RF falls off through variation of the cathode setting it is necessary to move the tank condenser, to re-tune it to the corresponding frequency, which will again give minimum mA.

Slow-motion dials, the adjustment of which can be accurately noted, will be necessary if it is intended to carry ECO frequency changing to its limit, and although there is no reason why the circuit given should not work well with the cathode side on 7 Mc, it will be advisable to disregard this possibility until the indications and adjustments for stable output and a clean note are thoroughly understood. When all this has been tried, the PA may be switched on and tuned exactly as already explained for straight CO or tritet drive. Make sure there is no tendency for creep or chirp on the note, and key the screen of the ECO only.

### ● Constructional Details

This completes our description of ECO working and those interested will no doubt like to know about the constructional alterations as applied to the present transmitter. Main considerations are a good low-loss DPDT switch (the Wearite rotary type has been used here); and secondly, the mounting position is important.

With a view to keeping the wires involved nearly as short as before, a hole was cut in the base behind the AC/Z, the switch then mounted to an angle bracket and the whole fastened with two wood screws to the underside with only the terminals protruding. An extension outfit through an Eddystone bush gives front control by the usefully-shaped knob supplied with the switch.

## A. A. MAWSE

The amplifier described last June (page 26) is still in operation. Apart from its connection with the original 1.7 Mc transmitter, it has given faithful service for reproducing gramophone records and as an amplifier for the Class B receiver in use at the station. Now, however, it is to form an integral part of the CO PA transmitter for telephony work.

The method to be tried first is known as choke control or Heising modulation, the bones of which system are shown in Fig. 2. The final valve in the amplifier is the modulator while the PA stage is that to be modulated—but not with ECO! Now for a few theoretical points, while studying the circuit until next month.

### ● Modulation, an introduction

It will be seen that voltage fluctuations corresponding to speech, built up in any previous stage and produced at the grid of the modulator, in turn cause corresponding variations in the modulator plate voltage since the grid of this valve controls its plate current. Now, transferring these voltage changes to the PA plate will have the effect of causing the steady carrier generated by the PA also to be varied in accordance with the speech frequencies which these fluctuating voltages represent. This will be better understood on careful reference

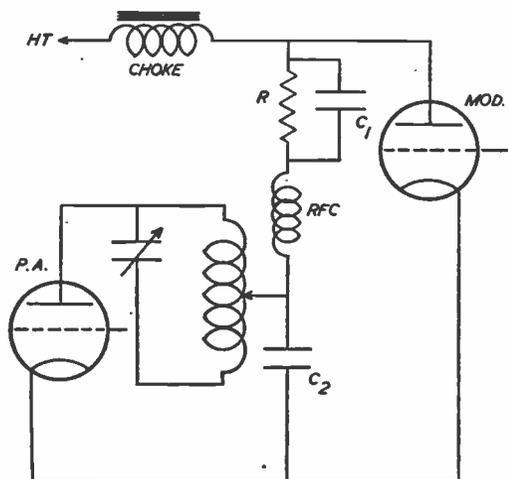


FIG. 2.

Fundamental circuit for choke control modulation. The choke should be 15 henry, and capable of carrying the plate current for both PA and modulator valves. C1 is 2 mF, C2 is not more than .002 mF, while the value of R is best found by experiment as discussed in the text.

to Fig. 2, which shows that modulator and PA HT supplies are common. Create a disturbance in one, and the other is affected.

The manner in which the voltage changes at the modulator plate are transferred to the PA should also be clear from this circuit, i.e., the function of the speech choke in the common HT lead. This LF choke presents an impassable barrier to voltage variations at audio frequencies, hence any change at the modulator anode is reproduced at the PA plate. The importance of the speech choke will now be evident; it must be large enough to carry the plate

current for both valves while maintaining its rated inductance of not less than 15 henrys. In low-power transmitters, a value of 15-20 henrys at 100 mA is suitable, and any choke of about this rating can be used.

The RF choke obviously has no effect on the speech voltage variations, which pass it without let or hindrance, but it serves to keep stray RF out of the modulator side. C2 must not be too large, or the audio frequencies will be by-passed to earth.

With reference to R, C1—if the voltage fluctuations at the modulator anode are occurring, say, as 100-volt peak swings on a steady HT supply of 400 volts, then the same swing, as we have already seen, will be caused at the plate of the PA. Now, a voltage change of 100 volts in 400 will not give very much modulating effect on the carrier. Taking very round figures, and assuming a "straight line" relationship for the purpose of explanation, we might say that the 100-volt change in 400 produced 25 per cent. modulation. If, now, the plate voltage at the PA could be reduced to, shall we say, 200 volts, and that same 100-volt swing applied, then it is obvious that the depth of modulation would be considerably increased, since the *percentage change* is so much greater.

This, then, is the function of R. First, the modulator valve is driven to give its maximum possible output without distortion; this is the starting point. It may be a triode capable of 25-watts audio output power when fully loaded or, as in this case, a small pentode giving 3-5 watts audio.

Then, a variable power-resistor R is introduced in series with the lead to the PA from the modulator, and this resistance is adjusted till the voltage relationship between modulator and PA reaches the point where deep modulation is obtained. This can be checked quite easily by listening on the frequency-meter or receiver till the carrier is heard to be "full of speech"—about the roughest test imaginable, but still a useful indication. The check must of course be made on an oscillating pick-up, i.e., with the frequency meter or with the receiver in oscillation, so that a "picture" of the carrier can be heard with the speech effect at the same time. This will be no check on *quality*, as the result will be similar to that obtained on an oscillating detector in ordinary reception. The actual speech as it is going out can be listened to on a non-oscillating pick-up, such as the 'phone monitor described in the July issue under this heading, or on the receiver, used as it would be for ordinary telephony reception.

Having arrived at the setting for R, it will be found that the PA input is down on the full CW output position. This is quite normal, and indeed obvious, because it will now be evident that what governs the depth of modulation obtainable at a given steady carrier input is the size of the modulator valve. If it gives only three watts audio power, then the RF carrier which can be fully modulated will not be more than six or seven watts.

Finally, the function of C1. As the resistor R will have some blocking effect on the voltage variations at audio frequencies, C1 is put in parallel to carry them over. For 10-watt transmitters, operated at 400-500 volts, R should be 5000 ohms, 10-watt rated, with provision for variation. The Varley type CP62 is very suitable. C2 is .002 mF maximum, C1 2 mF, and the speech choke can be any good make of about the rating already given—15 henrys at 100 mA.

# Conditions—The Month's Survey

## Notes and News from India

### Reported by VU2EU

*The purpose of this new feature will be to describe how short-wave conditions have varied during the past month, and to give, whenever possible, some idea of the causes of any fade-outs or spells of poor results which may have occurred. The period covered will be the month ending on the 15th of that prior to the issue of the Magazine, and the present article therefore deals with conditions from September 15 to October 15.—EDITOR.*

AT THE BEGINNING of this period a very severe ionosphere storm was in progress. This had commenced on September 12, and at first only the more northerly transmission paths were affected, but gradually the area of the storm was extended outwards from the poles. The peak was reached on September 15, by which time very little long distance reception was possible after dark on frequencies above 9 Mc, those transmission paths lying in an East-West direction being the worse affected. Even during daylight on this day, reception was very poor, especially on the higher frequencies. A small magnetic storm was also recorded in this country and the Aurora Borealis was seen in Canada.

As there were very few sunspots visible, and none in a position near the sun's central meridian, one can only assume that the cause of this storm was an active area which crossed the central meridian but which, nevertheless, could not be seen. Now, here is a very interesting point. If there were such an area a day or two past the central meridian, it would be expected to reach there again on its next rotation about October 9, and possibly cause another ionosphere storm two days later. On October 5 a large sunspot group appeared—coming round the sun's east limb—and, though its position did not quite coincide with the previously suspected area, it was very near. It crossed the central meridian early on October 11 but, strangely enough, had not given rise to a further disturbance by the evening of October 13. Perhaps this was because its period of activity had already passed before it reached the meridian.

#### ● Variations after September 17

Conditions became normal again on September 17, and, apart from a short period fadeout on September 20 (believed to be due to a chromosphere eruption) continued so until September 25. On that day a fairly large group of spots crossed the central meridian, followed by another group on September 27. From September 26 till October 3 conditions were generally poor and erratic, particularly after darkness, when flutter fading was prevalent. This was, we think, caused by corpuscles emitted by the sunspots as they crossed the central meridian.

From October 3 to 6, conditions were much more stable, but on October 7 and 8, another slight deterioration became evident. This coincided with a magnetic storm which started on October 7, but, as has already been said, the large sunspot

*(Continued at foot of next column.)*

Conditions have been erratic on 14 Mc, and at one time (during September), only ZS could be heard. LDUC, the Ellsworth 1938-'39 Antarctic Expedition on the "Wyatt Earp," has shown up on 14000 kc, with W2MQ and VE21C at the key.\*

VU2FO, whose several previous calls were mentioned in the October "DX Corner", is on DC mains. He and several other VU's are interested in 56 Mc, but so far nothing is known of their activities.

VU2FU is a new 'phone in Bombay, on about 14200 kc, and can be QSL'd via VU2LK, who now runs the QSL Bureau for India. Other stations active on telephony are VU2DR, VU2CA, VU2CQ and VU2FS, while XZ2DY represents Burma. VU2AN will be joining them as soon as he gets his new crystal for the HF end of 14 Mc.

7 Mc is practically hopeless in India during the hot weather, but there will be activity on this band a bit later on. A good DX season on 14 Mc is predicted, and VK's, XU's, ZL's and J's are beginning to break through; J5CC is the most consistent of them.

On 28 Mc, VU2EU is active and looking for DX, and both he and VU2ED are carrying out aerial tests.

Readers in India, Burma or Ceylon, whether listeners or transmitters, are cordially invited to provide material for these notes—it is hoped to establish them as a monthly feature—by getting in touch with VU2EU, W. H. G. Metcalfe, 3rd Indian Divisional Signals, Meerut, U.P. not later than the 5th of each month for the following issue.

\* [We shall be glad to know if anyone in England has yet logged LDUC.—Ed.]

#### Useful Pamphlet

Many of our readers must be interested in "Avo" instruments, as the range covers every conceivable requirement in test and service work. We have just seen a copy of a small comprehensive folder, available free on request from Messrs. The Automatic Coil Winder and Electrical Equipment Co., Ltd., Winder House, Douglas Street, London, S.W.1, which gives main details of over a dozen essential meters of various types. All "Avo" products have long been known as setting a standard in their particular field.

group had not reached the central meridian on that day, and it seems doubtful if it can have caused these two phenomena.

Short-wave conditions were steady again by October 9, and have continued so. It is interesting to note, however, that winter darkness conditions seem to have set in earlier than usual this year. It will be noticed, for instance, that even when conditions have been stable, North American stations on frequencies above 9 Mc have faded out between 2130 and 2300 GMT. This seems to uphold the view that the maximum of the solar cycle is already past.

# CORRESPONDENCE

The Editor invites comment on the views expressed.

## LF end of 14 Mc

The warning of Cairo is that we may in the future see many of our amateur frequencies taken away. Disuse of a band, or parts of it, cannot fail to be seized upon as an excuse. It is therefore regrettable that the LF end of 14 Mc is so sparsely populated; for no good reason, there has been a drift to the HF end by amateurs all over the world, entailing needless QRM. The remedy is obvious, and I think you would do Amateur Radio a service if you sponsored a "rush to the LF end."—E. H. Cox, Capt., R.A., G3CT, R.A. Mess, Woolwich, S.E.18.

[In spite of the fact that our own QRP is at the LF end, we agree that the QRM situation on 14 Mc might be eased somewhat by better distribution over the band. It is certainly essential that for the next few years full use be made of all amateur frequencies, from 1.7 Mc upwards.—Ed.]

## Plea from Palestine

I do wonder why so much space is devoted to the "Calls Heard" section, for I do not see any valuable information in it, but may I dare to ask you: Why all of the description you are giving, either transmitters or receivers are entirely for battery operation, and I do hope that those who are having an AC QRA with no QRM at all would like to build an AC operated receiver or transmitter. Owing to the fact that a Ham spirit has found its home in my body and soul, I would like to build for me a small receiver which will surely work FB.

I shall be delighted to see a circuit of a 0-v-2 with American tubes, as these tubes are much easier to get, and I hope that the overseas readers will agree with me, and this 0-v-2 should be able to hook-up a station from 5 to 180 metres, for much DX can be done with a small set having such a coverage. It should use plug-in-coils and should be built complete for itself for AC mains, 230 volts.

If any of our overseas readers care to drop me a line regarding Amateur Band reception and transmission, I shall be delighted to exchange views and things with him.—REUVEN SOKOLOVSKY, 4 Nachlat-Benjamin Str., Tel-Aviv, Palestine.

[Thank you, OM. We value your suggestions and wish you luck in Amateur Radio.—Ed.]

## Straight v. Superhet

Why does Mr. Paint, in the October issue, support the superhet so readily? To my mind, the straight battery set is the very best receiver one can have for DX. A local amateur has been using an American communication superhet, and borrowed my 0-v-Pen while I was away. I had great difficulty in retrieving it on my return, and he has since built one similar to mine, which he says he would far rather use than the communication receiver. I might add that I entirely agree with Mr. Roffey's letter in the same issue, about 56 Mc and the cutting down of the "DX Corner" and "Have You Heard?"—D. SCOTT-JOB, 2DBW, 13 Mayfields Close, Wembley Park, Middlesex.

## Suggestion and Criticism

"On the Amateur Bands" and "DX Corner" devote space to much the same material. Could they not be combined under the title of "Band Activities"? Each band could have its own sub-heading, so that information on those in which one is interested could be picked out easily. No "Calls Heard" should be accepted unless full details are given, while Club history and news are not of much value, especially as the activities are past; but future notices might be useful.

I should like to point out an error on p. 24 of the October issue, where it is said that images are found separated by the intermediate frequency of a superhet receiver. Surely this should read twice the IF? And what is this "accurate frequency" business, on which there is so much disagreement in the DX Corner? While on this subject, would it be possible to give some marker stations for the 14, 28 and 56 Mc bands?—W. H. PIERCE, 6 Glanfield Road, Beckenham, Kent.

[DX Corner is concerned mainly with results of DX listening and the pooling of information on everything relating thereto; Amateur Bands, on the other hand, deals with the use of them by transmitters, and DX results are only incidental to a discussion on, say, QRP or aeriads.]

With regard to the slip about image reception, we of course accept the correction with bowed head. In the example given in October's DX Corner, the BC station would have to be on 15,200 kc for its image to appear on 14,300 kc, assuming an IF of 450 kc.

The information on amateur frequencies offered by readers is published to assist in the location of DX stations, and obviously not for calibration purposes; the trouble is that these stations often change frequency.

Reliable markers for 14 Mc are JNJ, 13,945 kc, and WIK, 13,930 kc, while "Have You Heard?" in this issue gives several BC stations between 26 and 31 Mc. When 28 Mc is open, it is usually alive with signals, and cannot easily be missed on a receiver tuning over ten metres; see DX Forecast. There are no markers available for 56 Mc, but this band can be roughly located on an oscillating detector by looping one end of 8-ft. of wire near the grid coil, when variation of the tuning will disclose a point at which oscillation ceases sharply, starting again when this setting is passed. The "hole", due to the resonating effect of the 8-ft. aerial, will be at about 5 metres.—Ed.]

## Are we misunderstood!

I have become rather alarmed at the tendency of your publication to support and encourage the unlawful use of high power in the newer stations. This I think is deplorable, and I am in full agreement with 2CCD's remarks, as published in the September issue. There are plenty of G3's and G8's on 7 Mc who daily do great work on less than 10 watts, many of them with only a CO to feed the aerial.

"Old Timer" says that the average power pack installed by new stations nowadays gives 1000 volts. There are eight stations in this town alone, and none of them have more than 350 volts.—R. L. PLUCK, 2DIC, 9 Prospect Road, Southborough, Tunbridge Wells, Kent.

[We hope that precisely the opposite tendency is evident as the policy of the Magazine, and that our concern for the observance of the law and the ethics of Amateur Radio is equally obvious. 2DIC's assertion as to the purity of Tunbridge Wells in this respect is therefore most welcome.—Ed.]

(More letters on page 13.)

November 1938

# The Other Man's Station

G8LP



THOUGH H. G. HANLEY, 20 Uplands Avenue, Bradmore, Wolverhampton, is now signing G8LP, he is actually an old-timer who commenced transmission shortly after the War.

In those days, when prefixes were not needed, the call was 5AW and, apart from a powerful buzzer which would splash a signal about three miles when put in series with the aerial, the transmitter was a single-valve self-excited affair working on 200 metres; in 1922, this gave QSO with Denmark using 0.8 watt into one of the old Cossor valves with a hooded anode. Then 5AW went QRO to five watts, whereupon the hood got white hot and finally fell off! Another of his experiences about this time was participation in the famous Trans-Atlantic Tests on 200 metres, when Paul Godley was commissioned by the A.R.R.L. in December, 1921, to come over to England and see if he could hear American amateurs. While Godley shivered in his tent up in Scotland, 5AW was bringing them in on a variometer-tuned detector with one stage of noise.

Back on the air in March, 1937, after 12 years' inactivity, G8LP started with a two-stage '59 tritret-'46 PA CC transmitter and 20 watts input; he was WAC on 14 Mc in two months, the receiver being the MAGAZINE Class-B One-Valve, first published at that time.

The photograph shows the present equipment: RME-69 receiver, crystal microphone with Class-B set just behind, the plug-board for phasing and changing over the various centre-fed aerials, and the rack-type transmitters and power supplies. The big set is 6L6-T20-T55, with a class-AB modulator, and the transmitter on the extreme right is the '59-'46 rig, class-B modulated with a pair of 53's. A neat, attractive and efficient layout, and the cards show that the signal gets there.

G8LP's main interest is in aerials, with which he has done a considerable amount of work. The stand-by is a  $\frac{1}{2}$ -wave top centre-fed with 72-ohm line, which he finds excellent for general operation on 14 Mc. About 70 countries have been worked to date.

## CORRESPONDENCE—continued from page 12.

### CW on the National 1-10

It may be of interest to owners of this set to know that it can be converted into a reasonably efficient straight CW receiver by putting a 3-megohm leak in parallel with the existing 20-megohm grid resistor. It is also advisable to disconnect the hiss filter, but this is not essential.—DAVID MITCHELL, GW6AA, The Flagstaff, Colwyn Bay, N. Wales.

### Forward, Wigan

I would like to get in touch with SWLs and transmitters in the Wigan district with a view to forming a club. I am also willing to stand by for tests on any band from 1.7 to 56 Mc, and would be particularly glad to hear from transmitters in the Lancashire area using five metres. My receiver is a Magazine 0-v-Pen for 56 Mc, and a home-built 6-valve SS superhet for the other bands. I can fully endorse the opinion of 2FIK regarding IF regeneration in superhets: the increase in sensitivity and selectivity is remarkable.—F. J. RUTTER, 2FMF, 324 Wigan Road, Standish, Wigan, Lanes.

### Not Good Enough

Certain firms want reminding of their slackness. I have been waiting 10 days for an estimate from a large concern for a ten-watt transmitter; the same firm took a fortnight to deal with a simple enquiry about crystals. In another case, my cheque was accepted (and passed immediately), but I had to wait three months for the goods and collect them through a solicitor. A third concern advertised a piece of apparatus as "second-hand, but perfect," but it arrived quite unusable. My latest experience is to be informed that goods never received by me were sent on such-and-such a date.—A. J. HILL, G3RC, Robin Hood, Catsfield, Nr. Battle, Sussex.

### Reports, Please

I should appreciate SWL reports on my 7 Mc 'phone transmissions—frequencies 7080, 7106 and 7160 kc. Regarding Calls Heard, I also would like to see more reports of G calls logged overseas, and consider that printing scores of W's is a waste of valuable space.—R. L. CASTLE, G6CB, 7 Caxton Road, Wimbledon, London, S.W.19.

# On The Amateur Bands

By Old Timer

THOSE OF US who are interested in DX will know the anxiety and impatience with which we wait for some other station to finish a contact with an unusual country. This is natural, but it should not lead to the sort of behaviour which is now very prevalent. We deplore the tendency to "sweep" an electron-coupled oscillator on top of a station working the rare country before he has finally finished the QSO. Ask yourself: Would you intentionally interrupt a conversation between two people by "butting in" and preventing one of them from continuing? We hope that you would know better!

How much more is this an ill-mannered action if we put 250 watts on top of a 10-watt signal—what hope has the 10-watter of finishing his contact? Let us resolve to wait with patience until the final "VA" is sent, before settling on the desired frequency. It is equally important, however, that the station in contact should not send "VA" until he means it, otherwise resultant QRM will be *his* fault.

If we are lucky, make our contact, and then have no more interest in the DX station, it not fair to continue to use that same frequency to which we have QSY'd, especially when this frequency happens to correspond with that of the DX station. To call "Test" immediately afterwards merely means that we are swamping his "CQ." This latter point has been brought about by the modern tendency of calling a station on his own frequency, with the result that the unfortunate DX operator may end the evening by having a dozen ECO's on top of him, the majority of which will probably not be stable, and the most selective of receivers cannot cope with such a condition.

## ● Stability of Signals

There is no doubt that this intense interest in DX working on 14 Mc has taken us back a step or two from an experimental point of view. The desire to grab new countries at all costs has produced an alarming number of unstable ECO's, and we feel that we shall not be contradicted in saying that it is the sole reason for the indiscriminate use of this method of frequency control. Most of the operators employing ECO drive have at least one crystal for alternative use, but many of them do not, or cannot, produce a note which sounds anything like the good T9x that used to be heard from their stations. Contests bring forth quantities of chirps from hurriedly constructed oscillators, and the contestant at the other end is so anxious to make a quick contact that he reports the signal as T9 without even thinking.

Just two years ago the 14 Mc band was beginning to sound musical, the notes were good and clean, and the general technical advancement had reached a high level. British signals set the standard throughout the world for stability. Then, technical data was published on the "easy" construction of the ECO to give a T9 note "equal to any CO".

Unfortunately, the hams showed themselves to be utterly untechnical and just could not produce that T9x signal that the data promised them—the old crystal had hidden their technical shortcomings and had ironed out the chirps, but the ECO showed that it is necessary to know what happens in an oscillator before you attempt to make it drive the PA.\*

We feel that it is bad practice to do anything which can be considered as a retrograde step—if you cannot put out a really steady *keyed* note from an ECO, then go back to crystal control, even if you have to equip yourself with four or five crystals to spread over the band.

## ● Difficulty of Reception

Apart from the horrid chirps and poor notes which are produced, there is another point to consider; that is, the receiving angle. Those who use single-signal receivers with crystal filters know that it is impossible to peak a chirpy signal with the crystal in circuit, with the result that QRM will destroy the readability at once. A pure T9x signal can be pulled right through a half a dozen stations and be made QSA5, which is surely a great advantage if you seek to communicate something more than a mere formula QSO. There is nothing more annoying than when attempting to copy one chirpy signal, another creeps right through to the other side of the beat note. This does not usually occur when CC is used, although we know that nasty chirps can be produced when the PA is not correctly neutralised.

Your help is needed to clean up this state of affairs before it is too late. Do we want to go back 10 years?

## ● More on Ham Spirit

G8DU of Hanley offers a few thoughts on old timers and newcomers. He writes: "We read of old timers throwing their weight about and young timers feeling very small. Some that have been to see me have been so abashed that they have almost crawled in on their chins. There is no reason for this; all of us have experienced the thrill of that letter from the GPO containing our call and permission to operate, and yet some people take on that *ad astra* bearing and show the timid newcomer the 'works' with a 'see Naples and die' effect.—It's not playing the game with the fellow.

## ● "The Younsters"

"And now, the 'young squirts.' Some of you don't wait for your call sign and go on the air as soon as you can get some sort of signal into the aerial. But please don't come and boast about it to licensed hams. Not very long ago I received 16 cards from British stations and 7 cards from

\* [Is A. A. Mawse's *face red!*—ED.]

overseas for contacts I knew nothing about, and one of them enclosed a paper advertising a system of sending code which could be learned in ten easy lessons—I really wasn't fit to live with for days!

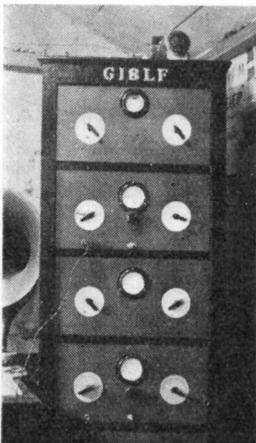
"We all have our faults, but we have our good points too, so when young '16-year-old' comes along to see you next time, full of the DX he has been hearing on his one-valver, listen to him and help where you can; don't just show him that 16-valve receiver of yours that was built with the loss of sweat and sleep, and say 'quite a simple little job.' Let him see the inside of your apparatus, and explain the difficulties that *you* encountered."

### ● Self-conscious 'Phone Operators

G8DU continues by saying: "There are thousands of SWLs to-day who sit and listen to the amateurs. I was told not long ago that some of the stuff put over by amateurs was as funny as any B.B.C. variety;—were *you* given a licence to compete with broadcasting? And just because you realise these folk are listening, don't go all 'high hat' and throw your aspirates in the wrong place. A listener came in the other day and told me he had an interesting time listening to an amateur 'phone station who was having trouble with a 5-amp. switch. The SWL asked 'couldn't he have mended the thing, I thought you fellows could tackle difficult jobs, let alone simple ones!' I wonder if we can?"

### ● A Northern Ireland Station

We are showing you the efficient-looking transmitter operating by E. O. Byrne, G18LF, of Clogher, Co. Tyrone. The line-up consists of a 59 CO or tri-tet link coupled to a P650 PA. The two bottom



panels house the 160-metre transmitter which uses another 59 CO link coupled to a PX4 PA and keying for both rigs is effected in the suppressor/screen lead to the COs. Two aerials are used at the station; a half-wave Windom sloping from 45-ft. to 20-ft. for 14 Mc, and a 99-ft. end-fed which can be used on 7 or 14 Mc, or on 1.7 Mc by the addition of an 80-ft. counterpoise. The longer aerial points N-S while the Windom slopes towards the SW.

The power supply consists of 220 v. DC mains with the addition of 120 v. accumulators and the receiver is a SG-y-Pen. His best DX includes W 1,2,3,4,8,9, VE1, LU, PY, HH, VU, VK and FA, but he is still waiting for the VK card to claim WAC.

G18LF is particularly anxious to obtain listeners' reports on his 1.7 Mc CW transmissions, and we feel that this sentiment will be echoed by most amateurs who operate on this frequency.

## The British Short-Wave League

### The Season's Plans

Like everyone else in Amateur Radio, the B.S.W.L. is looking forward to a busy and useful winter season, this being indicated by the healthiest of all signs—a rising characteristic on the membership curve, which has been helped up by the recent amalgamation.

To the short-wave enthusiast, the B.S.W.L. offers useful services and many advantages: Identification with an established society known all over the world, a well-run QSL Bureau handling thousands of cards, a QRA section, and the League's monthly REVIEW. This is published as a supplement to THE SHORT-WAVE MAGAZINE, members receiving them both free by post each month; the REVIEW does not of course appear in the bookstall issues of the Magazine.

The inclusive subscription covering all the above is 7/6 per annum, with a small charge for the various proficiency certificates granted to those who earn them. A high standard is set in these, and they are recognised as proof of efficiency in DX working.

### ● The Transmitting Section

Newly formed, and with a nominal subscription only at present, the main object of this Section is to keep in active League membership those who hold either full or AA transmitting licences, of which there are now many among B.S.W.L. members, and more in the process of graduation.

It is not intended that the Transmitting Section of the League should compete in any way with established national or international societies already representing the amateur, though its future policy will naturally be dictated by circumstances. In any case, much depends upon the support received by this branch of the B.S.W.L. organisation, and it will take time to develop.

Present plans include the provision of a lending library of text-books, to be available to members only, and an Information Bureau to assist transmitters in every possible way, thus promoting closer collaboration among licensed members and stimulating an interest in Amateur Radio throughout the League generally.

An advisory council is being formed, and several well-known amateurs have promised their active support. Organisation and policy will be worked out as membership increases, and there are many projects in mind which will interest both transmitters and listeners.

A stamped addressed envelope to the Secretary, British Short-Wave League, Ridgewell, Halstead, Essex, will bring full information regarding B.S.W.L. membership, and the Hon. Secretary of the Transmitting Section is J. R. Garrett-Pegge, G3MI, The Meades, Chesham, Bucks.

*Mention the Magazine when writing to Advertisers. It helps you, helps them and helps us*

# Adventures of an Op. No. 10 "FIRE"

By N. P. Spooner (G2NS)

SHORTLY AFTER the Croton oil episode had quietened down a bush fire came sweeping across one corner of the Company's enclosures. A galloping Paraguayan fence-repairer first brought the news and a dozen orders were bellowed at the assembling hands as the ranch suddenly sprang into roaring activity.

After a couple of miles we left the trail and cut through the scrub until we struck an angle of the barbed-wire fencing. Following it up we came to a gate and from there, like the angry murmuring of a pogrom, we heard the distant crackling of the conflagration. A mighty cloud of smuts and pieces of burning herbage swooped and whirled like demented vultures above the trees. We felt the stifling heat and could see angry tongues building up a vast sheet of flame on the far side of a clearing. A freshening wind fanned it into an inferno and drove it along furiously. Colossal showers of sparks, exploding like a shelled ammunition-dump, were thrown forward and ignited fresh growth. A rolling cloud of dense, acrid smoke swayed and hesitated and, away over higher ground, there sped mixed bands of large and small birds who fled before the approach of the devouring demon that soon reduced everything to ashes.

We were too late to do anything and could only wait and watch the fire, crackling like a thousand rifles, go roaring on its way. It left behind it a blackened, devastated track and drunken lines of twisted wire fencing in a still-glowing region where, through the outward silence of the approaching night, one could imagine the mysterious voices of nature issuing apparently from the tortured tree-trunks themselves.

## ● Civilisation beaten

It was a wild State where nature performed wild deeds. First it was explored by the missionaries, then ravished by adventurers, over-run by feverish fortune-hunters in a gold rush, abandoned again to the advancing jungle. The rubber boom peopled it once more but prices fell and back surged the bush. The cattle trade flourished and it teemed anew with activity, but a decline set in and wild life once again claimed possession.

What the future holds for it no one knows, but bad men still welcome its wildness as they flee there from the consequences of their evil deeds. Although the North West railway ran by, like a thin ribbon of civilisation, one had only to go a few miles from the metals to meet the advancing bush and make the acquaintance of jaguars, rattle-snakes and anacondas.

A tale is told of a city-bred police-sergeant and six men ordered to hunt down an armed half-caste who had crossed the border from the scene of an atrocity in the neighbouring State. Each day the pursuers heard the crack of one single rifle shot and each night a freshly-turned mound of earth marked the result. Two months later a solitary scarecrow returned to report that no capture had been made.

It was the sergeant, minus ears that had been slashed off with a razor.

In what manner bad men were hunted in the interval we never heard, but apparently the law suddenly decided to fight with modern weapons.

## ● A Jungle Station

One day, after riding for four hours to the nearest railway halt in search of native fire-water, we recognised the distant sound of some sort of internal combustion engine gaily spluttering away behind a newly-erected wooden shack. After loading up our cow-ponies, pannier fashion, with petrol tins of fire-water, we dispensed some of the red-eyed sugar cane juice to strange military police that we found littering the neighbourhood. The act sealed eternal friendship and gave us immediate entry to the mysterious shack where we were very surprised to find a perspiring Op. busy brass-pounding

A complaining motor-bicycle outside, of about 3½ HP, and jacked up on its stand, was doing its best to run a small alternator supplying the power for a portable spark transmitter. The sending gear consisted of the usual step-up transformer, spark-gap, key and inductances. The transmitting aerial was a weird looking array something like Fig. 1 and supported on crazy saplings cut from the bush. Fig. 2 shows the rough lay-out and, to retrace our steps in radio history, we can remind ourselves that the current was generated at a low voltage in order to avoid the difficulties of constructing a high-voltage alternator and the undesirability of handling high potentials.

For this latter reason the primary was keyed and the step-up transformer then raised the voltage to the high value necessary for charging up the condenser. As a spark discharge caused the air in the gap to act as a conductor, and as a short time had to elapse before it could regain its insulating properties, the alternator had a tendency to form a permanent arc across the gap because the current flowed first in one direction and then in the other. That would have stopped the condenser from becoming fully charged up and in order to avoid it a choke was introduced into the secondary circuit.

## ● Snags !

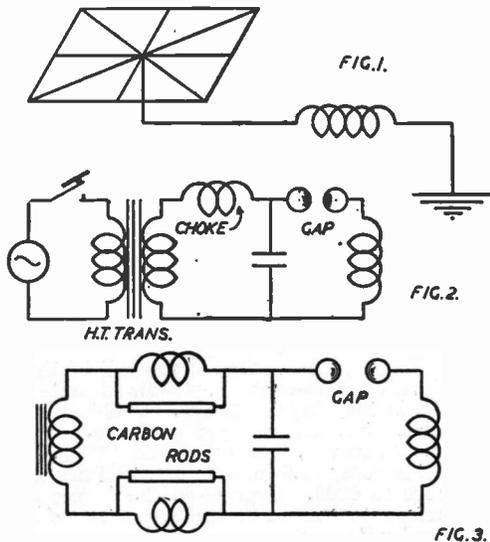
That sounded splendid in theory but, right away, produced two oscillating currents, one being the choke and the condenser and the other the inductance and the condenser. It was therefore necessary to arrange that the choke and condenser were tuned to the same frequency as the alternator. The gap had to be so adjusted that the discharge took place just at the moment of highest potential across the condenser, caused by the second half oscillation, and not at the lower potential given by the first half oscillation. A spark therefore occurred once in each complete period of the alternator and the spark train frequency was the same as the alternator current frequency.

The Op. in charge seemed chiefly concerned about the bother of spark gap adjustment and, between gulps of sugar-cane juice, explained that because the alternator current fell to zero when the condenser

was fully charged, the gap had to be set so that it broke down just before the maximum was reached.

If the spark gap broke down too soon, alternator current would flow into the condenser and cause arcing. If the gap broke down just as the condenser reached its full charge, the charging current would rise before the oscillations had time to die down and again arcing would result. If the gap was shortened to allow a spark twice during each period, arcing would also occur because the gap had no time to recover. Bad adjustment of the gap could even split the note by an intermediate effect in which two sparks occurred in one cycle and then only one in the next!!

We noticed that all the "hot" parts of the gear were enclosed in netting that switched the alternator current off if it was lifted up and, speaking of shocks, the Op. expressed his opinion that although the resistance of the human body varied, the average from one hand to the other was normally about 20,000 ohms. Whether a shock would prove fatal depended upon the degree of skin moisture



and the general state of health, but on an average an eighth to a sixteenth of an amp. was, he considered, usually all that was required.

Safety gaps protected the set-up transformer by allowing any arc to form across them if the secondary voltage rose above a safe level. Such an arc would rise, by its own heat, on two eccentrically mounted brass discs and, as the higher it rose the bigger would become the distance across which it had to jump, it would thus eventually blow itself out automatically.

### ● More trouble

Another source of trouble appeared to be "back oscillations." These were caused by HF attempting to flow back through the transformer secondary instead of across the spark gap, when the condenser discharged. If the end turns had set up across them a large voltage to earth, then the transformer insulation might be broken down. To avoid it, two protecting coils of 300 henrys each were often placed as shown in Fig. 3. By themselves, they

would sometimes prove worse than useless, because each had a capacity of its own. Add their inductance to that and it can be seen that the circulating currents thus set up were also quite capable of puncturing the transformer end-turns insulation. Safely to damp out the back oscillations therefore, two non-inductive carbon rods were shunted across the protecting coils.

A crystal detector and headphones were used on the receiving side and constant touch thus kept with the portable sets carried by the field parties.

Wishing the Op. good luck we emerged from the hut only just in time to save the contents of a tin of precious red-eyed hooch from being syphoned out by the station-master's thirsty offspring.

Next Month - - - - No. 11: "APPETITE."

## Radio Service Work

To all those with a living to make in retail radio, it is obvious that efficient service work is a *sine qua non*; in fact, with something like eight million receivers in operation, it is evident that there is a big field for the competent repair-man. The Borough Polytechnic, Borough Road, London, S.E.1, one of London's famous teaching institutions for those who have to study in their spare time, has just started afternoon and evening courses in Radio Servicing in which special attention is given to practical repair work and the most recent developments in the construction of radio receivers.

## Bargain News

We have recently seen a very fine delivery of high-grade apparatus for disposal at bargain prices, including low reading thermo-couple and hot-wire RF ammeters, moving coil milliammeters in ranges from 0-1 to 0-500 mA, Cyldon transmitting condensers, sending keys, Morse recorders, etc., etc. Available for inspection at Messrs. Electradix Radios, 218 Upper Thames Street, London, E.C.4, readers will find much else to interest them at these famous stores. Full lists are of course ready for those who must order by post.

## Some New Condensers

The latest catalogue issued by Messrs. The Dubilier Condenser Co., Ltd., Ducon Works, Victoria Road, North Acton, London, W.3, is of interest in that certain types not previously listed are now shown and priced. Information by special enquiry is also obtainable on low-value fixed condensers for transmitting purposes, and all who construct their own gear will find the new Dubilier catalogue very useful.

## The Morse Recorder

We are informed through Cecil Phillips, 2DMP, 181 Kingston Road, Staines, Middlesex, that carbon rolls for the Morse Recorder described in a recent issue are available from Messrs. A. E. Orford and Co., 44 Gutter Lane, London, E.C.2. These are 1-in. wide and 106 feet long, and are quoted at 12/- per dozen reels. Smaller quantities or singles could no doubt be obtained at a slightly increased rate. The tape is wound on a cardboard centre.

# HAVE YOU HEARD . . . ?

RECEPTION CONDITIONS were not particularly brilliant during the earlier part, or middle, of last month, the lack of new and interesting transmissions being most unusual for the time of the year. Admittedly, the American signals maintained their customary predominance much of the time, while comparatively good signals were available from the East and South Africa; but apart from a few European locals, nothing of a sensational nature made its etheric debut. This statement is justified by a dearth of readers' reports.

It has been argued that a greater interest is taken in amateur band reception than short-wave broadcast, but I am convinced that this is only due to the fact that it is more difficult to log and identify the latter stations, whereas the majority of the former use English, or repeat their call letters so frequently that under normal conditions failure to identify is practically impossible. A night's vigil may produce nothing new from the BC bands but a few hours of diligent searching in the amateur bands seldom fails to reveal a new "scalp," whether local or DX.

Two facts I will grant to the amateur station enthusiasts: (1) Broadcast bands are practically immune from the bad conditions so often experienced in amateur station reception, and (2) it is far easier to log Japan, India, and one or two other countries in the BC bands; but wouldn't the BC listener give a lot to be able to hear such unique DX as Pitcairn or Reunion!

## ● Watch out for these

Seasonal conditions are responsible for the disappearance or re-appearance of certain stations. There are a few I am finding particularly elusive just now and I should be glad if readers would make a point of keeping a look-out for them; they are HS8PJ (or HS6PJ as it is now reported) on either of its frequencies, ZBW (31.49 m), COCD (now back on 48.92 m), CFCX (49.96 m), CJCX (49.92 m) and VPD2 (31.47 m). Reports on these or any others of interest, should be addressed to me c/o THE SHORT-WAVE MAGAZINE.

## ● Boosting up that Super

Readers may be interested in the following tip. In addition to an array of battery receivers I use an all-wave seven-valve super-heterodyne that is sadly in need of rejuvenation. Short-wave reception is just possible on the lower frequencies but above 12 Mc or so the efficiency wanes almost to zero. To compensate for this I attach an 0-v-2 to the same aerial, switch both receivers on, tune to the same station and gradually increase reaction to the verge of oscillation, resulting in an enormous increase in the signal strength of the super-heterodyne. At the time of writing W2XE is R4 on the loudspeaker but the "pre-selector effect" from the 0-v-2 has increased the strength to R8, sufficient to drown the thumping of my typewriter. This may be

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

unorthodox (I'll leave this to the more technically minded of our fraternity) but is extremely effective, and more economical than purchasing an expensive pre-selector unit or amplifier.

## ● The News—Africa

Mozambique. I should like to take the liberty of reminding readers that on November 28 stations CR7BH (25.6 m), CR7AA (48.8 m) and CR7AB (85.92 m) are to broadcast a special dedicatory programme to members of the British Short-Wave League, from 1500-1600, during which a message from the writer will be transmitted.

CR6AA, Lobito, Angola, has kindly obliged with the following details relating to his broadcasts; incidentally, my letter to the station took seven months to reach its destination! Schedule: Mon., Wed. and Sat. 1945-2145 GMT; power 1,750 watts; opening and closing announcements in Portuguese, French and English, in the latter as "This is Lobito calling, Portuguese West Africa, short-wave broadcasting station CR6AA"; only Portuguese is used during transmissions, and the identification signal consists of three piano notes; frequencies 7,614 and 7,177 kc. The engineer-in-charge is Sr. Alvaro de Carvalho, and the address "Estação Radio Difusora CR6AA, Caixa Postal 103, Lobito, Angola, Portuguese West Africa."

## ● The Americas and West Indies

W2XAX, New York City, is the call of the new CBS television transmitter (441-line definition) to be housed in the Chrysler Tower. Details of power, frequencies, etc., are not yet available. W9XJL, Superior, Wisconsin, 11.49 m, and W9XUP, St. Pauls, Minnesota, 11.6 m, are both well heard from about 1600 to 1900. Reports on the former should be addressed to "Head of the Lakes Broadcasting Co., Superior."

R. Gammons has very kindly supplied the following particulars of other USW transmissions:—

W3XEX, 26.05 Mc, Norfolk, Virginia, a 50-watt relay of WTAR.

W9XAZ, 26.40 Mc, Milwaukee, Wisconsin, 500-watt relay of WTMJ.

W2XQO, or A, 26.55 Mc, Flushing, NY, testing around 1400.

W9XER, 31.6 Mc, Kansas City, heard at 1410 and 1515, owned by Midland Broadcasting Co., Kansas City.

W9XHW, 31.6 Mc, Minneapolis, heard 1300-1600, 50 watts.

W8XOY, 31.6 Mc, Akron, Ohio, heard at 1338. QRA P.O. Box 830.

W3XEY, 31.06 Mc, Baltimore, operates daily 2100-0500, 100 watts. (Verifies by QSL, well heard last year; QRA "The Baltimore Radio Show, Inc."—F.A.B.)

W3XKA, 31.8 Mc, Westinghouse International Station, Philadelphia, operates daily 1500-0400.

W1XEQ, 41.9 Mc, Mount Washington, Mass., testing with aerials directional to Europe around 1610.

WIXAL, Boston. This station now issues a fine programme booklet to members of the World-Wide Broadcasting Foundation, but the schedule is rather too complicated to reproduce in full.

COCA, Havana. A. G. K. Leonard obliges with the following data concerning this newcomer:—frequency 9,100 kc; relays CMCA, Galiano 102, Havana; power 100 watts; schedule 1300-0500 daily; English announcer our old friend Alec Kinghorn (a Scotsman) of COCD-tobacco publicity fame; verification by QSL card.

YNLG, Managua. Mr. Leonard also tells me that this station has moved to 45.3 m, 6,610 kc, with 1,000-watts power. A new QSL is sent out giving the QRA as "5a calle No. 207, Managua," but the slogan, "Radiofusora Nacional YNLG, Ruben Dario," remains unaltered.

HH2S, Port-au-Prince, Haiti. The same reader states that this station now sends a card in place of the original letter-veri, and has changed hands, the new owners being The West Indies Broadcasting Co.

### ● Better Reports, Please!

From the Director of the AIR, Delhi, I have received the following note:—"All India Radio, Delhi, feels indebted to the above Club (BSWL) and its members for supplying valuable data regarding this station's programmes and performances. It is

Britain. The long-wave transmitter mentioned in announcements is on 183 kc with 120 kw power, and the address "Turk Mühendisler Birliği, 5 No Lu Oda, Yeni-Sehei, Ankara, Turkey." Reports are welcomed but not verified by QSL at present. A. G. K. Leonard reports TAP on 31.7 m testing with recordings and announcing in English, finally closing at 2100 with their national anthem.

I am particularly grateful to these readers for their news items and take this opportunity of expressing my appreciation of them. Please keep it up!

### ● Broadcast Highlights of the Future

Probably one of the most popular forms of light entertainment is the cinema or theatre organ, a statement which I think is amply justified by the fact that such programmes figure very prominently in the American, BBC and Dutch AVRO and VARA broadcasts, but I wonder how many of us short-wave-light-organ-music enthusiasts are aware of the excellent recitals radiated by the CBS over W2XE, 13.94 m? On Sundays from 1300-1330 there is the "Organ Reveille," and at 1400 "From the Organ Loft." On Mondays, Tuesdays, Thursdays and Fridays a 15-minute programme of popular music, generally played by Fred Feibel or Ann Leaf, is available for 1430-1445 (I can recommend this), while on Saturdays the well-known Lew White pre-

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## African and American News—Readers' Notes— The Corn-Husking Broadcast

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felt, however, that enough importance is not attached to the necessity of a *detailed* reception report, without which it sometimes becomes rather difficult to forward a verification. AIR will feel obliged if this fact is brought home to the members of the Club." But tell me, AIR, why my two *carefully* detailed reports have been ignored! And one related to a test broadcast at an unusual hour for European reception.

### ● Readers write—

The following was passed on to me by a reader:—"Apropos your notes in the October issue re VP3MR and VP3BG, Georgetown, here is an instance of a very curious coincidence. I logged VP3BG recently for the first time in three years and decided to send him a report. Imagine my surprise when three days later I was introduced to a young lady from Georgetown who, when I mentioned the subject to her, turned out to be a personal friend of the station director of VP3BG, a next-door neighbour of the former director of VP3MR and was acquainted with most of the station staff in Georgetown. Strewth"!—W. Desmond Martin, 2CMX (Co. Antrim). To which I can only reiterate "Strewth"! Strangely enough I have managed to log VP3BG with fair regularity for many years.

P. Larrys of Croydon (I am uncertain of the signature) reports verification of his reception of the 15,195 kc TAQ transmission, the first report from

sides at the console between 1500 and 1530. Later, at 2100, Charles Paul may be heard over the 19.64 m channel.

A rather fascinating feature of the NBC programmes to be heard over W2XAD-XAF is "Half-and-Half"—and the best of each—a rather unique combination of light classical and dance music or "swing," played alternately by a small string orchestra. This has been heard on Tuesdays between 2130 and 2200, but I am not certain whether it is still broadcast as the 2115-2200 session of the station's programme sheet is not detailed.

On November 3 champion corn-huskers from eleven states of the U.S.A. compete for the 1938 "corn-husking" title on a farm near Sioux Falls, North Dakota, and NBC microphones will pass on the event to listeners over station W3XL (formerly W3XAL), 16.87 m, at 1730. This is a feature of the well-known Farm and Home Hour and, according to the NBC, "This year the listeners will first hear an explanation of the event and the conditions under which the contest is held. Then as the pick of the nation's corn-huskers race down the rows of standing corn, *an announcer with a portable transmitter will follow them, picking up the sounds of corn being ripped from the stalk and the bang of the picked and husked ears as they are tossed into the waggon boxes.*" The italics are mine; I have no comments! But still I have heard this programme, or commentary, in the past and consider it deserving of attention because of its novelty.

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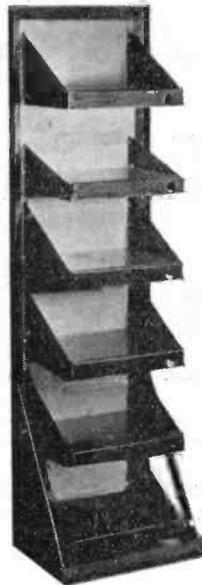
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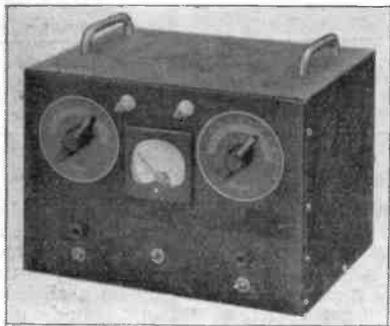
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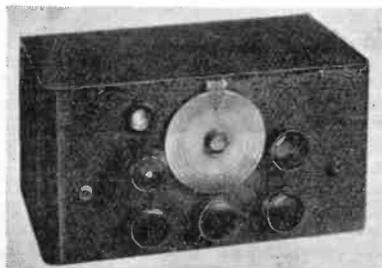
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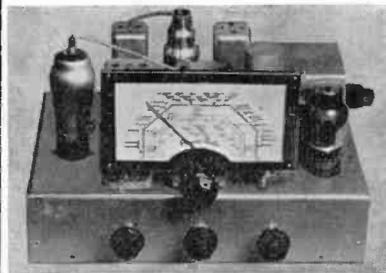
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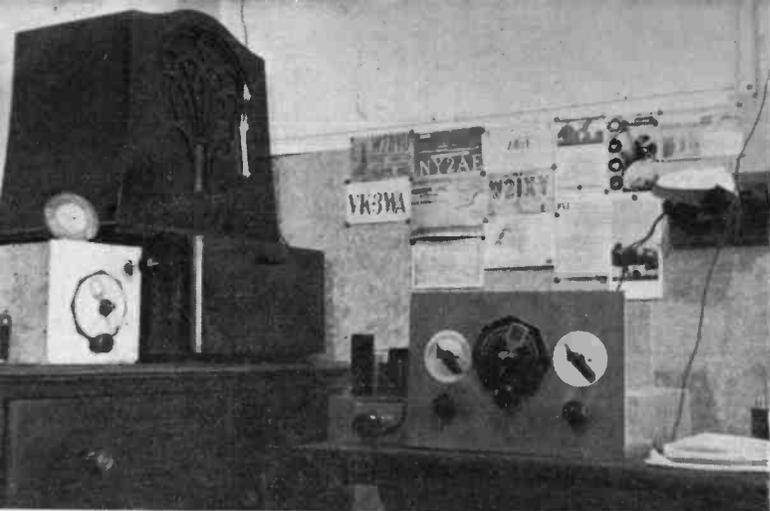
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# Listeners' DX Corner

By The DX Scribe

I. W. K. Smith of New Malden, Surrey, has heard over 600 14 Mc 'phone amateur stations on the home-built I-V-1 you see in our shack photo. His aerial consists of 20 ft. of wire round the picture rail.



BY THE TIME this is in print we shall have winter conditions upon us. This will no doubt mean that the local electricity power station will have to put its booster in circuit to cope with the increasing demands from the enormous body of SWLs. This statement may sound far fetched, but it is said that during a speech of His late Majesty, King George V, one grid station had to allow for an extra 17,000 kw, this being accounted for by wireless reception alone!

Winter means that 14 Mc does not deliver the vast quantities of 'phone DX that are normally to be heard during the summer months, but at the same time, much DX from odd quarters will come through on CW, and we suggest that some winter evenings may be very profitably spent in "swotting" the code. It will pay to turn your attention more to the LF bands, where W's should be very numerous in the early mornings.

## ● "Overtone" Reception Again

R. W. Iball, 1 Riddell Av., Langalds, Worksop, Notts, asks us to clear up a mystery for him. He was listening on 7 Mc and switched to 3.5 Mc "to see what was doing," but was surprised to hear many of the stations he had just heard on 7 Mc, though at much weaker strengths. As Mr. Iball was using an 0-v-Pen, the reception on 3.5 Mc would be due to the detector valve oscillating and beating its second harmonic with the 7 Mc signal, thus bringing it through on 3.5. To check this, increase the reaction control, and if the signal strength increases then you have "overtone" reception; if the reverse takes place, then you have true fundamental or normal reception.

## ● This Record HAC Business

Norman Vaus of Bournemouth tries to catch us out by stating that the 17-minute HAC by P. V. Jacobs is not a record; what we really meant to say was that it was Mr. Jacobs' record, and the best so far sent to the Corner. We know of one listener in Northern Australia who has HAC in 3 minutes! Norman reminds us of the recent record WAC, in 8 minutes 10 seconds, by W4DLH, G5ML, VU2CQ, VK4JU, SUIKG and HK5AR, when a complete round-table contact took place on January 4 this year; anyone listening then could have made HAC in the same time! K. Sly (2FAU), 16 Buckland Av., Slough, Bucks, claims that Mr. Jacobs' record was not a true one as he included an Asian BC station. Mr. Sly's HAC log included VK2JO, PY2HM, UE3AH, VU2CR, W1LAU and FT4AN, heard on May 3 between 2055 and 2115—20 minutes.

## ● Back Waves

2FAU presents us with two "calls" heard on 7 Mc, DV4E and DV6E. There is little doubt that these were back waves or spacers. Some transmitters are keyed in such a way that every time the key is up a signal is still radiated, but possibly on a slightly different frequency; therefore, "Test" sounds like "TMU" on its back wave and "CQ" is "IETETI"; try it over for yourself!

## ● Our Pet Aversions

C. J. F. Thompson, Moredun House, Fettes College, Edinburgh, 4, has two pet aversions. Overmodulated and frequency-modulated continental 'phones, and those continentals who whistle and say "ah, ah, ahlo" without signing for about 10 minutes, and then switch off their carriers. Unfortunately, we cannot control the actions of our Continental friends, even though this kind of thing does not coincide with our views either! Mr. Thompson sends a general log of 14 Mc 'phones but space does not permit us to publish. From another part of Scotland we hear again from Gordon Birrell of Dundee, who has received a card from XZ2EZ giving his frequencies as 14,200 and 14,360 kc. The best DX heard by Gordon on his two-valver includes ZS6AJ, DJ, 1AX, VQ2HC, FB8AB, FI8AC, KA1BH, PH1RI, VY, 2AY, 3WI, VS7RF and GJ.

## ● What is QRP?

Bob Everard reports reception of some QRP transmissions confirmed by card. The best are VE4CP 5 watts, VE4AC 7 watts, W6EZZ (Utah), 25 watts and HI7G 20 watts. He mentions many more of higher power but in our opinion true QRP can only be thought of in terms of 10 watts or under. The majority of G's operate on 25 watts or less and they are well received throughout the world, especially when beam aerials are used. An amateur with a good location and 20 watts should be able to WAC, providing he understands what he is doing with aerials and chooses the right times for working.

Raymond Joss, 22 Beaufort Gardens, Hendon, London, N.W. requests details of VP2AA and "ZS3S". The latter is undoubtedly ZS3F at Windhoek, S.W. Africa, while the former would be a new call in Antigua—they have just issued official licences in the British West Indies. Raymond started listening last Christmas, and since then has heard 89 countries; some of his QSLs include VP6TR, VK3KX, VS2AK, HP1A, VE1DQ, 2AA,

V87GJ, ZS6S, TF3C, LU8AB, CO7CX, VO6D, K4EMG, PY2CK, ES5D, and W's 3EOZ, 2DH, 7AMQ, 7EKA, 7BVO, 6NHB, 6EJC, 5DUK, 9YL (Col.), 9NGZ, also many European countries.

### ● More on VR6AY

Eric Otty of Doncaster informs us that the original transmitter sent to Pitcairn consisted of a two-stage rig giving an output of 60 watts. WIBES took a 600-watt amplifier with him, and Eric is under the impression that this amplifier was taken back to the States when WIBES returned. He wants to know how 600 watts can be obtained with a 750 v. power supply, so maybe W2IXY will inform us. We believe that the reason why VR6AY has not been heard so frequently is because he is not particularly interested in working amateurs (except W2IXY), but that the station operates frequently on shipping and other bands. His signal has been well heard, too, when the input has been in the region of 60 watts. Eric defends the action of exchanging SWL cards, explaining that these give details of receivers and DX heard, and generally mean the making of a new friend. TG5's card is the finest that he has ever received, depicting a native bird printed in natural colours.

Clifford J. Brown, 381 Kingstanding Road, Erdington, Birmingham, 22, informs us that the power of CNIAF is 500 watts from a "Utah" transmitter, whereas we had previously stated that the input at this station was only 50 watts. This is quite true, as his original transmissions were made with a 50-watt rig, while waiting delivery of his new and higher-powered one. Clifford is 15 years old and finds that the cost of having cards printed is prohibitive and so he makes his own, but does not tell us his process. We shall be glad to publish details of how to make home-made cards economically and neatly.

### ● What is DX on 14 Mc?

John B. Burt (2DKQ) of Reading asks us this question. Our answer is that we consider anything over 1,000 miles can constitute DX on this frequency, and this will therefore include Russians. Generally speaking, anything outside Europe comes under the DX category.

H. Sugden of Bradford writes to us on the changing condition of the 14 Mc band and the resultant loss of familiar voices, and feels that he will have to wait till next spring to log Arizona, which is his missing state for "HAS". On the contrary, 28 Mc will probably yield several Arizona signals during the winter, and W's will not necessarily be altogether absent on 14 Mc—merely more variable.

John Brodie, 79 Parish Road, Near Pontypridd, Glam., has heard 66 countries on 14 Mc 'phone in three months; VU2FS, SP1ZK and TF3C have sent cards, and the latter uses only 10 watts. Recent catches include FB8AB, VU2FU, KA1FC, 3KK, K6FKN, TI2LR, CR7AW and XZ2DP.

### ● Fade Outs

J. Crook, 22 Rawson Road, Bolton, asks if other listeners noticed the excellent conditions of the week commencing September 11, when the band was wide open between 1600-2000 GMT, but then all signals disappeared. This would be due to the effect of the "F2" layer, which is the one on which we depend for the reception of long-distance signals. At 2000

GMT this layer would probably rise to a height which would not permit of signals reaching Great Britain, although it is quite possible that they were coming down in Egypt or at an equivalent distance. On the other hand, it is possible that the layer was not in a condition to bend signals back to the earth at all—merely letting them pass into outer space. It has been found that a 54-day period seems to exist when the action of sunspots prevents signals from being refracted from this layer, and listeners will be well advised to study this problem, referring back in their logs for this average 54-day effect.\*

### ● Static-charged Rain

During our 1.7 Mc SLP, Jack Massey, "Watcombe," 9 Ash Grove, Wembley, Mddx., noticed that there was a loud hissing noise, and that it was raining at the same time. This frequently happens, and is more noticeable on the shorter waves. It is caused locally, by rain passing through electrically-charged clouds, the drops carrying a potential which is liberated as soon as they touch our receiving aerials. It is not possible to cure this noise even if we switch over to an inside aerial, as the continual discharging of these raindrops on gutters and other metal objects and even on the earth, causes a noise which will drown the strongest of signals. Next time it happens, go outside, or open a window, and listen to the rain falling; you will probably notice a "hissing" noise as the raindrops touch the earth—this is not the normal noise of ordinary rain.

E. Strowbridge, 11 Leigh Gardens, Kensal Rise, N.W.10, gives details of HAC in half-an-hour on September 9 between 2115 and 2145 BST. Stations logged in order were: VK2ZC, 4VD, PY2IT, W8LVM, CNIAF, FA3JY, VU2CQ. He received a card from NY2AE, who says that all QSLs will be answered providing a coupon is enclosed. Mr. Strowbridge tells us that OX7OU is the call of the Oxford University Expedition in Greenland. Cards for 14 Mc reception of this station should be sent to A. Croft, Esq., Leckhampton House, Cambridge. We understand that G2TR was the first British station to contact OX7OU. OQ5ZZ is an American Expedition to the Belgian Congo, and cards should be addressed to The Gatti Expedition, Leopoldville. While on the subject of Belgian Congo, this country is waking up in an Amateur Radio sense; recent calls heard include OQ5AQ 14360, OQ5AS 14280 and OQ5AV 14030 kc.

### ● 28 Mc

Ten metres is a variable band, and will reward those who do not give up at their first unsuccessful attempt. E. J. Bradford, Market Street, Ashby-de-la-Zouch, Leics., did not hear a single station during the SLP for this frequency. However, Sept. 25 yielded Mr. Bradford quite a few 28 Mc signals, showing that his receiver was not at fault. We know of certain locations where 28 Mc signals can never be heard, even using the finest commercial communication receivers.

T. G. Franklin, 47 Belvoir Drive, Aylestone, Leics., would like to correspond with other SWLs. P. W. Gifford, 21 Bengal Road, Winton, Bourne-

\* [See "Conditions—The Month's Survey" elsewhere in this issue.—ED.]

## DX CORNER

mouth, has also received a card from TF3C, whose full address is: T. Palsson, Box 117, Akureyri, Iceland.

Mr. Gifford would like to know if XZ2PB is genuine in Rangoon, but we suggest that this may possibly be XZ2DP who is in Rangoon.

### ● PK6XX and an Appreciation

We wonder if any of our British readers have logged PK6XX, The Archbold Expedition to Dutch New Guinea? He operates on 'phone on 14002 kc. R. Simpson, 80 Wilga Street, Concord West, N.S.W. Australia, hears him frequently, as well as VK9XX on the 28 Mc band in The Territory of New Guinea. Mr. Simpson has just been awarded a cup by an Australian journal for the 25 most distant stations received; he asks us to mention that the British stations who verified reception, and therefore permitted him to claim his award, were: G2MF, 2WD, 2TR, 5JO, 5LU, 5ZG, 6DT, 6BY, 6LL, 6GO, 6BC, 6WX, 8NJ, 8MA, and 8LP, to all of whom he sends his sincere thanks. We like to know that British hams play the game.

D. J. Mathers, 36 M. Beechwood Road, Ranelagh, Dublin, Eire, has been very active lately with his receiver. CE3AT, HK3CG, HR5C, K4FAY, NY2AE, VP4TK, VS7GJ, K5AC, 5AH, have come into his shack. He also mentions "ZC1PZ" and "FI8QC," but the latter would be FA8QC, and the former probably CT1PZ. QSLs have recently been received from VP6YB, VE1CR, W2LXY, PILJ, ZB1R and Europeans. D. F. Chatt, 23 North View, Sherburn Hill, Co. Durham, tells us that CN1AF operates on 14228 kc, and thinks he heard "CN1IF" as well, but as in the case of FA8QC just mentioned, the "A" and "I" sound very similar to English ears when uttered by a Continental. J5CC has been logged on CW as well as YU7DM, LY1AD and CN1AA for more unusual countries.

Alan Owen, "Cartref," 3 Cawdor Road, Inverness, would like to hear amateur stations announce their frequencies more often. This would help in receiver calibrating, and we feel that it would be a good thing for amateurs to adopt. Many of them using ECO drive do not know exactly on what frequency they may be transmitting, but where it is known, we hope they will say so. W. Morley of Shrewsbury does not agree that CN1AF represents a rare country, as he had heard him so much!! Our answer is that the first Tangier transmissions were made eighteen months ago by CN1CR and later 1AF came on 'phone. If two in a country make it common then we capitulate! He asks if Italian stations are pirates; here we would say again that no licences are issued in Italy, but all calls heard with an "I" prefix are quite genuine. Cards should be sent c/o A.R.I., Viale Bianca Maria 24, Milano, but *under cover please*, with no mention of call signs on the envelope.

### ● This month's best HAC

Our old friend Conrad Tilley, of Bristol, heard ZL3KX, VU2CQ, FA8CF, W2DH, HA4A and PY4BU on September 12 in 15 minutes, which is our best so far. It is interesting to record that he received three ZL 'phones during the month—ZLs 3KX, 4GM and 2BE. Cards have come in from W7FEZ, FB8AD, CO2OK, PY1DK, VE4EK, LU1UA, PK1JR, CX1FA, OA4R, LU4FG, CO8JK, HI9I, XE1GE, 1LK, VK2BK, PY2LM, 2HV,

K4EMG, W6MLG, 6CQG, 6OSY (portable), 9GGS (Col.) and ZS1BV. W5GGX (New Mex.) and W6FUO (Nevada) represent QSLs which Conrad will undoubtedly value!

### ● Autumn Conditions

S. F. M. Edwards, Birklands, Hornsea, Yorks, has noticed how October replaced W signals by VK, PY, VP3, 6, and SU, between 1800 and 2100 GMT. Some evenings Africans came in instead of PY's and VK's, and when conditions were good for the Southern Hemisphere, the signals from the western Northern Hemisphere were weak or absent. This sort of thing makes autumn listening all the more interesting. He thinks that the publication of frequencies is of little value, as by the time the frequency appears in print it is possible that the station may be working on an entirely different one. This is especially true where forms of frequency control other than crystal are used. We are inclined to agree, and ask you not to report unless a station has been heard on a particular frequency for a considerable period. Latest cards received by Mr. Edwards are from: KA1BH, VU2FS, K6OQE, VK3BM, ZS1AF, PK4GD, XE1GE, VE5OT, and PY2CK. KA3KK should be QSL'd c/o Box 3232, Manila, P.I.

### ● Aerials

S. E. Janes, 72 Kimberley Road, Croydon, Surrey, hopes to have his AA licence by the time this is in print, and asks if any local hams will help him to learn the code. We suggest you communicate with G3IG, the secretary of the Surrey Radio Contact Club. Mr. Janes finds the good old inverted "L" to be the best for all-round reception, but there is no doubt that aerials which are cut for the desired band will usually yield better results from given directions. The ideal, to our mind, is two half-wave doublets at right angles to each other, one for N-S reception, and one for E-W.

### ● CW Logs

John Roscoe (2FJM) at Leighton Park School, Reading, grumbles because we published no 14 Mc CW log last month. We have to ring the changes to suit all tastes, John, and you will find that we are doing what you want this month. The logs of 2AOU and 2DKQ are very comprehensive and are always appreciated. We know nothing of OQ5HR or VQ2R and suggest they are indeed pirates. John has heard ZB2A, the first Gibraltar station ever to transmit, but unfortunately he was only on CW for three weeks and has now returned to England. H. Owen, 2 Champion Av., Bashford Park, Newcastle, Staffs, writes again, and to quote from his letter: "I have now quite settled down to CW and there are about 5 CW entries to one 'phone in my log. When the band is rather flat, CW certainly proves its worth." He heard K5AM during the 7 Mc SLP and was rather dubious as the QRK was S7, but he need have no doubts—Panama Canal Zone comes through very well on 7! Mr. Owen also heard our old friend TAJAA and suggests he too is a pirate, but, although we have no evidence, we think that he is in Turkey, and so unlicensed that he is frightened to give the outside world anything tangible about himself! We did hear one rumour that he was a Turkish Army Officer operating army equipment.

(Please turn to page 34.)

# CALLS HEARD SECTION

selection of logs is at our discretion.

Late logs of particular interest may be held over till the following month.

## 1.7 Mc.

**RAYMOND JOSS**, 22 Beaufort Gardens, Hendon, London. "Trophy III.", various directional doublets.

**G8TO**, IZ, TR, AB, JM, NV, TL, QC, KW, 6SQ, UT, GR, SG, AG, 5IL, WW, CD, RD, 3CQ, GD.

**J. W. MASSEY**, BSWL826, 9 Ash Grove, Wembley, Middlesex. 0-v-0, 45-ft. end-on 25-ft. high, NW-SE. 16.9.38-16.10.38.

**G2XP**, 3GW, CQ, 5RV, CD, 6AB, GO, SG, 8GX, GL.

## 3.5 Mc.

**R. H. GREENLAND**, B.Sc., 39 Kensington Road, Barnsley, Yorks. 6v. AW. September 23rd, 0550 to 0720 BST.

'Phone—W1ADM, AR, CRI, FOM, GMD, IIM, ICU, 2BZ, HJV, JVS, OC, 3EFS, 4BPG, QP.

These calls, heard at the extreme high-frequency end of the 80-metre band, were particularly noteworthy because practically all the stations concerned were transmitting and receiving messages relating to the safety and whereabouts of people affected by the hurricane of the previous day. Stations at Cape Cod, Springfield, etc., were kept busy replying to others requiring information about possible victims of the floods.

## 14 Mc.

**MARTIN G. BOURKE**, 2AOU; "Credition," Samares, Jersey, Channel Islands. 1.9.38-10.10.38. Pen-v-2.

'Phone and CW—CEIEE, 3AJ, BF, DG, CM2AM, AO, AS, AZ, BZ, ESZ, GN, JH, MR, MZ, OM, OP, WD, 7AG, MV, CO2HY, JJ, LY, SV, 6OM, 7EV, VP, CP1AA, CR7AF, AL, AU, CX1CX, 2AJ, EL2A, FBSAA, AB, F18AC, HC1PZ, HMBB, EA, MC, 3L, 4AS, H13N, HK3CG, LDC, HP1A, TX, J2KG, 5CC, CS, 8CD, CG, K4AOV, EMG, FAB, FK, FKV, FCV, SA, 5AA, AC, AG, AH, 6MVV, OCL, PIN, 7GLL, KA1BC, CW, FH, RP, LUIDJ, 3FB, 4NB, 5BI, BR, 7AG, 8AB, AC, AZ, MX3A, NY1AD, OA4A, OQ5AM, AV, PK1BO, MF, MX, PK, RI, RL, 3EM, WI, 4DG, PX1A, 2D, PY1AP, CI, DS, GH, HP, 2CK, HT, 4AM, 5BJ, QG, QJ, 5TKR, T1AA, T12CAH, EG, UE8ME, U9ML, WA.

VK2(26), 3(32), 4(12), 5(12), 6(4), 7(3), 9DM, VG, 4KC (Papua), VP2AB, AD, 3AA, 4TK, 5Q, IS, 6YB, FO, 7NC, NS, 8AB, AD, GL, O, VQ2FC, HC, 3HIP, TOM, 4CRI, CT, KTB, 8AI, VR4AD, 6AY, V7SG, JW, MB, RA, RF, RP, VU3AN, CQ, DR, ED, EU, FH, FO, FG, FX, FV, FZ, W—all districts. XE1Q, GK, FG, 2IV, XUBMK, ST, 7CM, 8CM, MY, 9NT, XZ2KR, LZ, Y12BA, YV1AO, 4AE, 5AE, AVY, ZAE, ZBA, OXVC, ZC6AQ, ZDZH, 4AB, 9B, ZE1JA, F, G, I, Z, ZL1BT, DV, FT, GX, HJ, HY, KE, LM, MB, MR, 2BD, CW, FA, GW, LA, NT, OR, OK, QA, SM, WJ, 8AJ, AZ, GC, GF, GR, GU, GW, JA, KB, 4AF, AR, BR, BQ, CK, DQ, FK, GM, GY, ZP6OJ, ZS1AG, B, BC, BG, CN, CO, CT, 2AL, AM, AV, X, 4AI, 5AB, BS, Q, 6CF, DM, DY, EF, EG, EH, EJ, EU.

**R. J. LEE**, BRS1173, 9 Theobalds Green, Heathfield, Sussex. Heard during VK/ZL Contest, Oct. 1, 2, 8 and 9. VK2ADE, AEK, AFM, AHG, AJW, AJU, ADV, AV, AIB, CP, DA, DQ,

DV, EO, GF, HF, JX, KS, KL, ML, NF, OE, OJ, RA, TF, TI, VA, VU, VR, YA, ZP, 3BC, EG, EQ, EH, HG, KX, MK, NG, PE, QX, VF, WH, WL, WX, XN, 4AP, BB, HJ, JX, SA, UL, UR, 5FL, FM, HM, JS, LD, ML, OR, 6AF, LU, MN, MU, 7JB, AB, ZL1BR, BT, DV, FT, GX, HJ, IV, MB, 2DS, FA, GN, GR, GW, LA, LB, OU, 3AZ, FZ, GR, GU, 4AQ, BR, CK, FK, GM, CQ, GY, DQ, ZK1AA.

## 28 Mc.

**R. D. (Bob) EVERARD**, St. Margaret-at-Cliffe, Nr. Dover, Kent.

'Phone—VP3AA, PY2CK, LUI1DJ, 9BV, YV1AP, AQ, HC1FG, VE3ANF, OV, ZS6AA, DY, ZE1JR, JZ, T12RC, K4EZR, SUIGP, SG, CN8AV, AJ, and Police 'phones.

## 56 Mc.

**C. T. FAIRCHILD**, 2DGR, 1a Dover Road, Brighton, 6. 0-v-1 battery. CW—G2AO, UJP, XC, XI, XIP, ZV, ZVP, 3TV, 5CD, JZ, OJ, 6CY, FO, 8KZ, OQ, OS.

'Phone—G2AW, NHP, ZV, ZVP, 5CD, MAP, 8KZ, OS. Mod. CW—GNHP, 5MAP. Harmonics—G2RU, 3HP, JF, KJ, 6CY, 8AC, OQ.

**R. J. LEE**, BRS1173, 9 Theobalds Road, Heathfield, Sussex. "S.-W. Magazine" 0-v-pen., 66-ft. aerial, 475 a.s.l. G2AO; HG, JK, OD, UJ, UJP, XI, XIP; XC, ZV, ZVP, LC, 5MAP, RO, BY, JZ, 6FO, XM, 8DM, OS, OQ.

## SLP (1), September 21 0700—0830.

## 14 Mc.

**H. OWEN**, 2 Campion Avenue, Basford Park, Newcastle, Staffs. Eddystone "All-World Two." .33-ft. end-on, ENE-WSW.

CW—F8NP, G5MS, VA, 8IP, UD, G6GHZ, HA2F, I1KN, ND, OH6NS, OK1ZM, 2CP, EL, XF, SM5VR, 6NB, VE4AE, TJ, TY, YM4BE, YR5AX, VX, ZL4AY, GM.

'Phone—F3QG, FA8CF, G5JO, QN, SM7QC, W4EEV.

**J. SWORNSBOURNE**, Brookfield, Woldingham, Surrey. Battery 0-v-1.

CW—F3LH, G3SQ, 5PY, UX, 8II, HA2F, 3C, I1KN, OH6NS, OK2CP, PA0KV, SM5VR, VE4ABR, AMH, BN, OX, VK2AES, AID, AJD, DG, UY, 3BC, NG, OK, UM, 5LL, WR, W7DVV, 8EC, ZL1DV, MR, 3FZ, JA, 4AF, CP, FB.

'Phone—G2UT, 3AP, J6FC, K6GB, LA7K.

**K. SLY**, 2FAU, 16 Buckland Avenue, Slough Bucks. Tuned Zep. dipole, 66-ft. top.

'Phone—FA3HC, VK3HG, WA, W4SW, CW—FA8DA, C5RV, 8CC, HK, HA2F, K6PFB, OK2CP, SM5VR, VE4RO, VK2AIB, DG, UY, 3NG, SD, 5JS, W5CUB, YR5AX, VX, ZL2LA, CW, VM, 4CP.

**BSWL319**, 95 Chesterfield Road, Bristol. EA9AH, FA3HC, G2NM, UT, 5BM, JO, QN, 6PC, 8QX, HC1FG, HK3LC, LA6C, 7K, VK2NS, TI, 3HG, WA, W4SW.

**C. R. PERKS**, 2FAP, Cross Keys, Hednesford, Staffs.

EA7AV, F3LH, G5MS, RV, 8DI, FV, HK, IK, CM6AZ, HA2F, 5J, I1IR, ND, LA7K, OK2CP, LO, XF, ZV, SM5VR, WZ, 6NV, SP1AT, RP, VK2AHP, AIB, AJD, AJF, DG, UY, 3SO, UM, 4DO, RF, 5LL, YR5AX, ZL2IW, 3FZ, 4GM.

**D. F. CHATT**, BSWL959, 23 North View, Sherburn Hill, Co. Durham. SH4, I.S. Aerial, inv. "L." Height 15-ft. Length 75-ft. N-S.

'Phone—F3AF, 8UV, HK3LC, W4AEV, CW—F8ND, HA2F, 5J, HB9J, I1IR, OH6NS, OK2CP, EL, LO, XF, SM5WZ, 6NB, SP3AC.

## SLP (2), September 24 2300—2400.

## 1.7 Mc.

**K. SLY**, 2FAU, 16 Buckland Avenue, Slough, Bucks. Untuned inverted "L", 66-ft.

'Phone—G2JL, 5PZ, CW2BG, CW—G3GH, 5GT, HS, KV, RY, 6GM, LF, TL, 8ML, TR, QI, CW5BI.

**L. NASH** (2DRX), 11 Charles Street; **E. KESTIN** (2DPR), 55 St. Mary Street; and **G. SHORT**, Hammond Avenue, South Hill, Radipole; Weymouth and District Radio Society.

'Phone—CW2BG, G2JL, 3BW, CQ, GH, G-(T?), 5HS, RY, 8ML, CW—CW2BG, C3CW, GH, RU, 5GT, HS, KV, RY, 6FO, GM, LF, RF, 8ML, TR.

**H. OWEN**, 2 Campion Avenue, Basford Park, Newcastle, Staffs.

'Phone—G8ML, CW2BG, CW—G2JL, 3MD, SP, 5GT, HS, QKP, RY, 8IJ, ML, TR.

**ALAN OWEN**, "Cartref", 3 Cawdor Road, Inverness, Scotland. Battery 1-v-1, 66-ft. inverted "L".

G2GF, LF, 3GH, 5CZ, 6AV, GO, SQ, 8CI, ML, CW2BG, Wick Radio.

## SLP (3), September 28 0700—0800.

## 7 Mc.

**J. SWORNSBOURNE**, Brookfield, Woldingham, Surrey. Battery 0-v-1. CW—G8AX, K5AM, OH6A, OZ2AU, NU, 4SL, SM3MT, 7MV, SPIRW, W2IGT, OE, 3DV, 8ICL, 9RZQ.

'Phone—F3RD, G8NA.

**C. R. PERKS**, 2FAP, Cross Keys, Hednesford, Staffs.

CW—CT1PV, F3BT, K5AM, LY1AD, ONASL, OZ2AU, SPIRW, W8JOV.

**D. F. CHATT**, BSWL959, 23 North View, Sherburn Hill, Co. Durham. SH4, I.S. Aerial inverted "L", Ht. 15-ft. Length 75-ft. N-S.

'Phone—CT1PV, F3DY, RA, AH, 8AH, ZC, HB9CE, SPIRH, CW—LY1AD.

**H. OWEN**, 2 Campion Avenue, Basford Park, Newcastle, Staffs. Condx: QRN 56-4+, QSB on DX sigs. (mod. rap. 2-3 Spts.)

CW—F3EB, G3AH, K5AM, LA8M, LY1AD, OZ2L, SM7MV, SPIF1, RW, 2PF, U5BG, W3GX1, 4E1O, 8AGZ, JOV, QVS.

'Phone—CT1PV, F3DY, RM, OZ5BW.

# Radio Equipment on the Flying Boats

## Apparatus for Short, Medium and Long-Waves

By C. A. Rigby (Late R.A.F.)

THIS IS a brief description of the equipment installed by Marconi's Wireless Telegraph Co., Ltd. in the Empire and Trans-Atlantic flying boats operated by Imperial Airways, as well as in the Mayo composite machines.

For normal transmission and reception a 200-ft. trailing aerial with winch and fairlead is provided, with a fixed aerial on the fuselage.

### ● The Transmitter

The band-switching transmitter covers short, medium and long waves, the change-over affecting the circuits only, and not the valves, which are common to all bands. Fitted with six separately tuned drive and PA circuits, a single control serves to select the appropriate pair for the wavelength required. A variometer covers the complete range for trailing aeriols of .0002 to .00055 mF capacity, and for working with a fixed aerial of .00015 to .00022 mF, an extra loading coil is used. This is shorted by means of the "fixed and trailing aerial change-over switch" when the trailing aerial is in use.

The approximate limits of each wave-band are as follow:—

R1...15—22 metres.	R4... 40— 90 metres.
R2...21—32     "	R5... 80— 200     "
R3...30—42     "	R6...550—1100     "

Transmission can be effected on CW, ICW and telephony on all wave-bands.

The drive circuits are maintained by a DET.12, and the PA employs two output valves in parallel. An ML4 is used for telephony and for ICW modulation, acting on the PA suppressor grids. The audio frequency for ICW is about 800 cycles.

Selection of CW, ICW or telephony is made by switching, and for telephony a press button on the microphone energises the transmitter. For keying CW or ICW, it is only necessary to operate the sending key.

A relay controls the transmitter when keying or when the microphone switch is pressed. The receiver is automatically energised, giving "listening through" on telegraphy when the key is up, or on telephony when the microphone switch is open.

The screen-grid voltage for the PA is obtained from a fixed bias resistance in the transmitter (approx. 200 volts), while a similar biasing resistance provides the voltage for the suppressor grids (about 80 volts for CW and -45 volts for ICW and telephony).

The drive circuit is tuned by separate variable condensers for each wave-band. The medium and intermediate wave-band tuning condensers are continuously variable and fitted with engraved dials. The short-wave bands are tuned by small adjustable condensers which when set are protected by a cover to prevent subsequent interference. There

is, however, a vernier adjustment on each condenser giving a variation of 5 per cent. from the set frequency while the main spindle is locked.

The PA circuit is tuned by a variometer on the medium wave-band, a special coil being fitted to maintain the anode tap adjustment constant over the whole range.

On the intermediate wave-band the PA circuit is tuned with a continuously variable condenser, and on the short-waves it is carried out by means of semi-fixed pre-set condensers which are covered in after being correctly adjusted.

### ● Input

The transmitter takes the following approximate HT feeds:—

Drive ... ..	25 mA approx. on all wave-bands.
PA Anode ... ..	120 mA max. on all bands.
PA Screen ... ..	30—40 mA.
Modulator ... ..	12 mA.
Total Feed approx. ...	200 mA maximum.
HT Voltage ... ..	1,200 volts.

Power in the aerial circuit on medium and intermediate waves is about 75 watts and on short-waves 60 watts. The total LT input to the transmitter is 4.0 amps at 12 volts. Series-parallel resistances are fitted internally to enable the two amplifier filaments to be connected in series, and the drive and modulator filaments in parallel, for use on 12-volt LT supply.

### ● Receiver

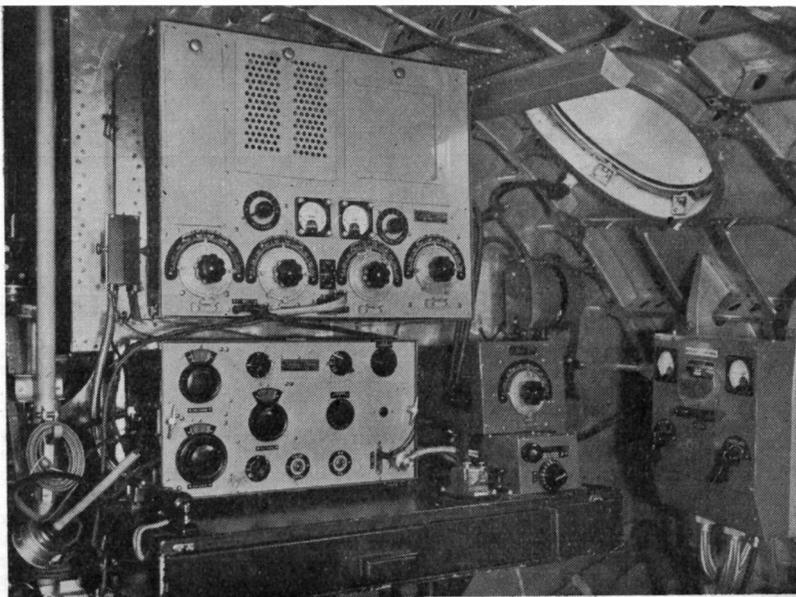
The receiver employs a high efficiency super-heterodyne circuit using multi-electrode valves. The wave-bands covered are: 15—100 metres, 183 metres, 300—450 metres, and 600—2000 metres, and reception of CW, ICW and telephony can be effected. On the longest wave-band (600—2000) the circuit arrangement allows of the receiver being used for direction finding and "homing" with the addition of the necessary directive aerial and accessory equipment.

Employing six indirectly heated valves with 12-volt filaments, the line-up is as follows:—

- Two triode-hexode frequency changers, one for the medium waves and the other for the short waves, with the object of avoiding switching at high frequencies. This stage operates as an RF amplifier, first detector, oscillator and frequency changer. (Marconi type X.31).
- A vari-mu RF pentode working on an IF of 465 kc. (Marconi type W.31).
- A double diode RF pentode in a further IF stage. (Marconi type W.D.30).
- A triode (Marconi type H.30) LF amplifier.
- A separate triode (Marconi type H.30), acts as a BFO on the IF stage for the reception of CW.

**Marconi Aircraft Installation in one of Imperial Airways Flying Boats.**

(By courtesy of Marconi Wireless Telegraph Co., Ltd.)



There are therefore four valves in circuit when receiving telephony or ICW, and five when taking CW, on either the short or medium wave-bands. Two independent tuning dials—one for each band—are employed, calibrated in metres and illuminated when in use. A separate control is provided for DF tuning on the 600-2000 metre band.

The receiver has eight main controls, with three additional ones where DF equipment is fitted.

The total LT input to the receiver is approximately 2.4 amps. at 12 volts, each valve filament taking 0.3 amp. and the illuminating bulbs 0.2 amp.

The total HT input to the set is 30 mA at 200 volts, and the maximum undistorted power output 150 milliwatts approximately.

### ● Power Supply

The main power supply for the transmitter is taken from a motor-driven generator set, comprising a Marconi-Stanley one HP engine, a motor for 24-volt input, and a double-output generator, giving 1200 volts at 200 mA for HT, and 12.5 volts 6 amps. LT, with smoothing.

For normal purposes, the motor drives the double-output generator, which supplies the full power necessary to operate the equipment.

In emergency, the motor is coupled to the petrol engine, which when running uses the motor as a charging dynamo for the main aircraft 24-volt battery, the double output generator still remaining coupled to the motor for delivering supplies to the installation.

HT for the receiver is taken from an anode converter. For landplanes, the generator set is replaced by a rotary transformer which can also be mechanically driven for battery charging.

### ● Direction Finding

A separate DF receiver may be included in the equipment, covering a range of 600-1550 metres in two overlapping bands. A corresponding 1-v-1 type receiver is available, having ranges of 300-650 and 800-1650 metres. The receiver works in conjunction with a frame aerial and a fixed aerial to give either "homing" or actual bearings of stations not in the line of flight.

The output from the screened DF frame, together with that from the open aerial, passes through a suitable transformer in the DF panel of the receiver. The output side of this transformer is tuned and calibrated in metres, and forms the grid of an amplifying valve, the tuned circuits of the receiver

being ganged to one dial. CW, ICW and telephony can be received at will, and separate volume and reaction controls, with a two-way wave-band switch, are provided.

For direction finding and "homing" purposes, a circular screened rotatable frame aerial (13-in. or 19-in. outside diameter), is mounted outside the aircraft fuselage and operated from inside either by means of a handwheel, or by a remote control. A circular engraved scale and pointer indicates the angle at which the frame aerial is set in relation to the aircraft's head. The scale can either be engraved 180°-0°-180° and the halves coloured red and green for port and starboard respectively, or marked 0°-360°. Bearings can therefore be taken on stations in the usual manner, or the frame aerial can be fixed at right angles to the line of flight for "homing."

The frame aerial is automatically locked in any desired position as soon as rotation is stopped. This type of frame aerial will shortly be replaced by a remotely controlled 8-in. loop housed in a streamlined casing.

The pilot's separate visual indicator equipment includes an anode converter which drives a rotating commutator type reversing switch. The visual indicator attachment also carries a small hand-reversing switch for aural reception, a phasing resistance, and a starting switch for the anode converter. The visual dashboard indicator comprises a meter having two pointers which, when the signal is applied, intersect and thus show the angular relationship between the head of the aircraft and the direction in which the station lies with reference to the centre line of the instrument. Only one indicator is used, as it can be switched into circuit for either DF receiver.

Provision is made so that both operator and pilot can wear a headset, in order to speak on the transmitter, receive signals, or "home," as may be required.

A separate loudspeaker can be included, thus enabling the operator to listen for calls while he is taking bearings on the DF receiver. The sending key is specially designed to be flame-proof and the contacts, which are totally enclosed, can be adjusted externally without removing the cover.

# The Amateur Codes

## How to use them and what they mean

WE ARE constantly being asked by readers new to short-wave working about the various codes used by amateurs.

Devised primarily to give speed in commercial radio-telegraph operation, a secondary result is that they make possible intelligible communication irrespective of the language difficulty, i.e., a Hindu can carry on quite an understandable conversation, using Morse and the various groups of the "Q" code, with a Russian or a Portuguese. The barrier of language simply does not arise, except when it is desired to convey a relatively complicated idea.

Furthermore, amateurs on their own have developed by long usage and tacit international acceptance a kind of universal language, which luckily for us is based on English. For instance, please becomes "pse", thanks is "tnx"—or "tku" for thank you—many is sent "mni", very "vy", I hope to see you again abbreviates to "hpe cuagn", and so on. Readers who can see the derivations of these forms will have no difficulty in getting at the meaning of "gb", "cul", "ur", "hw r u", and so forth. They can only be learnt by practice on the air.

### ● The RST Code

Then there is the RST Code, which is also strictly amateur in its application, and is used throughout the world to report the readability, strength and quality of note of a CW signal, the whole of this information being sent in one group. For instance, where an English amateur might want to say to a Frenchman "your signals are fully readable, moderately strong, but the note is rough AC, low-pitched and only slightly musical"—this is just an example,

of course—the actual transmission made by the British station to cover it all would be simply "ur sigs RST-573", which would tell the Frenchman what he should know.

Another very useful code, much in vogue some years ago but now almost forgotten, is the old F system, for 'phone reporting. This graduated from F1, which was meant to indicate a dirty noise, quite unreadable, to F9—perfect speech and a well modulated carrier. About 1926, no self-respecting telephony operator ever gave the B.B.C. better than F8.

### ● R Strengths

In amateur working, there will always be a certain discrepancy in the reports given by any two listeners; this is only to be expected, in that estimates of strength are largely a matter of opinion. Even a receiver fitted with an "R" meter does not solve this difficulty, for a great deal depends upon the way the set is handled. It is possible to get full loud-speaker signals by turning up the LF gain on a communication-type receiver when the carrier-level meter reads R3 only. Since the ultimate effect of the signal depends upon what reaches the ear, it is evident that a report of R3 is misleading.

On the other hand, as the "R" meter is usually operated by the RF and IF stages of the receiver, it can be a valuable indication of comparative signal strengths, especially where the received station is testing.

In practice, it is surprising how closely experienced operators agree in their estimates of signal strength when going by ear alone. This is not so marked now as it was in the old days, when the "0-v-1 with 'phones" was the receiving standard.

### THE Q CODE (as used by Amateurs)

QRA—Location (address)	QRS—Send slow.
QRB—Distance (miles)	QRT—Close down.
QRC—Frequency, kc.	QRU—Nothing further.
QRJ—Weak signals.	QRX—Listen.
QRK—Good signals.	QRZ—Who is calling.
QRL—Busy.	
QRM—Radio interference.	QSB—Fading.
QRN—Atmospheric interference (static).	QSL—Send a card.
QRO—High Power.	QSO—Contact.
QRP—Low Power.	QSP—Pass on (message).
QRQ—Send fast.	QSQ—Send single.
	QSY—Change frequency.
	QSZ—Send double.
QHM—Listening from HF end to middle of band.	
QML—Listening from middle to LF end.	
QLH—Listening from LF end to HF end.	
QHL—Listening from HF end to LF end.	

When sent with a query, as "QRT?", the meaning would be "Are you closing down?". Similarly, "QRM?" means "Are you getting interference?".

To say "My frequency is 7055 kc", the signal transmitted would be "QRG 7055".

### THE RST CODE IS:—

- R1—Unreadable.
- R2—Barely readable, occasional words distinguishable.
- R3—Readable with considerable difficulty.
- R4—Readable with practically no difficulty.
- R5—Perfectly readable.

- S1—Faint, signals barely perceptible.
- S2—Very weak signals.
- S3—Weak signals.
- S4—Fair signals.
- S5—Fairly good signals.
- S6—Good signals.
- S7—Moderately strong signals.
- S8—Strong signals.
- S9—Extremely strong signals.
- T1—Very rough hissing note.
- T2—Rough AC note, no trace of musicality.
- T3—Rough, low-pitched AC note, slightly musical.
- T4—Rather rough AC note, moderately musical.
- T5—Musically modulated note.
- T6—Modulated note, slight trace of whistle.
- T7—Near DC note, smooth ripple.
- T8—Good DC note, just a trace of ripple.
- T9—Purest DC note.

If the note appears to be crystal-controlled add an X after the appropriate number.

### F CODE FOR TELEPHONY

- F1—Speech distorted and badly over-modulated. Quite unintelligible.
- F2—Distorted but 10-15 per cent. intelligible.
- F3—General sense followed, but intelligibility low.
- F4—Pronounced distortion, 30 per cent. intelligible.
- F5—Speech breaking, poor quality, but intelligibility 60 per cent.
- F6—Unnatural speech, but readable.
- F7—Slightly distorted, 100 per cent. intelligible.
- F8—Good, clean speech.
- F9—Perfect, well-modulated telephony.

## ... HERE AND THERE ...

### Another Mullard Contribution

The new Mullard PV04-10, a ten-watt transmitting pentode, will be released shortly. Having a slope of 6 mA/V, it is rated for 10 watts anode and 3 watts screen dissipation; with 400 volts on the plate, it will give an RF output of 15 watts on 14 Mc for 0.33 watts driving power. This means that in Class-C, a grid current reading of something like 1 mA against double cut-off will drive the PVO4-10 to 25 watts input.

The anode-control grid capacity is 0.15 mmF only, which disposes of any possibility of the valve having to be neutralised in a reasonably well laid-out circuit. The amplification factor is 25, ensuring a high peak voltage at the grid of a succeeding RF power amplifier if the PVO4-10 is used in the intermediate stage of a high-power transmitter, though of course it can itself be operated as a PA for 10-25 watt working.

The normal screen adjustment is 250 volts with 12 mA maximum current, the filament supply is 0.7 amps. at 12 volts, and the cathode return current, i.e., the sum of plate and screen feeds, must not be allowed to exceed 85 mA. The base of the PV04-10 is standard British 7-pin, and its price is 27s. 6d.

We feel it would not be out of place at this point to draw readers' attention to the fact that Messrs. Mullards are not only keenly interested in the Amateur market, but are also doing their full share towards making available a range of British valves which, where price is related to high efficiency and long life, is rapidly making it unnecessary for the British amateur to go abroad for his transmitting valves.

Technical information and data sheets can be obtained from The Mullard Wireless Service Co., Ltd., Transmitting Division, 225 Tottenham Court Road, London, W.1.

### Denco — and Trolitul

We are pleased to bring to the notice of readers yet another firm specialising in the amateur field — Messrs. Denco, 234 Burrs Road, Clacton, Essex.

They are marketing a range of components in the nature of plug-in transmitting inductances, smaller coils for receiver and low-power stages; S/W RF chokes, stand-off insulators, etc., all employing "Trolitul" insulation. This is a transparent material of high electrical efficiency, completely non-hygroscopic, easily worked, and non-inflammable, with a loss-factor twice as good as steatite and nearly forty times better than bakelite.

Messrs. Denco can supply the material itself in sheet, rod and tube, some price examples being:  $\frac{3}{8}$ -in. sheet, 1d. per sq. inch;  $\frac{1}{4}$ -in. diameter rod, 1 $\frac{1}{2}$ d. per inch length;  $1\frac{1}{2}$ -in. diameter tube, suitable for coil formers, etc., 6d. per inch length.

The made-up components mentioned above are nicely finished and good looking ("Trolitul" lends itself to this), and they came well up to expectations under test conditions.

Illustrated pamphlets on Denco products can be had for the asking, and we shall be using many of these parts in apparatus to be described in early issues.

### Sidelight on History

Probably typical of amateurs throughout the country, the following epitomises the reaction to the recent Crisis of individual members of a certain provincial group:

- No. 1. Stood by ready to give the word "Go" to the furniture depository, pack his XYL off to distant cousins, rake out his old discharge papers and head for Portsmouth and a naval engine-room. ("It's always warmer below.")
- No. 2. Was prepared to repair local Fire Brigade telephones and alarms. ("Sure to go 'dis' all together.")
- No. 3. With his pal, No. 4, joined the C.W.R. ("Must get hold of some buckshee crystals.")
- No. 5. And No. 6, both in the Post Office, got ready for plenty of break-down work. ("Better than hunting 'fridge QRM, anyway.")
- No. 7. Commenced silencing ignition noise. ("To give the ops. a chance.")
- No. 8. Joined the Special Constables. ("To round up alien females.")
- No. 9. Answered the R.N.W.A.R. call. ("Heard a lot of new words.")
- No. 10. The Old Soldier. Expected conscription and anticipated power supply failures. He rigged an attic aerial, bought a battery set for BC listening, and installed a crystal receiver as a stand-by. N. S.

### Rueda Del Oeste

We are informed by Mr. H. O. Crisp, Elstowe House, Pear Tree Garden, Itchen, Southampton, the general delegate of the Western Association, that it has been declared dissolved by its founder, Mr. Felix Gunther, LU8AB, owing to the fact that the Argentine Government has recently promulgated a new amateur regulation which makes it illegal for any club or association to be mentioned on the air. Since the "Rueda del Oeste" is now prohibited, or at least its activities seriously curtailed, in the land of its birth, and it will be difficult to find a successor with the single-minded enthusiasm of LU8AB, Mr. Crisp is unable to say whether the Association is to be continued. It has members all over the world, still using the "Rueda" call, and the future will be a matter for discussion and negotiation.

### Three month's notice

is required if you want to resign from the Civilian Wireless Reserve in time of peace. Previously, members had to sign for five years unconditionally.

### 800 QSL Cards

will be sent out by Andrew Young, VR6AY, who promises to QSL 100 per cent. We don't know what happens if you're not in the first 800!

### A DX Listener Contest

is to be announced from HP5J, 9607 kc (31.23 m), at midnight on December 8. One of the prizes is a two weeks' holiday in Panama, with all expenses paid. Full details of the competition will be given in the broadcast.

# The Cathode Ray Tube

By A. F. Hollins

(Technical Service Dept., Mullard Wireless Service Co., Ltd.)

IT IS NOT INTENDED here to delve deeply into the theory underlying the design of the modern Cathode Ray Tube, but merely to indicate the basic principles upon which the operation of such tubes depend.

## ● Introduction

In its simplest form the cathode ray tube consists of an emitting cathode, an anode with a small aperture, positioned opposite the cathode, and a fluorescent screen.

Such a tube might be either of the high vacuum type or of the "soft" type in which a certain amount of residual gas has been left within the tube.

Many years ago it was discovered that in an evacuated or partially evacuated tube containing two electrodes, between which a high electrical pressure is maintained, a stream of negatively charged particles or "electrons" will pass from the cathode (negative electrode) to the anode (positive electrode), providing that the cathode is composed of a substance which will emit electrons under working conditions.

Originally the cathode was of the "cold emitting" type but in the later tubes "hot" cathodes, similar to those of radio valves, were used. It was also discovered that the electron stream (the so-called cathode ray) while not of the physical nature of light, obeys many of the laws which govern the behaviour of light; for example, cathode rays are normally propagated in straight lines, and therefore cast "electron shadows" if bodies capable of absorbing the rays are placed in their path. They can be focused into a concentrated beam or pencil, and can be reflected or refracted by electrical or magnetic means, just as light can be focused, reflected and refracted by lenses, mirrors and prisms.

A third, and equally important point, is that if the electron stream is made to impinge upon a surface coated with certain chemical substances, those substances will radiate

light at the point and instant of impact.

There are to-day two main classes of cathode ray tube available to the experimenter, the "soft" or gas focused type and the high vacuum type.

## ● Operation of the gas focused tube

The electrode system and operation of the "soft" type of tube differs somewhat from the high vacuum tube and perhaps the main point of difference is in the focusing mechanism.

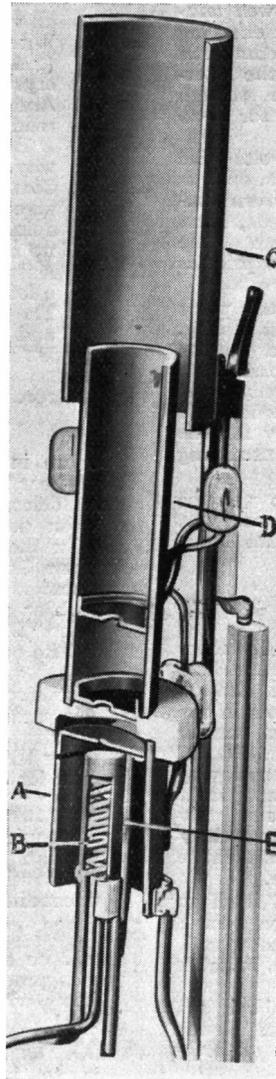
The tube may consist of an electrode system having the following elements. See Fig. 1.

1. A cathode.
2. A control electrode.
3. An Anode.
4. Two pairs of deflector plates.
5. A fluorescent screen.

The cathode is of special construction, entirely different from the type of cathode used in ordinary receiving valves. It is essential in a cathode ray tube that the electron emission should be as concentrated as possible, and the emitting surface of the cathode should therefore approximate closely to a point source.

The control electrode, which is usually in the form of a cylinder surrounding the cathode, fulfils a function somewhat similar to that of the grid in a receiving valve. With negative bias applied to this electrode the number of electrons passing through the tube decreases, and conversely, reduction of this bias results in an increase of the electronic current.

A further function of this electrode is that of forming the initial concentration of the beam.



A—Grid  
B—Heater  
C—Anode 2  
D—Anode 1  
E—Cathode

Longitudinal section of the electrode system of a high vacuum tube for oscillographic use. The double aperture of the first anode is clearly seen.

The anode of the tube is maintained at a high positive potential with respect to the cathode, this potential being from a few hundred volts to several thousand volts according to the type of tube and the purpose for which it is intended.

The focusing action takes place during the passage of the electrons from the cathode towards

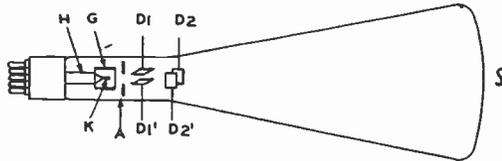


FIG. 1.

Elements of a gas-filled cathode-ray tube.

- H—Heater.
- K—Cathode.
- G—Control Electrode.
- A—Anode.
- D1 D1'—D2 D2'—Deflector plates.
- S—Fluorescent screen.

the screen. As a result of impact between the electrons and gas molecules, positive ions are formed in the path of the beam, and because of their greater mass they will remain in the beam for an appreciable time after formation. As a consequence, a positive space charge is produced within the beam tending to neutralise the negative space charge due to the electrons and thus causing the beam to converge.

At this point it will be of interest to examine some of the secondary effects associated with gas-filled tubes.

In the first place, due to the finite time taken for the ionisation of the gas within the tube, a very rapidly deflected beam becomes blurred since it does not remain in one position long enough to permit the formation of sufficient positive ions for satisfactory concentration of the beam.

Two further effects associated with gas-focused tubes are a departure from linearity of the deflection characteristics, as the field between the deflector plates is reduced below a certain value, and a somewhat lower value of impedance between the deflector

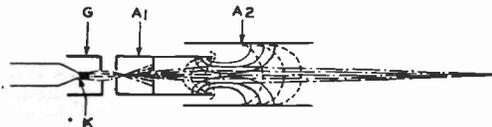


FIG. 2.

Electrostatic focusing in a high vacuum tube.

The two anodes A1 and A2 are supplied with different voltages, and due to the electrostatic field thus formed, the electrons are concentrated in a point at the screen.

plates than in the high vacuum tube, due to the ionic current.

However both of these two last-mentioned effects can be overcome, either by modifying the normal construction of the tube, or externally by adjustment of the electrical circuit connected to the tube.

### ● Operation of the high vacuum tube

The general construction of the high vacuum tube is fundamentally the same as that of the gas focused type, with the exception that additional means for concentrating the beam have to be pro-

vided, since the concentration effect of the residual gas ionisation is lacking.

The method of focusing the beam in a high vacuum tube may be either magnetic or electrostatic, but since the magnetically focused tube is not in general use for oscillographic work it is intended to deal here only with the electrostatically focused type.

### ● Electrostatic focusing

Reference to Fig. 2, which shows the beam outline of a normal two-anode tube at correct focus, will facilitate appreciation of what actually takes place. In the first place the electrostatic field between the cathode and the first anode is such that the stream of electrons leaving the cathode are initially convergent at the first anode but almost immediately tend to diverge again, then, due to the field existing between the first and second anode the beam is finally brought to focus at the screen.

The behaviour of the beam within an electrostatic field is thus similar to the behaviour of light when passed through a lens, and in the same way the "focal length" of the beam of electrons may be adjusted by varying the position, size and shape of the electrodes and/or the strength of the focusing field. Since, however, in a given tube the electrode

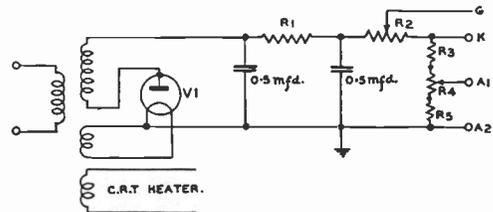


FIG. 3.

Circuit diagram of high tension unit for mains operation of two anode type of C.R. tube.

system and the optimum focal length are fixed by the dimensions of the tube, the ratio of voltages on the first and second anodes, necessary to produce the correct focusing field, is also fixed, and is virtually independent of the magnitude of the applied voltages within the working range. For the type of tube under consideration this ratio is approximately 1 to 4.

### ● Power supply

Fig. 3 shows a suitable circuit for the high tension supply for a tube such as the Mullard E.40-G3. It should be noted that in order to obtain a sharp image free from disturbance, the ripple voltage should not exceed about 3 volts, and the tube itself should be screened from stray magnetic fields.

It will be observed that the positive side of the high tension supply is earthed; therefore in building such a unit it is important to remember that contrary to normal radio practice the heater and cathode of the tube are at high tension with respect to earth and these parts of the apparatus should be made inaccessible. Also, special attention should be paid to the insulation of the heater transformer, which must be adequate to withstand the full high-tension voltage between the heater winding and earth. All potentiometers must have insulated spindles which should be earthed.

(To be continued.)

# Five-Metre Notes

By A. J. Devon

## September Receiving Results— More Logs Analysed — News from Overseas — Further Tests

THE BURST of activity over the September 9-11 Test Period, fully reported in our last issue, has not been followed up to the best advantage in view of what were for this country the outstanding results then obtained on 56 Mc. It will be remembered that our October survey recorded QRA-to-QRA contacts of well over 100 miles, and that several of these QSOs were better in terms of distance than any made by the portable stations, operated under presumably ideal conditions.

This minor triumph for the fixed stations is not reiterated here to stir the gall of the portable operators, but to emphasise once again that now is the season of the year to get going on 56 Mc from the home QRA, using crystal control and a CW receiver. To some, this may sound an expensive business, involving the tying up of much gear that could be used more profitably on other bands. The objection we frequently hear is "If I build a two- or three-stage CC transmitter for 56 Mc, it must lie idle when I want to work on 14 Mc, where I can at least be sure of a QSO." True, if you built that sort of a transmitter.

But, at the risk of being accused of trumpeting and trying to "plug" Magazine designs, it is a fact that our two-stage all-band Exciter\* is one answer to this problem. Giving output on the six ranges 1.7 to 56 Mc as required, it will drive an RK.34 connected as a neutralised push-pull straight amplifier to 25 watts or more from a 7 Mc crystal. It is simply a matter of changing coils and re-tuning to get drive for any band, with either CO, tritet or ECO connection. Admittedly, this does not get over the difficulty of having to keep one PA unit for 56 Mc only, as it is not possible to design along standard lines an efficient output stage which can be used on, say, the four bands 7 to 56 Mc. The latter frequency must, in general, be treated as a special case.

The Magazine 56 Mc transmitter as outlined here is a highly efficient rig, cheap and easy to build, and is all-British with the exception of the twin-triode output valve, for which we anticipate an English substitute will soon be available. On the receiving side, suitable designs of proved efficiency and tested performance have appeared in recent issues, so that there is no dearth of information on 56 Mc working.

As a footnote to these remarks, we might mention that with only one exception those several fixed stations which achieved noteworthy DX results over September 9-11 were using crystal control, and that the GPO is now asking new applicants for the 56 Mc band to quote a crystal frequency.

### ● Receiving Logs

Some extremely useful data has become available from the collective study of listener reports, of which

\* [See *January and April issues for the Exciter, and for the 56 Mc PA, those of March, April and May; all 1938.*—Ed.]

over twenty finally came in on the September Tests.

The main points which emerge are that everyone who heard DX used a straight receiver, generally 0-v-1, and that long aeriels gave better coverage and signal strength than the shorter fundamental types, such as dipoles. In some instances, however, a dipole with a reflector, beamed in a certain direction, received better along that line than any other aerial. This is of course only to be expected, but is also the reason why some listeners did not hear much DX—there wasn't any along the line on which they set up!

Coming to individual reports, that of G. F. Keen, 2BIL, is outstanding for the number of stations received and confirmed, while his notes and comparative tests with the three receivers and two aeriels they had available—he was assisted by N. D. Mattock, 2DFG, and between them they kept a continuous watch for nearly 60 hours—form a valuable contribution to our records. Camped on Dytchling Beacon, near Brighton (a photograph appeared in our last issue) and using a 135-ft. aerial with an 0-v-1, they logged a total of 151 CW and 61 'phone transmissions from 35 different stations, indicating a high degree of consistency in reception of these signals for the three days. G6LI (Mansfield, 166 miles) was heard on five separate occasions and G6FO (Newport, 132 miles) eleven times. The Preston Police, at 230 miles, were also heard once on 'phone. Other good DX was G5JU (Bristol, 112 miles) and G6FU (Longstanton, 92 miles). The remaining 30 stations were all at distances varying from six to sixty miles.

This very creditable effort by 2BIL and 2DFG entitles them to the Magazine Award for the best receiving performance during the Tests.

Another very good log and summary of results comes from W. F. Miller, 2AAH, listening portable at St. Roaches Hill, Goodwood, W. Sussex. With a 1-v-1 TRF receiver, in a total of only 4½ hours' work spread over the three days, he logged 14 stations, including G6LI at 168 miles, G6FO 110 miles and G6VF 96 miles, at respectively RST-549, 589 and 569. The aerial was a ½-wave doublet with ½-wave reflector a quarter-wave behind, the whole on a rotatable framework. It comes down into sections 4-ft. long, and can be set up in five minutes.

2AAH puts the DX achieved during the Tests down to "extended ground wave" effect, but suggests there may be a very low layer which at times becomes dense enough to bend 56 Mc signals and so give medium distance contacts. We strongly favour the latter idea, supported as it is by the occurrence of QSB at these distances. 2AAH also mentions the temperature differences which prevailed between his location and those points from which he heard signals as being one possible reason for the ground-wave range increasing.

H. Willetts of Bolton with 2ABF and 2CKC, listened at Rivington Pike, Lancs., using an 0-v-Pen super-regenerative receiver and a ½-wave

vertical aerial. They heard five stations on ICW and 'phone on the Saturday afternoon, GW6AAP on Snowdon (70 miles) and GW2NF from his home QRA at Colwyn Bay (60 miles) being the best. An 8  $\frac{1}{4}$ -wave horizontal wire gave better results than the small vertical aerial. Mr. Willetts makes some potent remarks on what can be done when organised tests bring a large number of stations on together. He suggests that the Magazine arranges regular week-end tests for the next six months, asking transmitters to send in for publication details of their times, frequencies and systems of transmission.

We endorse these remarks with fervour, and will be very glad to give all possible support to any scheduled 56 Mc activity.

C. T. Fairchild, 2DGR, also chose Dytchling Beacon, and with an 0-v-Pen heard 82 transmissions from 14 different stations on CW, ICW and 'phone. His best DX was G6FO at 132 miles, RST-569 on several occasions. The aerial was a 135-ft. horizontal wire.

R. J. Lee, BRS-1173, Heathfield, Sussex, whose general 56 Mc log is given in the Calls Heard section, uses a Magazine 0-v-1 and a 66-ft. aerial. He is there most evenings from 2130-2300 GMT, and nearly all Sundays. A report from BRS-1173, at 148 miles, constitutes G6FO's best DX to date on 56 Mc.

R. Holmes, Painswick, Glos., who though somewhat screened hears a lot on 56 Mc (his Test Period log and receiver details appeared in the October issue) reports again with a list of 12 transmissions received up to Oct. 16 from seven different stations, of which G6VF (Bristol) is the most consistent. Mr. Holmes remarks that this paucity of 56 Mc signals is not due to conditions, as proved by distant check stations, but to apathy, as suggested in the opening paragraph of these Notes.

S. B. Osborn, 51 Eversleigh Road, London, N.3, another whose Test log and receiver details were published in October Calls Heard, heard 19 stations on CW, ICW and 'phone, and is one of those reporting reception of G6FO (122 miles) on both vertical and horizontal aerials, during daylight and dark. QRK varied from R3 to R5. G2XC (Portsmouth, 65 miles) was RST-559 at Mr. Osborn's QRA, the other stations logged being less than 50 miles away.

H. W. Parker, BRS-2601, Ewell, Surrey, was another listener in the London district to report G6FO (118 miles), using an 0-v-Pen receiver and a  $\frac{1}{4}$ -wave horizontal dipole directional E-W, which gave an RST-568 signal from the Newport station.

The remaining 56 Mc listener reports either record reception of purely local signals only or else have already been dealt with in the DX Corner.

It is hoped that no reader of these Notes will draw any unworthy conclusion from the predominance of one particular call-sign both in this account and the one which appeared last month! It seems that the station in question was in fact getting out exceptionally well, and that can be the only excuse—if one is needed—because the reports and 56 Mc results generally have been extracted from the correspondence which reached us.

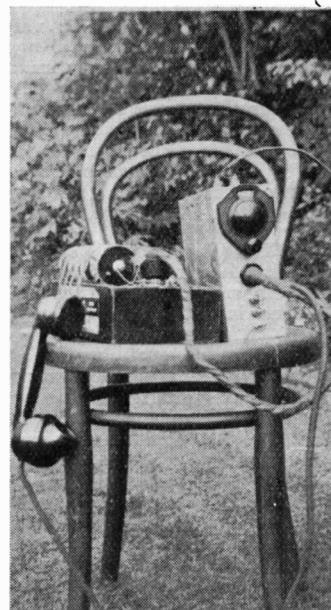
### ● Overseas News

F. H. Pettitt, SUI5G, Alexandria, tells us that stations SUI1WM and SUI1RD there will shortly be joining certain Cairo operators who are already making tests on 56 Mc. The SU crowd are beginning to show a more serious interest in the band, though we gather that local work only has been done so far.

As it would certainly be of the greatest value to G stations now looking for "first-hop DX," also to the many English listening stations, to have details of this Egyptian activity, we hope to be able to publish more positive information in the December issue.

In Australia and New Zealand, there are a fair number of stations regularly active. Readers will remember that VK2NO, Sydney, has been doing very well. It is reported, but not yet confirmed, that he has been heard by W9CCL. ZL3DJ is concentrating on 56 Mc DX, and there are keen users of this band in nearly all the large towns. Though ZL and VK have heard one another (across about 2,000 miles, by the way, and not a few hundred, as we at this pole of the Antipodes, sometimes imagine) no actual two-way working has yet been recorded on five metres.

From the American "Radio" for October we lift the news of the first east-west five-metre working, on July 24, when 2,000-mile QSOs were obtained by several stations, and the LF end of the band sounded



The portable equipment used by EI2J in the September 56 Mc Tests. He worked GW6AAP, at 112 miles with one watt input.

like 7 Mc does here on a busy Sunday morning—or so we understand! Though nearly all the best contacts were obtained with CC gear, W6DNS used a pair of HK54's with 175 watts input driven by a single HK54 as a stabilised oscillator (concentric-line), and he apparently made himself heard in all States except the 4th.

There is no doubt that lately the Americans have been having a very good time on 56 Mc, and European DX is being thought of as a serious possibility. The difficulty for us in this country is that while we would be very happy to get across the Atlantic, it can only happen during a spell of exceptionally favourable conditions. This looks like a waste of words, but the point of it is that we have a *better chance* of contacts at distances of 500-1,500 miles, if only the co-operation was forthcoming. If the accumulated data means anything, the indications are that "first-hop DX" across the Atlantic will be very rare, but there is under average conditions a strong possibility of putting down a signal in Central Europe or—since we have already mentioned SU—in Egypt.

### ● November Tests

As briefly announced in our last issue, Trans-Atlantic Tests on 56 Mc have been scheduled by

## 56 Mc NEWS

day and Sunday, this being the period in the 24 hours during which conditions should be best for the States. European stations are to transmit from 1500-1510, 1520-1530 and 1540-1550 GMT only, when W will be QRX. In the intervening periods, W's will transmit and G's should listen.

We cannot over-emphasise the importance of these Tests. They have been well publicised in this country and America, and we sincerely hope that they will be regarded as an opportunity for a collective effort at a time when it is known that many stations will be operating.

Naturally, we shall be very glad to have any details of results, even if negative, particularly if they can be referred to conditions on 28 Mc at the same time. We now have in this country a large number of stations efficient on 56 Mc in both transmission and reception, and if Old Man Conditions will just lift a corner of the blanket for an hour or so to let a few signals through, we shall be more than grateful . . . and somewhat surprised!

### ● Other News

G2XC (Portsmouth) says that he finds 56 Mc activity has slackened off considerably since the September Tests, but that he is on every Monday, Wednesday and Friday after 2200 GMT and expects to be taking part in the G/W effort this month. A DX report received by G2XC turned out to be a "phoney," as the SWL in question was unable to give anything but the vaguest details of a contact he said he had heard G2XC make. But the report tallied with what had already appeared in the Magazine!

The "card at any price" people operate on all bands, and since it is more important to have a definite check on 56 Mc than on any other, it is always as well when calling "Test" to use a code letter or a formula of some kind which will enable the report to be verified without doubt, as G2XC's experience shows.

G2ZV, 2DDD, G2OD and G8OS have been operating in receiver tests. The sets were 0-v-1, 1-v-1 and a resonant line rig belonging to 2CIL. Results showed that the 1-v-1 with an Acorn RF stage, built by 2DDD, gave a gain of anything from 3 to 4 R's over the others.

G2MF (Sheffield) took part in the September Tests, working portable in the Peak District, and using a controlled oscillator; his report was unfortunately just too late for our last issue. Local stations only were worked, and G2MF says he has now become a convert to CC for 56 Mc. Other Sheffield stations on the band are G5TO, G3FA and G2HQ, the latter of whom has just built a CC 5-metre rig, complete with modulator, in a space only about 9-ins. all three ways.

G2JK (Upper Tooting, S.W.17) has a 4-stage 10-watt transmitter for 56 Mc and is often reported in "Calls Heard." He has received G6FO (Newport, 122 miles) on one occasion at RST-549 on an 0-v-1 Colpitts.

G8LY (Winchester) says that though the locals are still audible, she thinks her receiver is going soft, and has had no 5-metre QSOs for some time. She is putting up a 10  $\frac{1}{2}$ -wave aerial for the November Tests, and reports a curious instance of "local cut-off," which occurred on October 3, 5 and 8, at

(Continued at foot of next column.)

"Radio." These are to take place on the four week-ends of this month, from 1500-1600 GMT each Satur-

### "LISTENERS' DX CORNER"—cont. from p. 24.

Norman Vaus has written several letters to us, and mentions that he heard W2GDU working TG9BA and wonders if this is the new call of TG5. We do not know, but we now understand that there will be four or five TGs on the air soon with official licences. Norman has added 6 new countries during the month, VP3AA, VQ4KTB, CN1AF, XE2N, FT4AN and S6AQ, but the latter left Hong Kong a long time ago, so probably the call was misread.

### ● Logs and SLP

As the winter is now upon us, we are trying the experiment of cutting out the Set Listening Periods for this month. Instead, we will publish the best logs under the following headings: 1.7, 3.5, 7, 14, 28 and 56 Mc, which will give a comprehensive survey of the bands. Special logs, such as Mr. Lee's list of VK/ZLs heard during the VK/ZL contest will be appreciated, and particular interest is attached to logs of British stations received from overseas. Please remember, however, that we are only allowed one page, and do not send a list if you think there will be little chance of it being published—just mention the best calls you have heard for inclusion in the text.

### DX FORECAST FOR NOVEMBER 1938

North America, (All times GMT)	7 Mc	14 Mc	28 Mc
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
<b>South America.</b>			
All ... ..	2200-0700	2100-0900	0900-1100 1500-2100
(Note:— S. America is frequently heard when U.S.A. signals are absent)			
<b>Africa.</b>			
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
<b>Asia.</b>			
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
YL, ZC6, VU (north), U8, 9 ...	2000-0300	1300-1900	
<b>Oceania.</b>			
VK, VK9 ... ..	1930-2030	0600-1000	0700-1100 1500-2100
ZL, VR2, 4, 6 ... ..	0700-0800	0700-1000	0900-1000
PK, KA, Guam. ... ..	1930-2030	1600-2100	1000-1200
	2000-2100	1600-1900	1000-1200 0800-0900 1400-1600

different times, when 2DUT, who is normally able to get G8LY Q5 as a regular signal, could not hear her at all.

### ● The GW Trophy

This has been won easily by David Mitchell, GW6AAP, whose highly successful work from Snowdon we reported fully in the October issue. He scored no less than 658 points, his nearest rival being G8JVP with 146. G6FO placed third with 130 points, and was the leading fixed station. Two more portables, G5ZTP and GW6OKP were fourth and fifth, with G2XC sixth as the second fixed station. The final listing showed 19 entrants for the contest.

Please let us have all 56 Mc reports and news by November 21 latest for the December issue.

## CLUB ACTIVITIES

**ASHTON AND DISTRICT AMATEUR RADIO SOCIETY**; K. Gooding (G3PM), 7 Broadbent Avenue, Ashton-under-Lyne.—At the sixth meeting (Sept. 21), W. P. Green demonstrated his 56 Mc rig. Signals were radiated by two members in G6TL and G3BY, and both sides of the QSO were followed at the meeting. A discussion on various types of USW receivers followed. Congratulations were extended to G3FF on contacting ZL with 8 watts CW. 2CYG is hoping to be on the air soon. Morse classes are held every Monday and Friday at G3NX (Commercial Hotel, Old Street).

**BRADFORD RADIO SOCIETY**, Cambridge House, 66 Little Horton Lane; S. Hartley, 7 Blakehill Avenue, Fagley; 2s. 6d.—The next two events are: Nov. 13, film illustrated lecture, "Short-Wave Working," Mr. Garnett; December 6, "High Quality Reproduction," Wharfedale Wireless Works.

**BRADFORD S.-W. CLUB**, Bradford Moor School, Laisterdyke; Fridays, 7.30; G. Walker, 2AWR, 33 Napier Road, Thornbury; 4s.—At the annual meeting last month the following elections were made: G. Walker, secretary; V. W. Sowen, treasurer; R. Hudson, E. J. Simonard (chairman) and H. Simpson, committee; G3KB is to act as technical adviser.

**BRIGHTON BRANCH W.F.S.R.A.**, 2 Cheapside, London Road; alternate Fridays, 8 p.m.; F. R. Jupp (2FAD), 12 Brading Road.—An AA permit has been granted and members are now designing a receiver, to be followed by a battery transmitter.

**CARDIFF DIST. S.-W. CLUB**, Globe Hotel, Castle Street; Thursdays, 8 p.m.; entrance fee 2s. 6d., 5s.—Membership of 38 includes 12 full licences and 17 AA's, who are anticipating a lively session. Morse practice is taken at 7.30 on meeting nights. The club's own magazine, "The News-Reel," is available to associate members, who receive copies for a fee of 2s. per annum.

**CANNOCK AND DISTRICT AMATEUR RADIO CLUB**, Cross Keys Hotel; D. Whitehouse (G2YV), Trumwyne House; first Sunday each month; 6d. each meeting.—Recent efforts have been productive of increased speed in Morse. More members are wanted and specially invited to the November 6 meeting.

**DEPTFORD MEN'S INSTITUTE S.-W. RADIO CLUB**; Tuesdays.—2FIU, 2FCW and 2ADT were welcomed during the past month. Mr. Casey is now 2FMN, bringing AA membership up to 8. Lectures by Belling-Lee, November 8 and Premier Supply Stores, November 22 have been arranged. The Morse class has made an enthusiastic start. A visit from G3IP of Kings Lynn was the result of a QSO made during the summer.

**DULWICH RADIO CLUB**; W. J. Bird, rear 55 Upland Road.—On October 2 (annual meeting) suggestions such as obtaining test equipment, and the inauguration of a theory class on Sunday evenings were raised. Morse classes Mondays and Wednesdays. Installation of a buffet is contemplated. The organiser is now 2FKZ. Recently a member has given a demonstration of his recording equipment, using glass records.

**EASTBOURNE AND DISTRICT RADIO SOCIETY**, Science Room, Cavendish Senior School; T. G. R. Dowsett, 48 Grove Road.—Experiments with the society's

5-metre transmitter were conducted on October 4, and it was shown how it could be quite quickly adapted for battery operation. It has been decided to fix an aerial for the transmitter at headquarters. There was also a display chassis, shown by T. G. R. Dowsett, of an AC superhet.

**EAST DORSET and WEST HANTS RADIO CLUB**, Lintlaw Lodge, Wimborne Road, Poole; R. P. Heatley, G5OH, 26 The Triangle, Bournemouth ('phone 2023); 5s.—Last month's meetings provided a variety of interest, from C.W.R. matters to a lecture on superhet design. Members are asked to bring test records to assist G5OH's amplifier demonstration (November 16); 30th, Mr. Dyer (assisted by the secretary) will lay open his transmitter secrets. Club news every Sunday on 40 metres at 1000 GMT.

**ENFIELD RADIO SOCIETY**; A. E. Dempsey, 50 Chase-side Avenue.—The fifth annual meeting was held in October. There are 7 members with AA and 2 full licences. Presentation of a set of gramophone records was made to Mr. and Mrs. Dempsey for their assistance during the year. New officers were elected.

**EXETER AND DISTRICT WIRELESS SOCIETY, Y.W.C.A.**, Dix's Field, Southernhay; Mondays, 8 p.m.; 5s., Juniors (under 17) 2s. 6d.; W. J. Ching, 9 Sivell Place, Heavitree.—Nov. 7: demonstration of the WIRELESS WORLD "Straight Six," by F. W. Saunders (G3MU); 14th, "Radio and the Moon," lecture by D. R. Barber, B.Sc., F.R.A.S.; 21st, Messrs. Voigt are giving a demonstration of loud-speakers; Dec. 5, "Electricity in Harness," by W. S. Pyrah.

**GLOUCESTER RADIO CLUB**; G. G. E. Lewis, 30 Kitchener Avenue.—Long-distance television is to be demonstrated on November 9; previous consistent reception of sound and vision is reported by Mr. Lewis (105 miles). November 3 is to be devoted to comparing AW receivers; December 7, "Aerials and Coils—receiving and transmitting" (discussion). The winter programme arrangements are complete.

**HACKENDEN RADIO CLUB**; The Alders, Hackenden, East Grinstead; E. G. Cooper (E. Grinstead 450).—Members had hoped to be able to report the completion of fitting out headquarters, but owing to other calls this is delayed. Assistance would be appreciated.

**ILFORD AND DISTRICT RADIO SOCIETY**; St. Albans Church Room, Albert Road (near Town Hall); Thursdays; C. E. Largen, 44 Trelawney Road, Barkingside.—Increased membership, direction-finding activities during the summer and latterly construction of the Society's transmitter (G3QU) assist the optimistic outlook (well merited) to be found in "The Bulletin," recent files of which show a splendid keenness among members.

**IRISH AMATEUR RADIO SOCIETY**, 83 North Circular Road, Dublin; Wednesdays; D. McNeill, 12 Merrion Road, Dublin, C2.—During the past month there has been a full complement of demonstrations—The MAGAZINE LF amplifier, J. G. White's mains receiver, loud-speakers, etc. A receiver-designing competition is shortly to be judged by the Editor.

**MAIDSTONE AMATEUR RADIO SOCIETY**, The Clubroom, 244 Upper Fant Road; P. M. S. Hedgeland (2DBA), 8 Hayle Road (Maidstone 4142); alternate Tuesdays.—November 15, "Interference Suppression," by H. J. Walters (Belling-Lee Co.); Novem-

ber 29, illustrated lecture and demonstration by Mr. Nixon of the General Electric Co., Ltd., on "The Design of Valve Amplifiers, including Contrast Expansion." Non-members are invited to attend these events.

**NEWCASTLE AND DISTRICT SHORT-WAVE CLUB**, 1 Farquhar Street; K. Scott.—Fortnightly meetings are to be arranged for the transmitter section; the usual monthly Sunday meeting is to be for general discussion, etc. An AA call has been granted to a member.

**NORTHERN IRELAND, RADIO SOCIETY OF**; Y.M.C.A., Wellington Place, Belfast; 4s. first year, 2s. 6d. subsequently; H. F. Ruberry, 2COF.—With a membership of 75, the committee has been kept busy formulating plans concerning the awards offered. The Stevenson Trophy was won by R. Barr, Junr., G15UR; Robinson Trophy, 2COF, G13KV, 5QX, 5ZY and 2UO are active on 14 Mc. G15HU, 8MI, 5UW and 8GK are using the 7 Mc band. All AA members are busy.

**SHEFFIELD S.-W. CLUB**, Schoolrooms, Ebenezer Street; D. H. Tomlin, 32 Moorsyde Avenue; Wednesdays, 8 p.m.—Morse practice commences at 6.30 each meeting night. Three enlightening lectures have recently been given: P. G. Voigt, "Quality Lour-speakers"; Mr. Petty, in the course of his talk, gave some interesting sidelights on tracing obscure receiver and amplifier faults; and G. F. Jones dealt with historical discoveries in electrical engineering and the difficulties encountered by early workers.

**SOUTHEND AND DIST. RADIO AND SCIENTIFIC SOCIETY**, J. M. S. Watson, G6CT, 23 Eastwood Boulevard, Westcliff-on-Sea (Southend 49829).—With visitors from the Ilford, Brentwood, Romford and Welwyn Societies Southend recently held their all-night direction-finding contest. About 50 enthusiasts, in 15 cars, set out at midnight to find the transmitter. L. Pugh was successful in three hours 23 minutes. The transmitter was reached by traversing a grass lane for half a mile, through a wood, across a clearing and into the wood again. At the edge of the clearing and the wood a ditch runs parallel and twelve yards from the clearing. The transmitter was concealed in the ditch and covered with a coat and some brushwood, being remotely controlled from a tent in the middle of the wood. The tests concluded with breakfast at 7.30 and a general exchange of experiences. The Society has found a room for meetings, which is situated in Southend High Street.

**THORNTON HEATH, S.-W. RADIO AND TELEVISION SOCIETY OF**; St. Paul's Hall, Norfolk Road; Tuesdays, 8.15 p.m.; R. E. Dabbs (G2RD), 4 Nutfield Road.—On October 11, D. P. L. May (2FKM) demonstrated his Hallicrafter Sky Rider very effectively and the following week the annual junk sale proved, as usual, a great success. An interesting evening is expected when a general discussion on the old question of "straight or superhet SW receiver" is being revived. The "sides" are to be led by Messrs. McCarthy and Childs, and it is hoped that G2DP, 2RD, 5DB, 3FP, 2BPL, DGN, DUV and DQG will be able to take part. Ultra SW interest is not being neglected and on the 8th inst. G2RD and G2DP are giving a joint talk on 5-metre receiver design. Trouble is again being experienced with "pirates," who are using local calls, particu-

larly the Society's (G8GY); interesting QSLs await the guilty parties at HQ!

**TONYREFAIL AND DISTRICT RADIO SOCIETY**, 81 Pritchard Street; Wednesdays, 7 p.m.; E. Powell (GW3QB), 44 Pritchard Street.—Most members attended the Field Day. GW3CR, GW3QB, 2FHL, and 2FKW are new calls. Officers elected for the ensuing year were: W. C. Hichens, chairman; J. B. Jones, vice-chairman; E. Powell (GW3QB), secretary; W. T. Rees (GW3CR), treasurer. Morse practice at every meeting, with GW3CR and GW3QB at the key.

**WEST HERTS AMATEUR RADIO SOCIETY**; A. W. Birt (G3NR), 6 Hempstead Road, Kings Langley, Herts.; 5s., payable quarterly.—The Society has recently celebrated its first birthday. At the A.G.M. the secretary gave a brief resume of the past year's activities, which clearly showed considerable progress. E. H. Rickett, G3PV, then gave a talk on "Band Switching and the Transmitter," after which G3NR lectured on "Aerial Systems." During the coming winter it is proposed to devote a short time at each meeting to the description of receiving equipment, for the benefit of listener-members. The early morning G3NR-PV schedule mentioned here last month has unfortunately had to be discontinued for the time being.

**WEYMOUTH AND DISTRICT SHORT-WAVE CLUB**, 15a, Hope Street; E. Kestin, 55 St. Mary Street; Tuesdays.—It has been decided to change meeting nights to Tuesdays, and the Morse classes to Saturday evenings, in order to suit the majority. The latter are progressing well, a few members hoping to pass the G.P.O. Morse Test soon, in order to operate the Club transmitter—G8WQ. Reports will be welcomed by the Club or any local amateurs. A 1.7 Mc field day was held but rain marred the occasion, although members enjoyed good listening. Experience gained should be useful next year, when a more ambitious event is to be staged.

**WILLESDEN AND DISTRICT RADIO SOCIETY**, 31 Willesden Lane; G. H. Talbot, 5 Linden Ave., Kensal Rise.—The Society offers co-operation with any transmitting amateur requiring reports, all bands. J. A. Mann has passed for a full call, two other members have applied for AA's. 2ATV is completing his rack-and-panel transmitter. The informal supper of last month was an enjoyable event.

**WIRRAL AMATEUR TRANSMITTING AND SHORT-WAVE CLUB**, "Beechcroft Settlement," Whetstone Lane, Birkenhead; J. R. Williamson, 13 Harrow Grove, Bromborough; last Wednesday evening in each month.—A low-powered but highly efficient transmitter was demonstrated by R. Cumberlidge (G3CK) on September 28. The rig, consisting of an 89 tri-tet capacity coupled to a 46 PA, complete with power supplies, evoked much admiration by its workman-like appearance. Mr. Cumberlidge explained his circuit and methods of obtaining high efficiency and stabilised grid bias from the HT pack. The Club is hoping to arrange a visit to the Liverpool head post office to see the telegraph instruments and picture-sending apparatus.

Readers thinking of joining a club are reminded that owing to considerations of space we are unable to say for each of them that new members are welcome . . .

# GUIDE TO THE WORLD'S SW BROADCASTERS

Compiled by F. A. Beane (2CUB)

ALL GMT

LATIN AMERICA

## Modifications and Corrections

"Radio Martinique," Fort-de-France, 9,700 kc, now broadcasts English programmes from Wednesday and Saturday midnight onwards. Announcements in French and English only now. Requests International Reply Coupons with all reception reports.

**TCWA, Guatemala City.** For additional details of this station see article "Have You Heard . . . ?" (September issue).

**HI8Q, Trujillo City,** Dominican Republic, 48.4 m, approx., is now reported discontinued.

**Cuban Broadcasters.** Many changes have been made since the radio conference was held in Havana; for particulars see article "Have You Heard . . . ?" (September issue).

**XEUZ, Mexico City, Mexico,** 49.02 m, 6,120 kc, sends reception confirmation in the form of a post-card view, suitably printed, according to reader J. Humm. It is a station of the National Broadcasting Network or "Cadena Radio Nacional, Partido Nacional Revolucionario."

## OAX4J, LIMA

(Peru)

Metres: 31.51 (actually near 32.15).

Kilocycles: 9,520 (actually near 9,330).

Power: Unknown.

**Operating schedule:** Daily 17.00—05.00. A "complete opera" is relayed every Sunday morning after 04.00.

**Standard time:** GMT less 5 hours.

**Distance from London:** Approximately 6,000 miles.

**Postal address:** "Radio Internacional OAX4J, Casilla 1166, Lima, Peru."

**Identification characteristics:** Frequent use of slogan "Radio Internacional," relays medium-wave OAX4I and employs three chime signal and male and female announcers, signs off with recording of "Goodnight Sweetheart."

**Verification of reception reports:** By attractive folder-type QSL card.

## HP5G, PANAMA CITY

(Panama)

Metres: 25.47. Kilocycles: 11,780.

Power: 1,500 watts.

**Operating schedule:** Not definitely known but from approximately midnight to 04.00.

**Standard time:** GMT less 5 hours.

**Distance from London:** Approximately 5,050 miles.

**Postal address:** "Radiodifusora HP5G, Apartado 1121, Panama City, Panama."

**Identification characteristics:** Slogan "Ron Dalley," English announcements at 15 minute intervals, male announcer for Spanish, time given verbally by "courtesy of the Panama Power and Light Company."

**Verification of reception reports:** By QSL card.

## OAX4T, LIMA

(Peru)

Metres: 31.37. Kilocycles: 9,562. Power: 10 kw.

**Operating schedule:** Daily 16.30-18.30; occasionally heard testing at other hours.

**Standard time:** GMT less 5 hours.

**Distance from London:** Approximately 6,000 miles.

**Postal address:** "Estacion OAX4T, Av. Petit Thouars 447, Lima, Peru."

**Identification characteristics:** Announces as "Estacion Radio Nacional del Peru," relays medium-wave OAX4A. Government owned.

**Verification of reception reports:** By plain QSL card.

## OAX4Z, LIMA

(Peru)

Metres: 49.32. Kilocycles: 6,082. Power: 10 kw.

**Operating schedule:** Daily 23.30—04.30 or 05.00.

**Standard time:** GMT less 5 hours.

**Distance from London:** Approximately 6,000 miles.

**Postal address:** "Estacion OAX4Z, Av. Petit Thouars 447, Lima, Peru."

**Identification characteristics:** Announces as "Estacion Radio Nacional del Peru," sometimes simply as "Radio Nacional." Has been known to use English and French when closing down. No chimes or other signals used. Government owned and sister station to OAX4T. Relays OAX4A.

**Verification of reception reports:** By plain QSL card, as that of OAX4T.

## OAX4G, LIMA

(Peru)

Metres: 48. Kilocycles: 6,230. Power: 400 w.

**Operating schedule:** Daily 00.00—04.00; seldom heard.

**Standard time:** GMT less 5 hours.

**Distance from London:** Approximately 6,000 miles.

**Postal address:** "Radiodifusora OAX4G, Robert Grellaud y Cia., Apartado 1242, Lima, Peru."

**Identification characteristics:** Announces as "Radio Grellaud" and closes down with a waltz "Goodnight Sweetheart."

**Verification of reception reports:** By attractive QSL card bearing five photos of transmitter and small call-sign.



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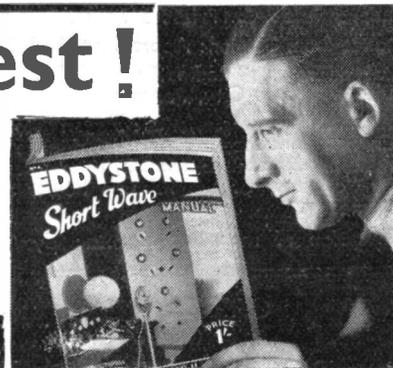
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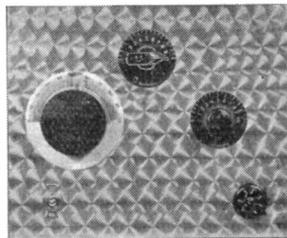


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10 RATIO OUTPUT TRANSFORMERS, 5s. 6d.; 80 watt, 20,000 ohm, 4s. Catalogue free.—2ATV, 86 Dibin House, Maida Vale, W.9.

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HEAR AMERICA, AUSTRALIA, JAPAN. New Receivers with valves, from 19s. 6d. Numerous testimonials. Lists free.—W. J. BUCKLE, 63, Avenue Approach, Bury St. Edmunds.

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- 1 Advertisements must be accompanied by 6d. in stamps or P.O. made payable to "The Short-Wave Magazine, Ltd." and crossed.
- 2 A maximum of three lines only will be allowed, including name and address.
- 3 Trade and Box Number advertisements cannot be accepted.
- 4 We reserve the right to refuse any advertisement.
- 5 We cannot act as an intermediary for an advertiser in this section.
- 6 Advertisements must reach this office not later than the 15th of the month preceding the month of issue.

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

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Sell 3-valve BATTERY RECEIVER with valves, £1 post free.—FMQ, Clarke, 318 Dickenson Road, Manchester, 13.

New FERRANTI MAINS TRANSFORMER (300v, 5v, 4v) 7s. 6d.; also A.F.4, 3s. 9d.; and Colvern two-gang BC coil, 6s.—2BTF, 110 Foresters Drive, Wallington, Surrey.

Transverse Current MICROPHONE, 5s.; Bound volumes "Practical Wireless," Nos. 1-4, 10s. the lot; PX.4, 3s. 6d.—212T, 2 Harbord Road, Sheffield, 8.

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Sell—"T.R. BULLETIN," Feb. 1935 to Jan. 1936, 6s. 6d.; 2 pairs Eriesson headphones, 4,000 ohms, 5s. pair, perfect; post free.—Geldard, 51 Reginald Terrace, Leeds, Yorks.

10-25w TX, Gear, Rack, Xtal (7 Mc), Meters, 2 P.Packs (400v, 120 mA), extra tubes, rectxs., etc., 61/6's, must sell, details.—2DLN, 2-36 Colsterworth Road, London, N.15.

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BARGAINS! Brandes "Superior" (B.B.C.) Headphones, 7s. 6d. 1/2 Trans'rs, 1s. each, Blue Spot PM MC 1/2s, cost 60s., sacrifice 10s.—Davies, 42 Cranbourne Rd., Salt-Hill, Slough, Bucks.

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ALL-WAVE BATTERY 3v, 13s. 6d. DC eliminator with trickle, 7s. 6d. Lionel electric train, £2.—2BTF, 110 Foresters Drive, Wallington, Surrey. Phone 5435.

4 Premier SW COILS (13-170 m) 3s.; Telsen RG4 (4-1) I.F. Transformer, 2s. 6d.; Wave-change on-off switch, 1s. 6d. I. Lightbody, 37 Stanmore Road, Mount Florida, Glasgow.

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.0005 Clydon Cond., 2-gang screened, dial and SM, cost 25s. for 5s.; Clydon .0003 "Bebe" 1s. 6d.; Pifco Volt-Ammeter 6s.—Gaunt, Caledonian Road, West Hartlepool.

Wanted—600-0-600, 120 or 250 mA Transf. with heaters, 7 Mc crystals, "Varmatch" Mod Transf.—GSTI, 10 Chipstow Crescent, Ilford.

Owing to space considerations we regret that a few advertisements are being held over until next month.

# 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.
31.36	9,565	WIXK, Millis, 1000-0100.
31.37	9,560	OAXAF, Lima, 1630-1830.
31.38	9,560	DJA, Zeelen, 2300-0350, 0505-1600.
31.41	9,550	W2NAD, Schenectady, 2315-0300.
31.41	9,550	VUB2, Bombay, 0220-0320, 0600-0830.
31.41	9,550	HVJ, Vatican City, not used at present.
31.41	9,550	OLR3A, Prague, temporarily discontinued.
31.41	9,550	TPBH, Paris-Mondial, 1615-2300.
31.45	9,540	DJN, Zeelen, 2150-0350.
31.46	9,535	Schwarzenburg, Bern, 1800-1900.
31.47	9,534	VPD2, Suva, 1030-1200.
31.48	9,535	W2NAF, Schenectady, 2100-0500.
31.48	9,535	LKC, Jelo, 1000-1300, 1630-2200.
31.48	9,530	VUC2, Calcutta, 0700-0900.
31.49	9,530	ZBW3, Hong-Kong, 0130-0615, 0800-1130.
31.50	9,523	ZRH, Roberts Heights, 0445-1230.
31.51	9,520	OZF, Skamleback, 0100-0400.
31.51	9,520	HJAHB, Armenia, 1200-1600, 2300-0300.
31.55	9,510	H88PJ, Bangkok, Tu 1300-1500.
31.55	9,510	G8B, Daventry, 1830-2100, 2115-2300, 2320-0200, 0220-0420.
31.58	9,500	OFD, Lahti, 1705-2200.
31.58	9,500	VK3ME, Melbourne, M-Sa 0900-1200.
31.58	9,500	FEWW, Mexico City, 2300-0600.
31.63	9,484	EAR, Madrid, 2100-2400.
31.69	9,465	TAP, Ankara, Turkey, evenings until 2100.
31.79	9,437	COCH, Havana, 1300-0500.
32.02	9,369	XOY, Chengtu, 1345-1530.
32.15	9,330	OAXAJ, Lima, 1700-0500.
32.26	9,300	HIC, Trujillo City, 1200-1400, 1700-1930, 2100-0200.
32.61	9,200	COHN, Havana, 1300-0430.
32.88	9,125	HATJ, Budapest, M at 0000.
32.97	9,100	COCA, Havana, 1300-0500.
33.00	9,091	PJC2, Curacao, S 1536-1736, weekdays 1136-0136.
33.32	9,030	COBZ, Havana, S 1242-0500 (M), other days 1242-0600.
33.50	8,955	COKC, Santiago de Cuba, 2200-2300, 0230-0330.
33.53	8,950	HCBJ, Quito, 2145-0315 ex. M.
34.02	8,665	COJK, Camaguey, 0100-0200.
34.08	8,650	HJAHU, Medellin, .
34.97	8,580	YNTR, Managua, 1800-1930, 0630-0245.
38.00	7,854	HC2J8B, Guayaquil, 2245-0145.
39.40	7,614	CR6AA, Iobito, M, W and Sa 1945-0145.
40.49	7,410	YDA, Bandoeng, 0130-0700.
40.65	7,380	YBCK, Mexico City, M 0000-0100.
44.31	6,780	HIII, San Pedro de Macoris, 1740-1840, 2340-0140.
44.64	6,720	PMH, Bandoeng, 0930-1600, S 0230-0630, 0930-1600, or 1630.
44.84	6,690	THEP, San Jose, 2100-0500.
44.94	6,675	HBO, Geneva, .
45.00	6,666	HC2RI, Guayaquil, S 2345-0045; W 0215-0115.
45.25	6,630	HIT, Trujillo, 1740-1840, 2340-0240.
45.31	6,618	"El Prado", Riobamba, F 0200-0400.
45.39	6,610	YNLG, Managua, 1830-1930, 2300-0300.
45.70	6,565	H15P, Puerto Plata, 2240-0040, 0240-0440.
45.80	6,550	TIRCC, San Jose, T, Th, Sa 2300-0000; S at 1600; M 0100-0200.
45.81	6,555	H14D, Trujillo, M and Sa 1655-1840, 2140-0040.
45.83	6,645	YV6RB, Bolivar City, 1530-1700, 0000-0230.
46.01	6,520	YV4RB, Valencia, 1530-1830, 2230-0230.
46.39	6,480	HIII, Trujillo, 2240-0240.
46.30	6,479	H18A, Trujillo, 1340-1540, 1940-2140, S 0210-0340.
46.40	6,465	YV3RB, Barquisimeto, 1200-1300, 2200-0230.
46.51	6,450	H14V, San Francisco de Macoris, 1640-1840, 2240-0140.
46.73	6,420	YV6RC, Bolivar City, 1500-1730, 2230-0230.
46.73	6,420	H11S, Santiago de los Caballeros, 1640-1840, 2240-0040.
46.80	6,410	TIPC, San Jose, 1200-1430, 1700-1900, 2100-0430.
46.88	6,400	TGQA, Quezaltenango, 0200-0400, S until 0600.
46.88	6,400	YV5RI, Caracas, 1330-1830, 2230-0330.
47.06	6,375	YV5RF, Caracas, 1700-1900, 2200-0300.
47.17	6,360	YVIRI, Maracaibo, S 1330-1930, weekdays 1600-1830, 21.00-0400.
47.28	6,345	YVIRC, Valera, 2230-0230.
47.39	6,330	COCW, Havana, 1200-0500.
47.50	6,316	HIZ, Trujillo, 1630-2000, 2230-0200.
47.62	6,300	YV4RD, Maracay, 2100-0100.
47.77	6,280	HIG, Trujillo, 1200-1400, 2040-0140.
47.85	6,270	YV5RP, Caracas, 0100-0400.
48.00	6,250	YV5RJ, Caracas, 1530-1730, 2130-0230.
48.05	6,243	HIN, Trujillo, 1640-1940, 0010-0210.
48.11	6,235	HRD, La Ceiba, S 2100-2300, weekdays 0100-0100.
48.15	6,230	OAXAG, Lima, 2200-0400.
48.31	6,210	YVIRI, Coro, 1530-0230.

M.	KC.	CALL-SIGN, LOCATION, SCHEDULE.
48.47	6,190	TG2, Guatemala, generally as TGWA, also S 0500-0600.
48.58	6,176	ZHO, Singapore, 1040-1540, also Sa 0625-0740, S 0440-0740.
48.59	6,174	XEXA, Mexico, 1430-1630, 2030-2230, 0500-0600.
48.72	6,158	YV5RD, Caracas, 1500-1700, 2000-0300.
48.78	6,150	H15N, Moca City, 1140-1340, 1540-1940, 2140-0140.
48.78	6,150	CJRO, Winnipeg, S 2000-0300 (M); weekdays 2300-0500.
48.80	6,150	CR7AA, Lourenco Marques, 1710-2100, S 1500-1900.
48.80	6,147	ZRD, Durban, 0445-0550, 0830-1230, 1400-1700 (see August issue).
48.82	6,145	HJAHB, Medellin, 1430-1900, 2100-0400.
48.86	6,140	SP?, Torun, Poland, 2000-2300, testing.
48.86	6,140	W8NK, Pittsburgh, 0300-0500.
48.94	6,130	VE9HX, Halifax, 1100-0315.
48.94	6,130	V13DG, Georgetown, 1515-1615, 2000-0045 (or later).
48.94	6,130	LKJ, Oslo, temporarily discontinued.
48.94	6,130	COCD, Havana, 1400-0600, S 1500-2300.
48.98	6,125	CXAA, Montevideo, 1500-1700, 1900-0100.
49.01	6,122	HP5H, Panama, 0000-0300.
49.02	6,120	O??, Helsinki, evenings.
49.02	6,120	W2N5, Wayne, 0430-0530.
49.02	6,120	XEUZ, Mexico City, 1400-1800, 2300-0630.
49.10	6,110	GSL, Daventry, 2320-0130, 0220-0425.
49.10	6,110	HJ6AB, Manizales, 2300-0500.
49.18	6,100	W3XAL, Boundbrook, 0200-0600.
49.18	6,100	YUA, Belgrade, between 0545-2230.
49.20	6,097	ZRK, Kilpheuvel, 1700-2100, S 1700-2020.
49.20	6,097	ZRJ, Maraisburg, 0445-0550, 0905-1230, 1400-1630. (see August issue).
49.30	6,085	HJ5ABD, Cali, 1500-1800, 2200-0400.
49.31	6,083	VQLO, Nairobi, evenings until 1915.
49.32	6,082	OAXAZ, Lima, 2330-0530.
49.42	6,070	CFKN, Toronto, 0100-0500.
49.42	6,070	YVIRD, Maracaibo, 0000-0400.
49.46	6,065	SBO, Motala, 1830-2300.
49.50	6,060	W3XAU, Philadelphia, 0100-0400.
49.50	6,060	W8XAL, Cincinnati, 1045-0400, 0400-0700, S 1300-0100.
49.51	6,057	ZHU, Singapore, 1040-1340, S 1540-1740.
49.59	6,050	GSA, Daventry, 1720-2100, 2115-2360.
49.65	6,042	HJ1AB, Barranquilla, 1600-0400.
49.67	6,040	W1XAL, Boston, 0000-0200.
49.67	6,040	W4XB, Miami, 1700-2000, 0200-0500, S 2100-2300, 0200-0500.
49.75	6,030	HP5B, Panama City, 1700-1800, 0000-0300.
49.75	6,030	HVJ, Vatican City, 1900-1915.
49.83	6,020	XEUW, Vera Cruz, 2300-0600.
49.83	6,020	DJC, Zeelen, 1630-2125.
49.88	6,015	HJ3ABX, Bogota, 1600-1900, 2300-0400.
49.92	6,010	CJCN, Sydney, 1200-1830, 2100-0130.
49.92	6,010	PRAS, Pernambuco, 2100-0200.
49.92	6,010	COCO, Havana, 1255-0430.
49.94	6,007	XYZ, Raangoon, 0200-0345, S 0230-0430.
49.94	6,007	ZRJ, Maraisburg, 2030-2100.
49.94	6,007	ZRH, Roberts Heights, 0445-0550, 1500-2030; S 1030-1200, 1400-1700, 1615-2015.
49.96	6,005	HP6K, Colon, 1200-1400, 1630-1800, 2300-0100.
49.96	6,005	CFCN, Montreal, 1400-0415.
50.00	6,000	ZTC, Cape Town, evenings.
50.00	6,000	CXAZ, Montevideo, 1530-0330.
50.00	6,000	XEBT, Mexico City, 1500-0500.
50.17	5,980	CS2WD, Lisbon, from 2100.
50.26	5,970	HJ4AD, Medellin, 0100-0430.
50.27	5,969	YV5RC, Caracas, 1600-1830, 2200-0330.
50.28	5,940	TG2N, Guatemala City, 0200-0300; S 0400-0600.
50.51	5,940	PJCL, Curacao, 2330-0130.
50.59	5,930	YVIRI, Maracaibo, 1600-1830, 2200-0330.
50.72	5,915	H12S, Port-au-Prince, 0000-0300.
50.80	5,905	T11S, San Jose, 1700-1900, 2300-0400.
51.02	5,875	YV3RA, Barquisimeto, 1800-1900, 2300-0300.
51.06	5,865	HKN, Tegucigalpa, 1830-1915, 0630-0500.
51.15	5,865	H1J, San Pedro de Macoris, 1740-1900, 2240-0300.
51.28	5,850	YVIRI, Maracaibo, 1345-1445, 1615-1800, 2145-0300.
51.46	5,830	TGPH, San Jose, 1700-1900, 0000-0400.
52.45	5,720	YV2RA, San Cristobal, 1630-1730, 2300-0200.
60.03	4,995	VPD2, Delhi, 1230-1730.
60.60	4,950	YV12, Madras, 1200-1700.
61.10	4,905	YV12, Bombay, 1200-1730.
61.22	4,900	HJ3ABH, Bogota, 1630-1900, 2300-0400.
61.48	4,880	VUC2, Calcutta, 1136-1736.
61.48	4,880	HJ4AR, Medellin, 2300-0400.
61.98	4,841	HJ3ABD, Bogota, 1400-1900, 2300-0500.
62.50	4,800	HJ1AR, Cartagena, 1330-0400; S 1400-0200.

(13.92-31.35 M Stations were given last month).

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## NATIONAL N.T.E.

This new National Combination Exciter and Speech Amplifier is the ideal transmitter control. Includes multi-band exciter unit, operating on 5, 10, 20 and 75 metres, or 10, 20, 40 and 75 metres, with a high gain built-in speech amplifier.

Either conventional single-crystal or National Varicap Holder may be used. Crystal Oscillator followed by three doubler stages, each using 6L6 Tubes. All switching controlled from front panel. The four-stage speech amplifier delivers 15 watts audio from PP 2A3's.

## HARVEY UHX10

The ideal standby or 10 to 20-watt transmitter. An extremely neat and efficient two-stage unit, with full modulation. Covers every amateur band, including 3 to 160 metres.

Phone CW or modulated CW. A separate power pack is available for operation direct from 230-volt AC. Alternatively, a 6 or 12-volt generator with remote control and filter unit can be supplied. The transmitter itself measures only 12 ins. x 6½ ins. x 7 ins. Power pack 12 ins. x 6 ins. x 7½ ins.

## RCA, ACR 150

Conservative 150-watts CW and 'phone output. Tube Line-up RF 807, 802, two 807's, two 808's; Audio 6J7, two 6C5's, two 2A3's, two 808's. Isolated speech amplifier of special design, 10 to 160-metre operation. All controls fully metered, including modulation indicator. Interlock safety switch, stable neutralisation. High- and low-power output controls.

## HARVEY UHX35

The only transmitter on the market adequately covering ultra-high frequencies. Can be supplied for operation on any frequency below 120 megacycles up to 14 megacycles. All controls and coils easily accessible for quick wave-dialing. RK-35 final amplifier driven from two RK-25's in parallel.

Every circuit fully metered. High-fidelity speech amplifier and modulator with high impedance input. Flat response from 50 to 15,000 cycles to within 2.5 DB. All units are mounted in a heavy black crackle cabinet.

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