# The SHORT WAVE Magazine

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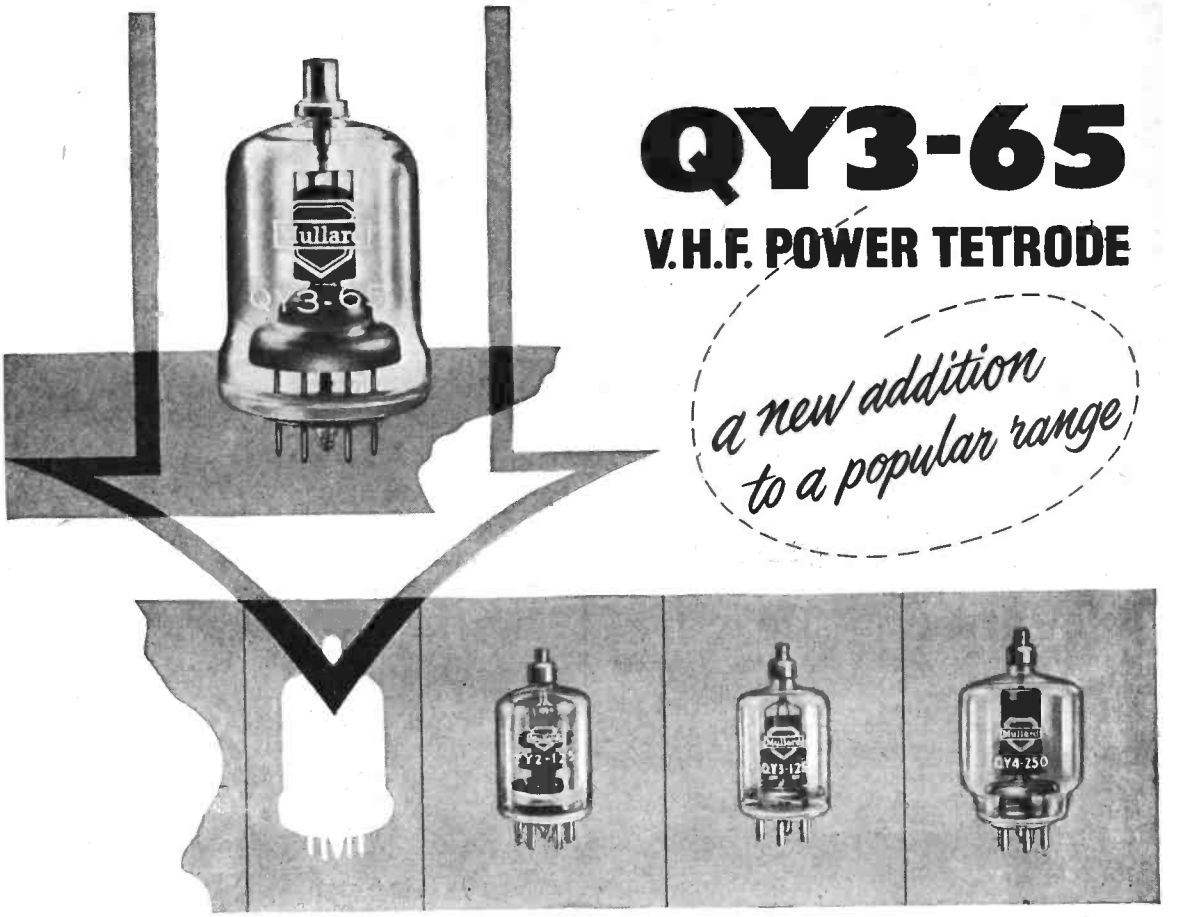
VOL. XIII DECEMBER, 1955 NUMBER 10




This new tetrode, the QY3-65, embodies a similar technique and construction to the Mullard range of all-glass transmitting valves which are already well established in communications and industry. It has an anode dissipation of 65 watts and a maximum frequency of 250 Mc/s and is directly interchangeable with the American 4-65A.

Relatively high outputs can be obtained from the QY3-65 at low anode voltages, and its quick heating filament allows power consumption during standby to be reduced to a minimum.

Write for detailed information on this valve, power triodes and other tetrodes made by Mullard.

| MAXIMUM OPERATING CONDITIONS (CLASS C AMPLIFIER) AT 50 Mc/s | | | | | | | | | Maximum frequency at reduced ratings (Mc/s) |
|---|---|---|---|---|---|---|---|---|---|
| Valve | Type | $V_a$ (V) | $V_{gl}$ (V) | $I_a$ (mA) | $I_{gl}$ (mA) | $V_{in}$ (peak) (V) | $P_{load}$ (W) | $\eta$ % | |
| **QY3-65 (CV1905)** | **TETRODE** | **3000** | **-100** | **115** | **10** | **170** | **224** | **81** | **250** |
| TY2-125 (CV1924) | TRIODE | 2500 | -200 | 205 | 40 | 390 | 310 | 76 | 200 |
| QY3-125 (CV2130) | TETRODE | 3000 | -150 | 167 | 6.5 | 300 | 300 | 75 | 200 |
| QY4-250 (CV2131) | TETRODE | 4000 | -225 | 312 | 9 | 374 | 800 | 80 | 120 |

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# SHORT WAVE MAGAZINE


VOL. XIII DECEMBER, 1955 No. 148


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FOR THE EXPERIMENTER AND THE RADIO ENGINEER

The SHORT WAVE Magazine

# Christmas

Each year we are happy to have the opportunity, at this time, of sending our greetings for the Christmas season to all our readers, at home and in the far corners of the earth.

This is the tenth occasion since the war that we have had this privilege—ten years during which there have been great advances in Amateur Radio technique and a large increase in the number of licensed radio amateurs, not only in this country but throughout the world as well. It is a fair claim that SHORT WAVE MAGAZINE has played its full part in this development. In writing these lines we feel we have the solid support of many thousands of keen readers, whose interests it is our duty and our pleasure to serve.

During the next decade we hope to be able to widen our scope and expand our activities, so that it may truly be said that SHORT WAVE MAGAZINE mirrors all that is best in Amateur Radio.

For this coming Christmas Season and the New Year, our good wishes for their happiness and our thanks for their support to all who, at home and abroad, may chance upon these lines.

*From the Managing Editor and Staff of*

SHORT WAVE MAGAZINE

# Station Layout and Organisation

## POINTS ON OPERATING COMFORT AND CONVENIENCE

N. P. SPOONER (G2NS)

*Here is another article based not upon theory but on practical experience. It will be of particular interest to those who want to make the most of the time they have for going on the air. While there is nothing new in any of the ideas or opinions put forward by our well-known contributor, what he has to say emphasises how much can be done to improve operating efficiency at the average station.*
*—Editor.*

IT may surprise readers to learn that some amateur stations still carry out the following drill when changing over from Send to Receive, and *vice versa*: 'Switch off the transmitter, change aerial from transmitter to receiver, switch off monitor, change headphones from monitor to receiver, switch on the receiver (and, who knows, perhaps lose the distant station because the band setting or spreading control has been accidentally knocked during the upheaval).

These strange manipulations ceased to be necessary when the "surplus" market was first flooded with innumerable relays—and although the coax feeder change-over known as Switch Type 78A may now be hard to find, the coax Switch Unit Type G is still available, besides great numbers of the Type 3000. The excellent use to which these relays can be put has been fully covered in the pages of *Short Wave Magazine* since as far back as 1938.

Instead of attempting to amplify such information, this article is intended to suggest other ways of making station control easier under present-day conditions. Much can be done by simple alterations to the variety and scope of auxiliary equipment, station layout and operating methods. Operators should not have to skip like mountain goats to reach items of gear they have dispersed too widely and the absorbing hobby of Amateur Radio should never become a penance. In other words, the time when a QSO was completed by fixing this-and-that with crocodile clips and pieces of flex has given way to the smoothness of one-knob control that puts an entire station on and off the air at will from the operating position.

The ideal, of course, for a keen amateur to aim at is always to have available a main transmitter and receiver, with a second transmitter and receiver for alternative or break-down use. This may at first sound grandiose, but if the average reader thinks back and counts the dozens of rigs he has probably made (and promptly pulled to pieces again), it should not be too difficult to resist fresh temptation until two transmitters are assembled and earmarked *for operation only*; not for immediate dismantling or the borrowing of components. In regard to two receivers, few amateurs now build their own and the "surplus" market can always offer a factory-made superhet in exchange for the cash that will be available if fresh transmitter constructional work and ensuing dismantlement is held up for the time being. Again, as many of us cannot spread ourselves as we might wish, greater comfort can always be enjoyed by re-positioning the gear in such a way that its handling is smarter and more efficient, even when heaped into a shack which consists of "the cupboard under the stairs."

### Organising the Station

The work entailed by modernisation is certainly not formidable, the results are immediately beneficial and, as an encouragement, it might be mentioned in passing that the forerunners of the gear now assembled at the writer's own QTH, pictured here, made their initial contacts from a converted kitchen coal-hole measuring 6 ft. x 3 ft. Over the years "promotion" to better shacks has been achieved and individual items have been replaced, re-built or modified whenever a new method promised to be better than the old or likely to function more smoothly. Granted, then, that ease of handling and operational comfort are worth ensuring, what points should be considered in the process of re-organising?

### Aerial Equipment

With the exception of the light scaffolding variety, the erecting and lowering of a pole is not always a single-handed job and it is therefore wisest to arrange that it not only remains up but will live out a gale. Pole-butts simply dropped into a hole are liable to rot off at ground level and can be a source of worry; the best investment, and one that lasts a radio-lifetime, is a concrete tabernacle, its bolt-holes lined with piping and each post internally reinforced with four or more mild steel rods running its whole length to prevent


**This photograph illustrates the approach to Station Layout discussed by G2NS in his article. The operating position is at the left, with the Eddystone S.640 and S.750 receivers. Next come the harmonic indicator (designed for TV frequencies) and the aerial tuning unit, with the HF band transmitters below the call-sign plaque. On the right is a Top Band transmitter and a tape recorder. Between the transmitter units are the phone monitor, the GDO and the low-pass filter in the RF feed lead to the aerial tuning panel. Below bench level are a number of auxiliary units, including a band-edge marker, a CW monitor and an AC mains booster ; the large dial, below right, is the calibrated scale of a capacity-resistance bridge. Evidently, G2NS is also a reader of " Short Wave Magazine " !**

snapping in the manner plain concrete posts have been known to do. This will support a heavy 30 ft. mast without staying and, as a labour-saving point, practice shows that little advantage will be gained by following the technical advice that " insulators should be inserted at 3/8th-wave intervals " in any guy wire that may be added later. Unless of the type used at sea, pulleys can prove another source of worry. A large ring-bolt instead of a pulley is the answer, and through this should be threaded two lengths of rope. The aerial rope is a single length for attachment to the insulator and aerial wire and the other is a double length with its ends joined to form an " endless rope," or tail rope. This, it is to be hoped, will rarely be needed and it may therefore be losely wrapped round the mast and tied. Its purpose is to save a tedious lowering of the mast whenever a broken or worn aerial rope has to be replaced. It is only necessary in such a case to tie a new aerial rope to the endless rope and run it up and through the ring until it is returned near enough to the ground to be untied. This action threads the rope through the ring and insulator, and the wire can then be attached to the new aerial rope and hoisted back into position.

Although the endless rope may be loosely wrapped and tied to the mast, this cannot be done with the aerial rope in case rain tautens it until it snaps. If, on the other hand, it is left dangling it will ride up to such an extent during wet weather that the aerial wire, drooping in sympathy, will experience a considerable loss in effective height. To check this, all that is needed is an old window sash-weight from the nearest junk yard, permanently hanging from the bottom of the aerial rope. Incidentally, " rope " can mean anything, and the best purchase is log-line (from a ship chandler) if it can be obtained.

The choice of aerial is usually dictated by its owner's particular line of specialisation, but

it is, nevertheless, always worth remembering that an all-band system takes advantage of the fact that, in its own good time, each amateur frequency offers its own special plums, especially in the way of DX. Many impatient types spend a great deal of their time putting up and pulling down sky-wires in rapid succession, but it is the writer's opinion that, grim as it may sound, every new system should be given at least twelve months' trial—a Summer and a Winter—before it is condemned and another is tried out.

**Feeding In**

Cheap ebonite rods are a poor way of introducing bare feeders into the station, and as most entries are made by way of a smallish window or fanlight, it is far better to remove the pane and have it drilled for a few coppers-per-hole by a glass merchant; the holes should be spaced for Zepp feeders, with one large enough to take alternative 300-ohm ribbon and also allow the passage of coaxial cable with a plug attached. If any strain is expected, a piece of old quarter-plate as used by signwriters makes a cheap and strong substitute for the original 32 oz. glass pane, especially if held in by wood beading besides sprigs and a bedding of putty.

Yet another lead-in method is to have one pane of glass removed and replaced by a 3/16in. sheet of clear perspex. This can then be drilled as required at any time, and items such as the aerial change-over relay or aerial tuning panel mounted directly on it, if necessary.

Unless coax feeder is used an aerial tuning unit, preferably band-switched, will be required. This should be fitted with an harmonic socket for checking the amount of rejection given by the low-pass filter. In these days, a sensitive harmonic detector (of the valve type rather than a crystal diode) is a definite must-have, and this can be left plugged into the ATU, or elsewhere along the screened chain of components between the PA output and the aerial. However small the indication, a thermo-couple aerial ammeter with the ATU will show what is really "going up the spout" and whether tuning has been carried out correctly when a pi-tank is in use. The ATU is also an attenuator of unwanted harmonics and should be shielded, with an earth connection. In the coax line between the ATU and the low-pass filter a coax change-over relay, like the Type 78A or Type G, can be inserted for taking advantage of any directional properties the aerial may possess. (This will be found more satisfactory for reception than a separate piece of flex draped round the picture-rail!)

Low-pass filters should preferably be of the 30 mc type only, in order to force the manufacturer of any TV receiver in the neighbourhood (with a pirated 14 mc amateur frequency for its IF) to "carry the can back" in strict accordance with the PMG's present TVI policy. Directly 9 mc low-pass filters are added by amateurs to their other harmonic-suppression devices in the station—out of neighbourly regard for complainants—the PMG's ruling on this matter is rendered nugatory and the manufacturer is encouraged to maintain his couldn't-care-less attitude about choice of IF and image response. On no account should this piracy by the manufacturers be countenanced! The distant repercussions of British TV can be heard in the chance remark made by a VP7 visiting the writer: "Although I live on the edge of Kilowatt Row (Florida), I've been wondering for some time why I couldn't raise the G's in the afternoon like I used to. I understand, now I've been on leave, half G-land closes down directly TV starts up in the evening"!

**Layout of the Station**

Benches or tables should, if possible, be arranged in a semi-circle, with the operating position at the centre to allow an easy reach to right and left. Although a matter of personal choice, it will usually be found convenient if the stand-by receiver is placed on the left-hand bench where it can be in close operating proximity to the main receiver, which is seated to the left on the centre bench, together with headphones, log and key. For easier handling of the controls, mounting blocks that lift the front of the receiver and tilt the set should be arranged. The band-switched ATU can be placed centrally, with the main transmitter to the right. A shelf below will accommodate such items as loud-speaker, band-edge marker, CW monitor and mains booster. No CW or phone signal should ever be radiated without continuous monitoring, a simple oscillator being excellent for CW and a crystal diode for telephony. The CW monitor should be positioned so that a comfortably strong signal from the transmitter can be heard in the monitor and the beat from the monitor is, in turn, nicely audible in the receiver.

To make a contact the simple procedure is first to heterodyne the received signal with the VFO alone (the rest of the transmitter being dead) and then tune the monitor until it beats with the received signal. Both VFO and

monitor are thus ready for action close to the desired frequency when one changes over to call the distant station.

A monitor is also very useful as a retriever of lost stations. When QRM springs up, no attempt should be made to re-tune and search for the lost station on the receiver—it is the *monitor* that should be switched on because it has already been set to the distant station's frequency when the contact was first made. If the note from the monitor is found on the receiver dial, this will be an immediate indication of the exact spot where the distant station originally appeared.

The right-hand bench in the new scheme of things can accommodate the standby transmitter, any power packs or auxiliary equipment not in constant use, like absorption meters, GDO, Morse practice hummer, tape recorder and so on.

**Switching**

The entire station should be switched by simply operating a one-knob control. Some receivers and most commercially-built transmitters are fitted with extra contacts on the send-receive or stand-by switch that only need wiring in series with the DC source that energises the relays. In their absence, a separate manual switch or even the pressel-switch on the microphone will serve the same purpose. A separate manual toggle-switch should be placed in parallel across any relay-switch circuit that may call for individual switching, such as HT to the VFO (for heterodyning the received signal), the monitor (for retrieving lost stations or beating with the received signal) and the PA (for parasitic hunting). Separate over-ride manual switches will also be found useful for allowing the receiver to be used without the rest of the equipment, and for keeping the relay-switched headphones connected to the receiver when heterodyning or beating with VFO and monitor.

If preferred, the headphones can always be used with a one-to-one transformer plugged into the output jack of the monitor to provide simultaneous monitoring and listening, and thus save the use of one DPDT relay.

The actual switching required will usually be receiver (aerial-to-earth) protection, receiver HT, transmitter HT, modulator HT, monitor HT, aerial change-over and headphones change-over.

**Operating**

No scheme for the simplification of operational methods would be complete if it did not also cater for Award, Certificate and DX-hunting because much unnecessarily hard work is often made of this quest for far-away places with strange-sounding names. An easier procedure evolved by the writer, which he terms "General Search," may therefore be of interest to readers who are ever keen to contact fellow-amateurs in Choctawhatchee, Paranapanema, Velikiustiug, Gishiginsk, Bandjagara or even Wigan. Although the method to be suggested necessitates an initial expense and some hours of preparation, the outlay is amply repaid when average operating ability and a good aerial (upon which depends 75% of *every* station's performance) are brought into play.

As a simple example, let it be supposed that confirmed contacts with Montana, Utah and Nevada are still required for the "Worked All States" Certificate issued by the ARRL. It would in such a case obviously be useless to attempt contact with every W7 signal heard on the chosen band, for the simple reason that its owner might prove to be situated in Arizona, Idaho, Oregon or Washington! The question then is *who* should be called and who should *not*, a decision often having to be made rapidly before the station under investigation has signed over.

To obtain the answer to this, the initial outlay is incurred by purchasing from the Publications Department of the Short Wave Magazine, Ltd., a current copy of the complete *Radio Amateur Call Book*. Without this, it is virtually impossible to tell where one is heading, and with it some time should first be spent

## NEW LICENSEES—UNRESTRICTED PHONE

### GPO CONCESSION

The Post Office authorities have recently announced that the "12 months telephony restriction" on new licensees has now been lifted. That is to say, all holders of CW-only licences may operate on telephony straight away, irrespective of whether they have completed their 12 months on CW. Log inspection is not required. In due course, the GPO will circulate to all concerned an amending letter giving effect to the new relaxation — but there is no need to wait for that.

It is emphasised that the new concession in no way alters the terms and conditions for obtaining a Licence in the first place — it will still be necessary to pass the usual Morse test.

in preparing the required pages for easier reference. Anyone who has already attempted to turn up this huge volume in its original form will agree that trying to find the QTH of a small voice crying in the wilderness, before its owner has changed over, is a formidable task that in the time may be impossible.

The preparation required (in our example) consists of marking in the margins of the W7 pages with bold capital letters, the first two letters of the call-sign with which each fresh block of allocations commences. These blocks usually run from AA, AB, AC, AD, AE and so on to AZ, followed by BA through to BZ, CA to CZ, DA to DZ and ending with ZA to ZZ. Most of the listed calls will be three-letter ones, but two are quite sufficient to catch the eye when written in the margin, and will thus pin-point the actual block in which the wanted station will be found. For instance; to find quickly the State in which W7FQZ is situated, a book-marker starts one off at the first W7 page, a flicking of the pages follows until the eye picks up the bold written-in marginal letters FQ at the beginning of the required block and the eye then runs down the column until FQZ is reached. If found to be situated in a State that is of no immediate interest or in one that has been already worked, the call-sign should be placed in a separate not-wanted list, because it will be frequently heard if its owner is anything like active. To be lured into looking up the QTH of a station that has already been identified as unwanted or previously worked is a waste of valuable time, so that a glance at this separate list often saves a reference to the *Call Book* itself.

One other point to be watched is the time-difference that governs the sleeping, working and operating hours of the U.K. and the U.S.A. After having patiently waited in the queue to work a rare State, it can be very disappointing to hear its representative announce to the listening world that "he must now QRT and go to work"—a pronouncement often to be heard when listening takes place over here around the hours of 2 p.m. and 7 p.m.

The suggested *Call Book* preparation can still be of little additional value if a definite operating procedure is not followed. The key should be forgotten and time-wasting CQ calls, even directional ones, should never be launched. Success will only attend those who follow closely the legendary tactics of the Wise Old Owl, who heard more by speaking less. In other words, key-itch must be completely curbed and general search carried out by combing the chosen band slowly from beginning to end. Only then will it be realised how many DX contacts are spoiled by the senseless European habit of calling CQ upon every possible occasion, often without any attempt to listen first on the frequency. While this buffoonery at least keeps its devotees fruitlessly busy, it has the advantage of allowing the DX-hunter to seek elsewhere in a methodical manner. The writer's view may be quite wrong, but he feels that, except in the case of very new aerials just erected, an operator should already know from previous experience where his signals are likely to go during periods of reasonably good conditions. The way, then, to effect a desired contact is first to listen for a signal coming from the wanted direction and then to call its originator when invited to, or the opportunity occurs. Aimless CQ's are very rarely answered by the required people and very frequently loosen some other amateur's insecure grip on a faint DX contact. With general search, every signal and every QSO heard in progress is held on to until the participants reveal their call-signs. Their identification then decides whether an attempted contact be tried or whether the signal is abandoned and the call placed on the not-wanted list. If a band is combed from, say, the LF end up to the HF end, it is advisable not to return through the band but to jump back to the beginning and repeat the process from the LF end once again. This gives a lapse in time during which previously identified QSO's will have terminated, new stations will have started up and the likelihood of previously-heard stations being re-investigated to no purpose is lessened.

It might perhaps be mentioned that in the first three weeks after the adoption of this method and during a spell of good European-U.S.A. conditions on 21 mc, the writer heard 47 States (Montana only missing), worked six wanted ones in WØ, W5 and W7, and listed 101 not-wanteds. Exactly the same method can, of course, be applied to WABC working on Top Band. In conclusion, readers are reminded that *Short Wave Magazine* has for some years been publishing full details and circuits suited to the various improvements suggested in this article, and, where not already adopted, it is hoped that fresh consideration will be given to the idea and the possibility of re-organising the station for slicker and more comfortable operation.

# About the T.1154

## GENERAL ARRANGEMENT, MODIFICATION AND OPERATION

IF there is one item of "surplus" equipment, more than any other, that never seems to die, it is the ex-R.A.F. T.1154, still available at a ridiculously cheap price.

The T.1154 was the first modernised airborne transmitter to be supplied to the R.A.F. during the early part of the war, and it was designed to work in combination with a companion receiver, the R.1155—also well known and still in good supply.

It cannot be said, however, that either the T.1154 or the R.1155 are really suitable for serious work on the amateur bands. Nevertheless, at its price and because it can be modified, the T.1154—which is basically a very sound design—has become popular. In any event, it can be kept as a useful stand-by while, to some people, it is an interesting intellectual exercise to work out the modifications needed to make it into a good transmitter. And in

### Table of Values

Essential Circuit of the T.1154 Transmitter

| | | | |
|---|---|---|---|
| *C1, C2 | = 150 $\mu\mu$F | R1 | = 51 ohms |
| C3, C5 | = .005 $\mu$F | R2 | = 15,000 ohms |
| C4, C10 | = 200 $\mu\mu$F | R3 | = 50,000 ohms |
| C6 | = .004 $\mu$F | R4, R5 | = 75,000 ohms |
| *C7 | = 205 $\mu\mu$F | R6 | = 350 ohms |
| C8 | = 0.25 $\mu$F | R7 | = 5,000 ohms |
| C9 | = .01 $\mu$F | R8 | = 12,000 ohms |
| C11 | = 50 $\mu\mu$F | R9, R10 | = 20,000 ohms |
| C12 | = .001 $\mu$F | R11 | = 2,000 ohms |
| CM | = Carbon microphone | R12 | = 6 ohms |
| | | R13 | = 10 ohms |
| EM | = Electro-magnetic microphone | R14 | = 650 ohms |
| | | R15 | = 7,500 ohms |
| V1, V4 | = ML6 | R16 | = 800 ohms |
| V2, V3 | = PT15 | | |

(*C1, C7 *are larger values in the MF tuning section,* 200-500 *kc*).

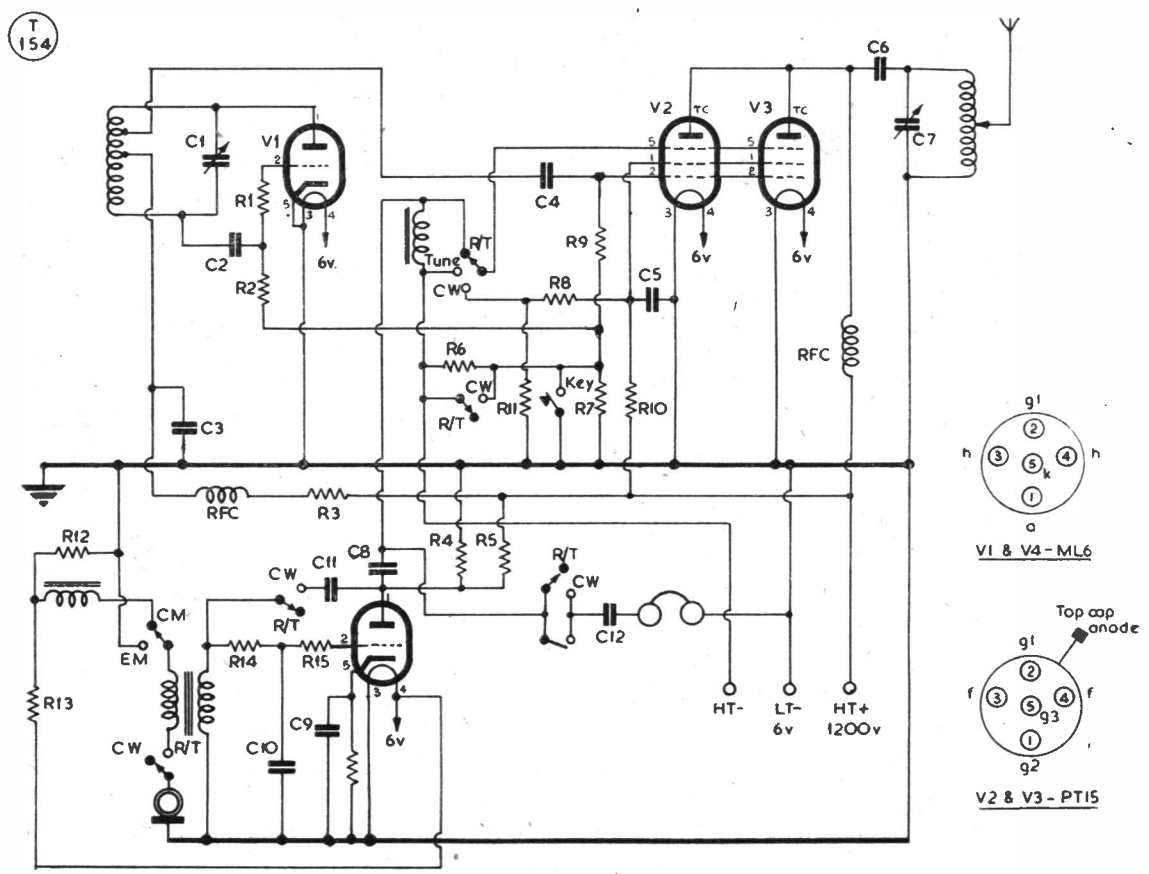



**Fig. 1. Essential circuit of the T.1154 transmitter. The arrangement is MO-PA (V1-V2, V3) with an ML6 driving a pair of PT15's in parallel. In the original V4, also an ML6, was used for suppressor-grid modulation and MCW transmission. This part of the circuit can be modified as indicated in the text. For simplicity, the separate tuned circuits for each of the three ranges covered have been omitted in this diagram. For effective amateur band operation, various modifications are necessary.** (*Note: The resistor across C9 is R16*).

the end, when finally "reduced to produce," the T.1154 will yield a very useful assortment of parts !

The fact remains that a great many T.1154's are in regular use, and in most cases their owners have contrived to make them put out a reasonably good signal. Indeed, several practical articles on the T.1154 have appeared in *Short Wave Magazine*, the most recent being that by G3EGC in the June, 1955, issue. The notes below, which, as well as being based upon articles published previously, also contain some new material, should be read in conjunction with the suggestions by G3EGC in the June issue.

## General Description

The T.1154 is a 100-watt CW/Phone transmitter, using an MO-PA arrangement — an ML6 driving a pair of PT15's in parallel. The frequency coverage is in three ranges : 5·5-10 mc, 3·0-5·5 mc and 200-500 kc. Thus, the amateur bands covered are 3·5 and 7 mc.

At the 'phone position, provision is made for operation with either a carbon or an electromagnetic microphone. Suppressor-grid modulation is used, with a second ML6 as modulator, and there is a side-tone circuit for CW monitoring.

Each tuning range has its own coil-condenser assembly on both MO and PA sides and on all three ranges, which are selected by means of switching. Any desired frequency in the range selected, up to a total of eight, can be pre-set by an ingenious click-stop mechanism which locks the dial at a particular setting.

## Aerial Coupling

The aerial coupling as fitted is direct and was designed to be used either with the aircraft fixed aerial or the usual trailing aerial, which on the HF bands could be run out to a length to match the frequency.

At a ground (amateur) station, the aerial output could be taken to any type of transmitting aerial *via* a suitable matching network.

Apart from the wave-range selection and tuning, the T.1154 is entirely relay controlled, with automatic change-over in combination with the R.1155 receiver. Two panel meters are fitted, reading 0-300 mA for plate and 0-3·5 amps RF for aerial current.

The equipment is extremely ruggedly built and is shock-mounted to withstand the inevitable rough usage involved in aircraft working. Unit construction has been adopted and the various elements of the transmitter are on separate chassis.

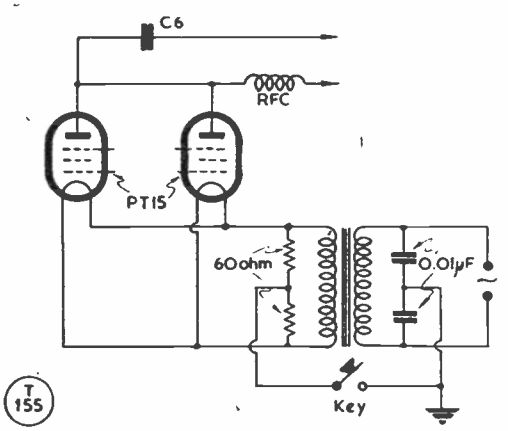



**Fig. 2. LT supply and keying circuit for the T.1154 PA. Originally proposed by G2ASY in our December 1953 issue, this gives clean, sharp keying, with a good note, and is a great improvement over the original.**

In the air, power at 1250 volts HT and 6 volts LT was obtained from motor-generators operated off the aircraft 24-volt DC line. One of these two generators was double-wound to give LT for the transmitter and R.1155 receiver, as well as HT for the latter.

The inter-connection between the units—transmitter, receiver, power generators and control system—involved a good deal of complicated wiring and the use of a starter control for ensuring that LT was fully applied to the transmitter before HT could be switched on.

## Instruction Manual

There is not the space here to discuss all these points in detail; the Service manual describing the installation contains on the T.1154 alone some 24 quarto pages of instructions and warnings, with numerous illustrations and tables and two double-page detail wiring and circuit diagrams. Indeed, this manual is a model of its kind, containing all the information which could possibly be required on the construction, operation and maintenance of the whole installation. Wherever possible, anyone contemplating the modification of a T.1154 should endeavour to obtain the manual, one copy of which was originally supplied with each equipment issued to the Service.

## T.1154 Circuitry

The essential circuit, for one band only, is shown in Fig. 1. As three separate wave-ranges are selected and tuned, there are actually three switched sets of coil-condenser assemblies at the anodes of V1 and V2, V3. The modulator section can be modified to give much improved results (*see* p.177, June, 1955, issue),

and so can the PA tank—*see* same article, which also discusses some other desirable PA modifications. At Fig. 2 is an improved LT supply and keying circuit, fully described below.

The first thing is to remove completely the long-wave (200-500 kc) tuning sections, being careful to leave the common HT positive lead intact. This is the rear-most of the vertical bare wire leads on the left of the chassis. It feeds the yellow, red and blue sections through an RF choke just at the rear of the yellow oscillator sections. The next step is to get the red and blue oscillators operating with a T9 note when feeding the oscillator valve V1 with AC. A ·01 $\mu$F condenser is connected across the filament of the ML6 oscillator and the note should be found to be T9.

A separate filament transformer is necessary to supply the PT15's, the long yellow positive LT lead to the PA valves being eliminated by taking connections direct to them from the transformer. A 6v. 3 amp LT transformer can be installed in the space formerly occupied by the long wave PA tuner (bottom right of chassis). Then, two 60-ohm resistors are connected across the secondary of the filament transformer in series and the point between them earthed, with two ·01 $\mu$F condensers across the primary of the same transformer and to earth in the same manner.

When this is done the PA note will be T9, with no trace of AC ripple. When the yellow lead to the PT15's is removed the connections from the other sides of the filaments to the chassis are also taken out, as the PA can

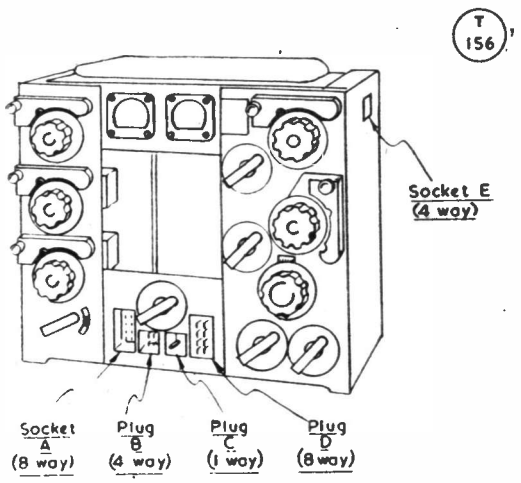



**Fig. 3. Outline appearance of the well-known T.1154, to locate the connector points, the key to which is given in Fig. 4.**

then be keyed by breaking the lead from the centre of the two 60-ohm resistors and inserting the key there. The keying is clean and smooth.

The send-receive relay at the right-rear of the chassis is fixed in the " send " position and the aerial lead plugged in to the " HF aerial " socket.

Figs. 3 and 4 will enable the power connection points on the T.1154 to be identified, without the necessity for laborious tracing through the whole transmitter. By connecting power as shown in Fig. 4 (the " emphasised " leads) the transmitter can be got going—though at first this should be into a dummy load consisting

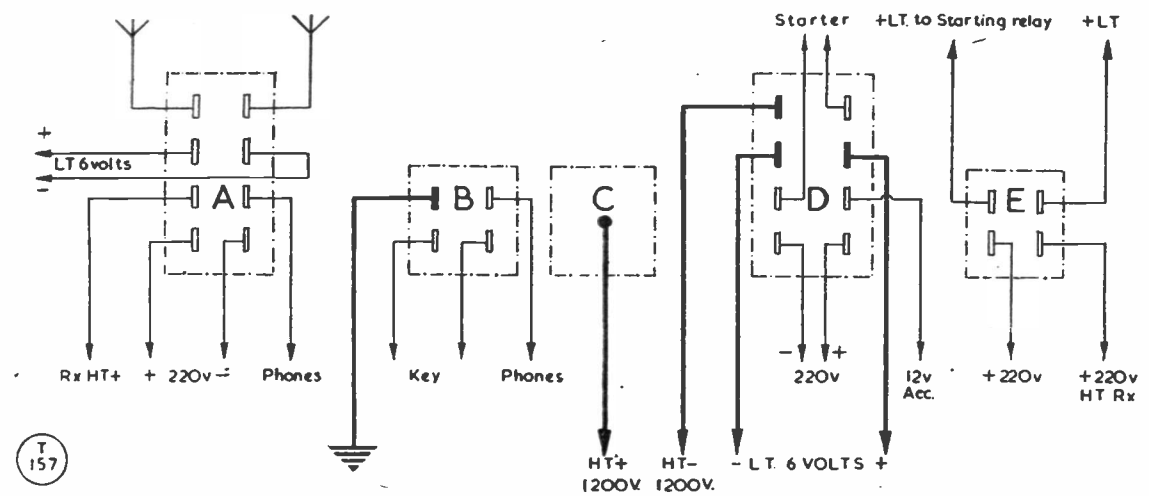



**Fig. 4. Detail of the connector system on the T.1154 transmitter—see Fig. 3 for location diagram. By making the connections as emphasised in this sketch, power can be applied direct to the transmitter without involving the receiver inter-connection or control circuitry, which can be ignored.**

of a 60-watt lamp coupled to the PA coil by a few turns of flex. Furthermore, if AC is used, the LT supply connections will have to be modified as shown in Fig. 2.

In any event, before putting the transmitter on the air, an aerial tuning unit should be provided, which can be of the type suggested by G3EGC on p.177 of the June, 1955, issue of *Short Wave Magazine.*

**Power Supply**

It is not necessary to provide the full 1200 volts called for by the original design. The transmitter will work quite well at lower inputs with 500-600 volts HT. In the latter case, it would be necessary to locate R3 (*see* Fig. 1) in the assembly—it will be one of the high-wattage types on the rear panel—and substitute a 20,000-ohm 10w. resistor. This is to ensure the ML6, V1, getting enough HT to give sufficient RF drive at the reduced voltage.

**The Valve Types**

The PT15 is a very good valve of its kind, and certainly should not be sneered at merely because it is an obsolescent type. Its characteristics are similar to the American RK20, which is still in the lists. For less than 2 watts of grid drive, the PT15 will give up to 60 watts RF *output,* and a single valve can be run at 100 watts DC input with 1200v. HT. A pair in push-pull are easy at 150 watts input at least up to the 14 mc band, and probably on 21 mc as well (the writer has not himself used a PT15 above 14 mc). As they are usually "given away" with the T.1154, their potentialities should be kept in mind for other amateur band transmitting apparatus — incidentally, the PT15 is on a British 5-pin *ceramic* base, and is a directly-heated filament valve, taking 6·0 volts at 1·3 amps. (The S.T.C. 4052A is a similar valve, but is on an American 5-pin base, pluggable with the RK20.)

The ML6, two of which go with each T.1154, is also a very useful RF valve, as G5JU has shown in his article in the November, 1955, issue of *Short Wave Magazine.*

# Going After DX

## NOTES FOR NOVICES

PART I

### THE OLD TIMER

*The intention of this short series—promised in our November Editorial—is to give the beginner on the DX bands some advice and guidance on raising it. Though the art of working DX cannot be taught and can come only by practice and experience, there are a number of fundamental "rules of procedure," evolved over the years, which the novice needs to know, and which will help him considerably in his quest for DX. It is our contributor's hope that he will be able to pass on the benefit of his own experience of many years on the DX bands.*
*—Editor.*

EVERY weekend finds a handful of brand-new stations taking the air for the very first time, and every weekend finds the bands more crowded. Conditions are vastly better than they were a year ago, and they are likely to improve for some time to come, which means that more and more stations will come back on the DX bands after "resting" during the years of poor conditions.

It is our guess that at least two-thirds of the novices taking the air have, as their chief ambition, the idea of working DX. Not rare stations like ZD9's and VR6's—just "DX," meaning W's, VK's, ZS's and whatever they are lucky enough to reach with their new gear.

In this and subsequent short articles we hope to show them how to do it with the least trouble to themselves, and with the least interference to all the other users of the bands.

**Avoid CQ Calls**

Our first and strongest piece of advice is "Don't call CQ." CQ calls are all very well on an apparently empty or dead band—a hopeful throwing out of bait. But on a heavily populated band they are a waste of time, because there will be so many of them already going on! So look for a DX station calling CQ, set your VFO very near his frequency (say 2 kc on one side or the other) and call him when he signs.

Get in *quickly* — don't waste time over "dah-de-dah-de-dah," which is the trade mark of a man who simply hasn't a clue about DX work. Send his call perhaps four times—no need for more—and sign your own three or four times. Simply "W1ZZZ W1ZZZ W1ZZZ W1ZZZ de G3XXX G3XXX G3XXX K." No need for any other trimmings, and the quicker you start it the better. If he doesn't hear you during a call of that length, you can take it that he wouldn't have heard you any-

way, either because he's already on to someone else or because you just aren't getting there.

**Avoid Long Calls**

Never waste time by giving too long a call. Remember that all the time you are calling, you are *deaf* to what is going on. Sometimes it is best to give an extremely short one (call three times and sign twice). Then, when you go over, if there seems to be no one else on the frequency, and your man hasn't come back, try again. You may have been one of several short calls, all QRM'ing each other, and your second one may be in the clear.

A long call is simply exasperating to all concerned. An experienced DX operator will be able to copy two or three stations calling simultaneously, and it is usually the *first* one to sign that gets him. As for long CQ calls—any listening station merely gets impatient and tunes around to find someone else with a snappier technique.

**Get the Speed Right**

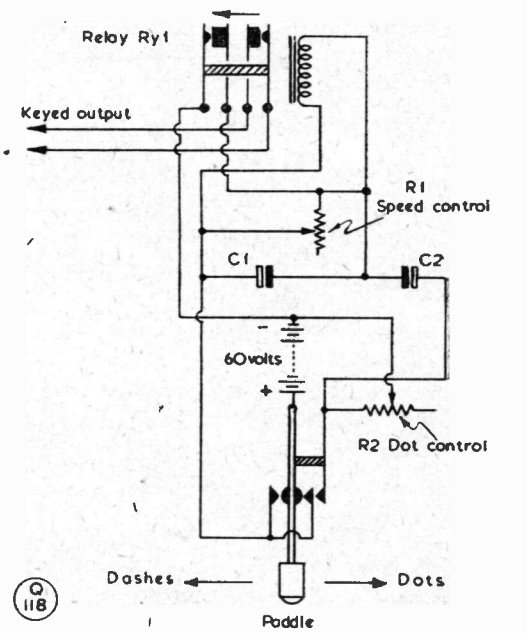
In general, you will do well to call the DX man at roughly the same speed at which he has sent his CQ call. If he has sent a long slow one, it may be because his receiving conditions are bad or it may be because he is an indifferent operator. In either case a slowish reply is a good thing. If he rattles it off on a bug with the confident manner that suggests that he is used to being replied to, then go back to him smartly. He will probably not be too tolerant of slow callers, and if he has several replies he will choose one that is going at a reasonable speed. But a word—don't try to send faster than you really can! Let your characters be what the good Samuel Morse intended—clear and clean and sounding unhurried. They *will* sound unhurried, even at a decent speed, if you are not falling over yourself by trying to send too fast for your own capabilities.

**Listen!**

If you have a consuming desire to work a VK but find the band full of W's, don't sit in the middle of the welter and call "CQ VK." You have probably got the time wrong anyway, and even if a VK heard you, you probably wouldn't hear *him* through the mass of W's. So listen, listen, and listen again. Find out what is on the band before you embark on DX-chasing. Don't be tempted to call the first station you hear. Listen to a DX station calling CQ, wait and see how many replies he gets (if any). If he is too popular, with half the band queuing up for him, then he's not for a novice like you. Choose another one away from the disturbance that he is causing. If possible, pick on a station that is slightly weaker than the others—he may not get any reply except yours. If you listen on Twenty, for instance, around 0800 and hear half-a-dozen ZL's coming in, you can be sure that the strongest one of the bunch will get replies from all over Europe to every call he puts out. Lots of people have poor receivers and haven't heard the others at all! So have a go at one of them.

Lastly—and most important, this—make sure that your note is as steady, clean and free from chirp and clicks as you can possibly make it—really T9. When three or four stations are all calling on the same frequency, the one with the best note stands out like a searchlight among candles. Make sure it's yours.

*(To be continued)*




**"THE CODEWRITER"**

G3IIH, author of this article in our October 1955 issue, writes as follows: "The closed relay contacts should be inserted at the negative battery terminal, between this and the common negative of C1 and C2, and not between the relay coil and slider of R1, which will merely cause the relay to act as a buzzer when contact is made at the paddle end. I am exceedingly sorry for the mistake, for which I accept full responsibility, and sincerely apologise to you and to anyone who may have been inconvenienced." The corrected circuit diagram appears herewith.

# THE RADIO AMATEURS' EXAMINATION–1955

The results of the Radio Amateurs' Examination held on May 6, 1955, were published on November 2, and so were too late for our last issue. The Question Paper as set, with the Examiner's comments, appears herewith.

It is of particular interest to note that, this year, there was not only a significant increase in the number of candidates coming forward for examination, but also that the pass percentage was higher than in 1954. The nett result is that, at the total of 369, some 42 more candidates qualified in the U.K. in 1955 than in the previous year. As will be agreed, the questions were fair and reasonable and, if anything, easier (for the average keen radio man) than in some recent years. It is this that probably had some effect on the pass rate, though it will also be noted that the Examiner's general comment is to the effect that candidates' work was good.

The next Radio Amateurs' Examination is in May, 1956, for which entries must be in by March 30 next —they can be made either direct to the City & Guilds of London Institute, *or* the local Technical College (quoting C.G.I. subject No. 55) *or* to the Education Authority for the candidate's area.

Detailed information and advice about taking the R.A.E.—with specimen questions from the Examination over several years, and notes on exemptions—appeared on pp.325-327 of the August 1955 issue of SHORT WAVE MAGAZINE. It should also be noted that an official pamphlet, entitled *How to Become a Radio Amateur*, can now be obtained on request from: Radio & Accommodation Dept., General Post Office, Headquarters Building, St. Martins-le-Grand, London, E.C.1. This gives the would-be candidate a great deal of essential information, and also lists, in full, the exemptions for the theoretical examination and the Morse test. In general, practically all personnel in the signals, radar or communication branches of the three Services are exempt from either the R.A.E. or the Morse Test, or both ; there are also a number of civilian exemptions in corresponding categories.

Recent issues of SHORT WAVE MAGAZINE have contained details of centres where courses are being held in preparation for the 1956 R.A.E.—*see* p.299, August, and p.382, September, issues.

## *QUESTION PAPER*

### 55.—RADIO AMATEURS' EXAMINATION

**Friday, May 6th, 1955, 6.30 to 9.30 p.m.**

Eight *questions in all are to be attempted, as under :*

All four *in Part 1 (which carry higher marks) and* four *others from Part 2.*

**Part 1.**

*All four questions to be attempted from this Part.*

1. State the conditions laid down by H.M. Postmaster-General in respect of the licensing requirements for
   *(a)* Frequency control and measurement,
   *(b)* Non-interference,
   *(c)* Receiver. *(15 marks.)*

2. Compare the advantages and disadvantages of absorption and heterodyne frequency meters and state under what conditions each type is used. *(15 marks.)*

3. State what precautions should be taken in a radio transmitter to avoid:
   *(a)* Harmonics,
   *(b)* Spurious oscillations,
   *(c)* Key clicks and thumps. *(15 marks.)*

4. *(a)* Describe, with the aid of a diagram, the circuit of a full-wave rectifier, with smoothing, to provide the high tension DC supply of a transmitter.
   *(b)* Show how the output voltage is affected by the insertion of a smoothing circuit. *(15 marks.)*

**Part 2.**

*Four questions only to be attempted from this Part.*

5. Explain the meaning of
   *(a)* self inductance.
   *(b)* mutual inductance.
   Define the unit of inductance *(10 marks.)*

6. Give the circuit diagram and state the functions of the stages of a three-valve tuned-radio-frequency receiver suitable for telephony reception on the lower frequency amateur bands. *(10 marks.)*

7. If the effective series inductance and capacitance of an aerial is 70 microhenrys and 100 picofarads respectively and an inductor of 30 microhenrys is connected in series with the aerial, what is the resonant frequency? *(10 marks.)*

8. Explain the following terms in relation to alternating current:—
   *(a)* peak value,
   *(b)* effective (r.m.s.) value,
   *(c)* instantaneous value. *(10 marks.)*

9. Describe, with the aid of a diagram, tuned and untuned aerial feeders and state their relative advantages and disadvantages. *(10 marks.)*

10. Describe the construction of any receiving or transmitting multi-grid valve, stating the function of each electrode. *(10 marks.)*

## *THE RESULTS*

The following general report is given on the papers as a whole and is not necessarily applicable to the work of individual schools.

| | 1955 | 1954 | 1953 |
|---|---|---|---|
| Candidates : Home | 428 100.0% | 395 100.0% | 477 100.0% |
| Passed | 369 86.2% | 327 82.8% | 388 81.4% |
| Failed | 59 12.8% | 68 17.2% | 89 18.6% |
| Candidates : Overseas | 8 100.0% | 13 100.0% | 9 100.0% |
| Passed | 3 37.5% | 7 53.0% | 8 88.9% |
| Failed | 5 62.5% | 6 46.2% | 1 11.1% |

The number of home entries for the 1955 Radio Amateurs' Examination was more than in the preceding year. The general standard of the work was good.

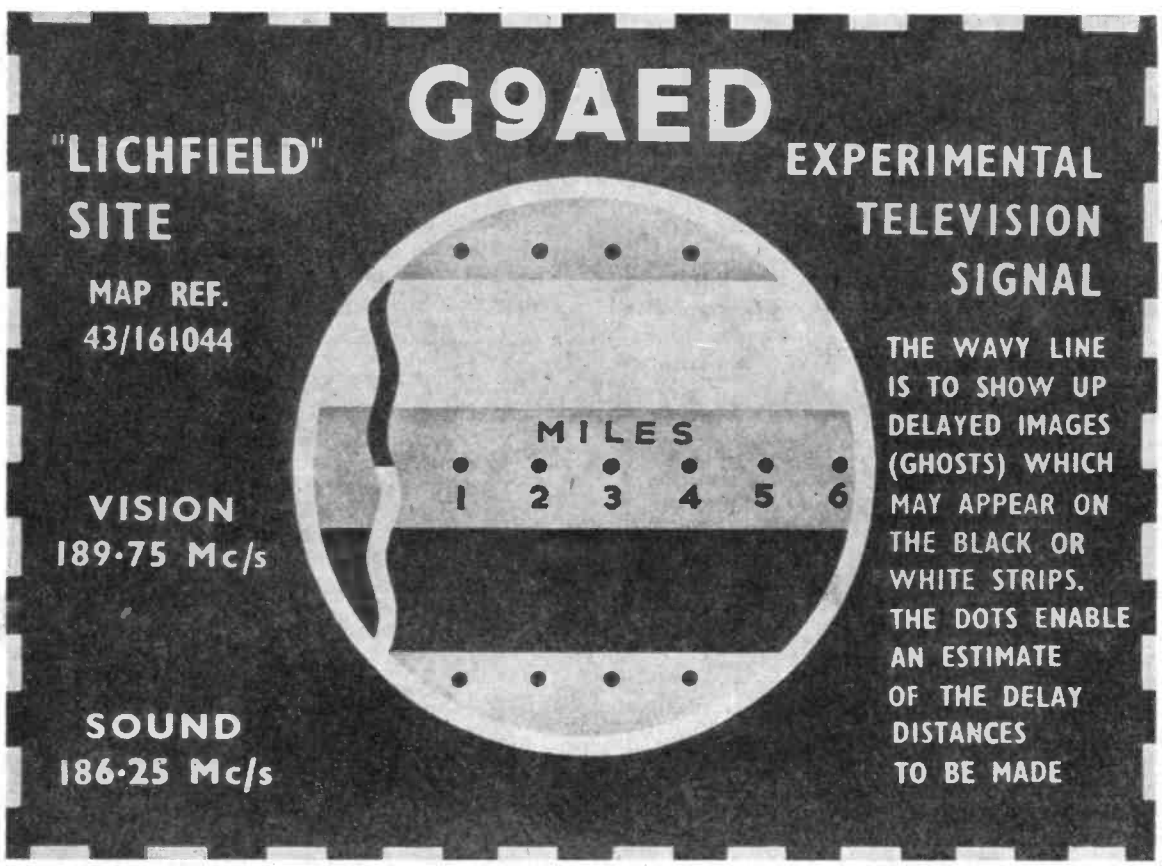
A report on each question follows:—

*Questions 1, 4, 5, 6, 8 and 10.* Well done by practically all candidates.

*Questions 2 and 3.* Fairly well answered by most of the candidates.

*Question 7.* Generally well answered. A few candidates, although giving a correct numerical answer, omitted to place the decimal point correctly.

*Question 9.* Not many candidates attempted this question, and the few who did only gave a fair answer.




**The G9AED Test Card as now being radiated from Lichfield, Staffs., by the Belling-Lee Band III transmitter. All relevant details are given in this photograph. Transmitting periods are: Monday-Friday, 10.0 a.m. to 1.0 p.m., 3.0-6.0 p.m., and 7.30-8.30 p.m.; Saturdays, 10.0 a.m. to 1.0 p.m. There is no other week-end transmission. The G9AED transmitter is rated at 1 kW ERP, peak white.**

# Bendix TA-12 Transmitter

## SOME NOTES FOR GUIDANCE

THE American surplus item known as the Bendix TA-12 is being heard of more frequently these days, and it is thought that a few comments on this equipment — of which there are two "marks"—may be helpful to owners and prospective purchasers.

A four-channel band-switched transmitter, the TA-12 is available either as the TA-12*B* or TA-12*C*. There is an important difference between them, in that the '12B only covers one amateur band, 80 metres, found in the tuning range 3000-4800 kc; the '12C, on the other hand, has a range of 4800-7680 kc in addition, and so gives both the 3·5 and 7 mc amateur bands. Both "marks" of TA-12 are the same in every other respect, the '12C tuning to an upper limit of 12000 kc in its Channel 4 position, and the '12B only as far as 7000 kc on its HF range. It is probable that individual models of the TA-12B could be squeezed into the LF end of the 7 mc amateur band, but that would only be with condensers "all out."

The diagram shows the tank circuit arrangement of the TA-12 (for both "B" and "C" versions) and it will be seen that a form of pi-section coupler is used, with the output condenser a fixed capacity and the loading adjusted by the slider-tuned coil.

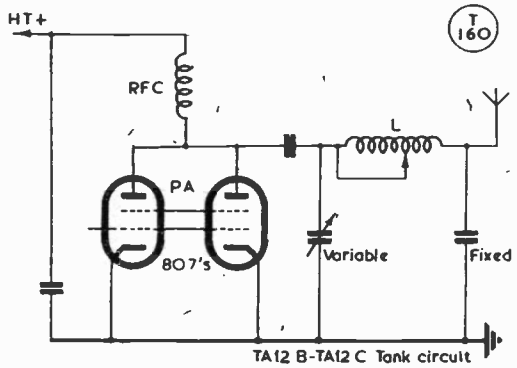
### Power and Modulation

The PA consists of a pair of 807's in parallel, designed for an input of about 60 watts at 400-500 volts; heaters are, however, wired in series, because the TA-12 was designed for a 24v. DC supply on the LT side, and the other valves—12-volt types—are arranged in series-parallel. The transmitter valve sequence is 12SK7-807 into par. 807's on each of the four bands.

Hence, considerable re-wiring of the LT side, and some re-valving, is necessary to make the transmitter suitable for 6·3v. AC operation. An external HT supply would also be required, because in the original, power was from a dynamotor. Modulation must also be provided, and a pair of 807's in any of the conventional modulator circuits would again be suitable.

The TA-12 is quite an attractive proposition, its general construction being "table-top." Its dimensions are 15 ins. wide by 10 ins. high by 7 ins. deep, approximately. With extensive modification, it could be converted into a useful band-switched and fully metered transmitter for 80 and 40 metres—and possibly 160 metres as well, if the MF tuning range of 300-600 kc (common to both "marks") were to be suitably modified. Only one meter is fitted—an RF thermo-couple for reading aerial current—as external metering was intended for the original; jacks are provided for this.

The full circuit of the Bendix TA-12, with notes on re-wiring, modification and operation, is given in the *Surplus Conversion Manual*, Vol. II, which will be found to be a very useful source of reference on this equipment.




**Tank circuit arrangement of the TA-12, which is the same for both "marks," B and C. The PA consists of a pair of 807's in parallel. A separate tank circuit is provided for each of the wave-bands covered. These are 300-600 kc in both, and 3000-7000 kc in the B, but 3000-12000 kc in the TA-12C.**



**MOBILES ON TOP BAND**

Due mainly to the popularity of the N.Z. ZC1 Mk. II as a mobile equipment, the tendency is for 160-metre /M stations to cluster in the neighbourhood of 1900 kc, which is about the LF tuning limit of the ZC1 transmitter. Since loaded whips, resonated at any frequency, tune fairly sharply, working off the resonant frequency (on either receiver or transmitter) is not very practicable without some quick and easy means of re-adjusting the aerial loading coil. Though loaded whips *are* very effective radiaters at the resonant frequency, their efficiency falls away rapidly off the resonance point.

# Approach to VFO Design

## CONSTRUCTION TO ENSURE STABILITY, CLEAN OUTPUT AND FREEDOM FROM DRIFT

J. N. WALKER (G5JU)

*Intentionally, this article is not illustrated because it discusses a number of the practical points involved in getting good output from a VFO. The circuitry is taken for granted—it can be any of the usual arrangements—since our contributor's arguments apply equally to any VFO design. A good circuit, properly designed as such, will yet perform indifferently if attention is not given to the points he makes.*
*—Editor.*

THIS is not primarily an article on the design and construction of variable frequency oscillators, although design points are bound to creep in here and there. It is intended to help those—among them some not very experienced amateurs — who have built VFO's and find them not altogether satisfactory. In actual fact, this article covers ground which is generally taken for granted when a constructional design is published.

In amateur parlance, the term "VFO" is somewhat elastic and can mean either solely the oscillator valve and its immediate circuits, or a complete exciter unit delivering RF power at the operating frequency. It can also mean something in between the two, such as an instrument which delivers a watt or two at a frequency which still has to be multiplied up in the transmitter proper. At any rate, the points here cover the whole field.

### Possible Faults in a VFO

A VFO may function satisfactorily in many ways, but suffer from one or more of the following faults:

*(a)* Frequency drift.
*(b)* Poor tone (of several kinds).
*(c)* Tone good on telephony, but deteriorating when keyed.
*(d)* Insufficient or varying power output (over a range of frequency).

Since designs vary in detail considerably, the hints given under each heading must be of a general character, but by paying attention to them, a first-class performance should finally be achieved.

### Frequency Drift

In any modern oscillator circuit, at least as applied to an amateur VFO, the design will —or should—take care to minimise the effect of the valve inter-electrode capacity on the frequency. One method, for example, is to use very light coupling, as in the Franklin circuit, or to include large parallel capacities, as in most other circuits. A *very slight* change of frequency is to be expected during the time the valve is warming up, but thereafter the valve (presuming it is in good condition) can be excluded as a cause of drift.

If drift does occur, it is due to the slowly rising air temperature affecting the various components. The materials of which these are made have differing temperature coefficients — which expression simply means they expand (and contract when cooled) unequally. Hence, there are changes in the capacity of condensers and in the inductance of coils, and whilst these changes are physically extremely small, they have a measurable effect electrically, especially where the frequency is high.

Obviously, the less the rise above ambient (normal room) temperature, the less will be any frequency drift. It is here that different methods of construction, using an identical circuit, will show up. A unit built on an open chassis with plenty of space between the valves and components will normally exhibit very little drift—though it may be unstable for mechanical reasons, or due to stray capacity effects. But the same unit, enclosed in a cabinet or box with everything packed in closely, will probably show quite a lot of frequency drift. The points to watch are the grouping of the oscillator components together, well away from valves or resistors dissipating much heat, and to remember that heated air rises. Therefore, the oscillator components should be low down, *e.g.*, sub-chassis, and the valve raised up, with ventilation provided immediately above it. The long leads which this form of construction may necessitate are of no great consequence if, as is usually the case, the oscillator frequency is comparatively low, but the leads should not be allowed to vibrate. It is best to bunch together and tuck away the "cold" leads (those carrying HT and LT), making the "hot" (RF) leads of stiff wire and isolating them as far as possible. Probably the ideal is to adopt the system, not yet popular, of mounting the actual tuned circuit components in a box on their own, right away from the valve or any source of heat, and use a length of coaxial cable for inter-connection—a good commercial example of this is in the Labgear transmitter design, pictured on

p.467, November, 1955, *Short Wave Magazine*.

The fixed condensers actually forming part of the oscillator circuit should be of the best quality obtainable, both on the score of good temperature co-efficient and of maintaining high efficiency, since any power loss will show up as heat. Silvered mica types, of the lowest possible power factor, are undoubtedly the most suitable.

Practically all air-dielectric variable condensers have a positive temperature coefficient —it could hardly be otherwise, since, when the metal vanes expand ever so slightly, the capacity is bound to increase. The effect is minimised by choosing condensers with a wide air gap—no figure can be quoted since so much depends on the actual capacity required and on the physical size which can be accommodated; 100 $\mu\mu$F is a good value if wide plate spacing is achieved in the type used.

The chief cause for drift is usually the coil. There is a special alloy, known as "Invar," which has zero temperature coefficient—but it is not generally available. As copper has a high positive coefficient steps should be taken to minimise the effect of expansion—which means using fairly thin wire (24 SWG is amply thick enough) and spacing the turns by at least one wire diameter, and preferably more. The former can be of threaded ceramic or polystyrene, or ribbed bakelite, and, in every case, the wire should be stretched a little and then wound on *very tightly*. After adjustment to the required value, the turns should be cemented in place with polystyrene cement.

Finally, there is the problem of correcting dirft, which entails the use of a small condenser specially made to possess a negative temperature coefficient. Some may wonder why this has not been mentioned earlier—the answer is that everything possible should be done to avoid the necessity for fitting a NTC condenser.

To secure just the right degree of correction, a good deal of experiment is called for and no hard-and-fast rule can be given. The capacity, the coefficient, the type (encased or open), and the mounting position all have an effect, and the right balance for any given degree of drift must be found by varying these. And a word of warning here—it is wise not to rely too much on either the marked capacity or the marked coefficient of the small-value condensers generally used, as the writer has learnt from experience!

**Poor Tones**

This heading can conveniently be sub-divided into signals suffering from (*a*) AC ripple, (*b*) "Burbles," and (*c*) Random variations — all when the note is monitored on a receiver tuned to the fundamental frequency, with the oscillator valve only in operation, so that the issue is not confused by a possible fault in a later stage.

AC ripple can be due to three main causes, which are:—insufficient HT smoothing; ineffective by-pass condenser across the heater (value should be at least ·002 $\mu$F and up to ·01 $\mu$F is permissible); or leakage between heater and cathode. There are ways of getting around the latter trouble, but a new valve is the most satisfactory solution.

Burbles and random variations can be traced to several causes. One is what is known as "scintillation," a fault which is liable to develop in a small ceramic condenser, due to imperfections in the silver coating. The negative temperature coefficient type is particularly suspect, which is another reason for avoiding its use, if at all possible. The trouble may also occasionally arise with a silvered mica condenser in which a poor connection has developed where the lead-out wire joins the silver coating.

Resistors also sometimes show variations after being in service for a while, especially where they run warm, the trouble again usually being an unreliable connection between the lead-out wire and the body of the resistor.

Finally, a dry joint in any part of the oscillator circuit can lead to endless variations of frequency. The cures for each and all of these various faults are self-evident.

**Unsatisfactory Note on CW**

Often, it happens that the beat note of an oscillator, when listened to on a receiver, is good in every respect, yet the final outgoing signal is not perfectly steady, suffering either from a slight wobble or a definite change in frequency.

The wobble effect is probably due to parasitic oscillation or to one of the stages working on the border of stability. The latter is most likely to be found in a pentode/tetrode amplifier coming after the VFO, where the input and output sides are working on the same frequency. Any such stage in the exciter unit should be tested by supplying HT of near normal values to the screen and anode of the valve concerned, but *not* to any other valve. Attempts should then be made to provoke self-oscillation—a milliammeter in the anode circuit will help as an indicator by showing variations of anode current. If the slightest instability becomes

evident, additional screening and possibly decoupling must be included, or a measure of neutralisation introduced.

If the anode current varies when the grid or anode (and sometimes also the screen) tag on the valveholder is touched with a screwriver (no drive being applied, of course) and no signal can be located on the receiver at or near the frequency on which the stage operates, parasitic oscillation is almost certainly present. The usual remedies should be applied, consisting of low-value resistors of 47 ohms or so as grid and plate stoppers, connected right on the valveholder ; indeed, it is a good plan to put these in when building the unit in the first place.

Another fault is well illustrated by an experience the writer came across recently. Here a VFO, previously very good, had suddenly developed a poor note. Examination of the output stage—an 807 operating as a straight amplifier — showed that a screen decoupling resistor had been getting pretty hot. As it was a 470-ohm resistor carrying only a small direct current, something was evidently wrong. It was found that the mica by-pass condenser connected directly to the screen had become open-circuit. RF current was therefore passing through the resistor, causing it to heat up, and then through a later decoupling capacity. Had this second condenser not been there, much RF would have been fed into other parts of the circuit and the whole performance upset.

It may have been noticed that no mention has been made of poor decoupling in the various stages, or of an ineffective buffer following the oscillator, both of which would allow RF to get back to the oscillator and upset the stability and tone. The reason is simply that such points should have been looked after in the original design, although, as the example quoted shows, the decoupling may suffer from a fault developing in a component after it has been used for some time. But it should not be forgotten that similar trouble can occur in a new piece of equipment in which poor quality parts are employed.

Again, a varying HT supply will cause a change of frequency, but this is another matter which should have been looked after originally.

**Insufficient Power Output**

Here it is presumed that the power output is noticeably less than the designer intended or quoted, or possibly less than was expected. When this occurs, it is almost always in a VFO incorporating wide-band couplers. It does not seem to be well understood that broad-banding a circuit inevitably results in a loss of output, with consequent low drive to the following stage. Hence, one must either ensure really adequate drive to the grid of the first broad-banded stage (often not too easy) or else use valves in the chain which work efficiently with low drive. For example, the popular 6V6 is *not* a good choice in wide-band stages, comparing unfavourably with valves like the Brimar 5763 and the Mullard QV04-7.

Considerable care is required when setting up a broad-band exciter, to ensure the broad-banding is not overdone, as may happen only too easily. Where difficulty is experienced in persuading the stages to produce adequate drive over the full band, it is better to narrow the bandwidth, adjusting for good drive over that part of the band most used, and putting up with the falling off which is bound to occur over other portions of the band. Alternatively, arrangements can be incorporated in the exciter to peak the drive on frequency ranges not accommodated in the wide-band coupler.

In some cases the output may be low and intentionally so, the idea being to build up the power level in the transmitter proper. However, power will be lost in transferring the drive to the following stage, which may be some distance away, and such loss should be reduced to a minimum. Where necessary, the final stage in the VFO can be made fully tunable in order to obtain the highest possible power gain. The aim should be to secure at the centre of the band considerably more drive than is actually required, to make up for transfer losses. Where it is excessive, the drive can easily be levelled out by fitting a control in an accessible panel position, one of the best-known methods being to use a potentiometer to adjust the screen grid voltage.

**CATHODE KEYING**

From the Valve Application Department of Standard Telephones we have a note drawing attention to the undesirability of keying in the cathode of a valve without some protective device. The opening of the cathode circuit can result in a large potential difference developing between cathode and heater elements and should be avoided, as it is detrimental to the life of the valve. The recommendation is a resistor of not more than 250,000 ohms permanently connected between heater and cathode—of course, on the valve side of the key. Such a resistance, which would pass negligible current, would not prevent the valve cutting off on keying.

If you are a G3+3 still in your CW period, *see* the note on p.517.

# AMATEUR RADIO For The Beginner

**PART IX**

## VFO FOR THE LF BANDS

*By* **A. A. Mawse**

ONCE the first flush of success has died down somewhat, one of the first reactions of the crystal-controlled, or "rock-bound," beginner is a sense of frustration! He feels he is missing interesting contacts due to his inability to move about the band at will. In fact, under present operating conditions on our bands, a well-constructed variable frequency oscillator (VFO), properly used, is virtually a necessity.

The operative words are contained in the last sentence. Let it never be forgotten that a badly-made or badly-operated VFO can be a menace of the worst kind. A little quiet listening on the DX bands will provide ample evidence of this statement! A good operator would never tolerate a poor VFO, so it would be correct to say "By thine VFO shall ye be known!"

What, then, are the factors that constitute "a good VFO," and how can these results be achieved?

### Stability

Undoubtedly this comes high in importance. When a valve warms up from cold, small changes occur in the disposition of the electrodes. These changes, although minute, alter the inter-electrode capacities, and, if the tuned circuit is sensitive to these changes, then a gradual drift in frequency will result. If the heat generated by the valves causes a similar warming-up of the oscillator coil, the inductance of the coil will change.

If the oscillator circuit constants are so chosen that relatively high currents circulate in the coil, they will have the same warming effect and provide yet one more possible cause of frequency drift. If the oscillator circuit components are not well screened, capacity effects may be present, causing a change in note with a shift in position of the operator. Unless all wiring, particularly that associated with the oscillator circuit, is made rigid, vibration in the room or on the bench—caused, perhaps, by keying—will be set up, sufficient to produce a form of frequency modulation. Poor quality components—particularly condensers and resistors—will change their values slightly when under load, causing drift or unsteadiness. So there are quite a number of factors involved!

### Isolation

As one function of a VFO is to maintain its set frequency, irrespective of outside influences, it follows that the frequency should not be affected by variations in the load, or driven circuit. In other words, the load must not "pull" the oscillator. This can be achieved by placing one or more buffer amplifiers between the oscillator and output, and, since for reasons of stability, previously discussed, it is desirable that the oscillator itself should run at the lowest possible power input, these buffers also serve to boost the output to suitable levels.

### Feed-Back

This is another source of trouble that can be prevented by correct design. In a badly-screened VFO it is possible for some of the RF being radiated by the PA to be picked up at the grid of the oscillator, amplified through the buffer chain and fed back into the grid of the PA. Hence, a vicious circle is established and the whole circuit rings round or "howls." This can be particularly unpleasant if the PA is being modulated, generally resulting in frequency modulation of the transmitter. The remedy, of course, is to box the whole VFO unit in a metal cabinet and to by-pass to earth with suitable condensers all feeder leads at the point where they enter the cabinet.

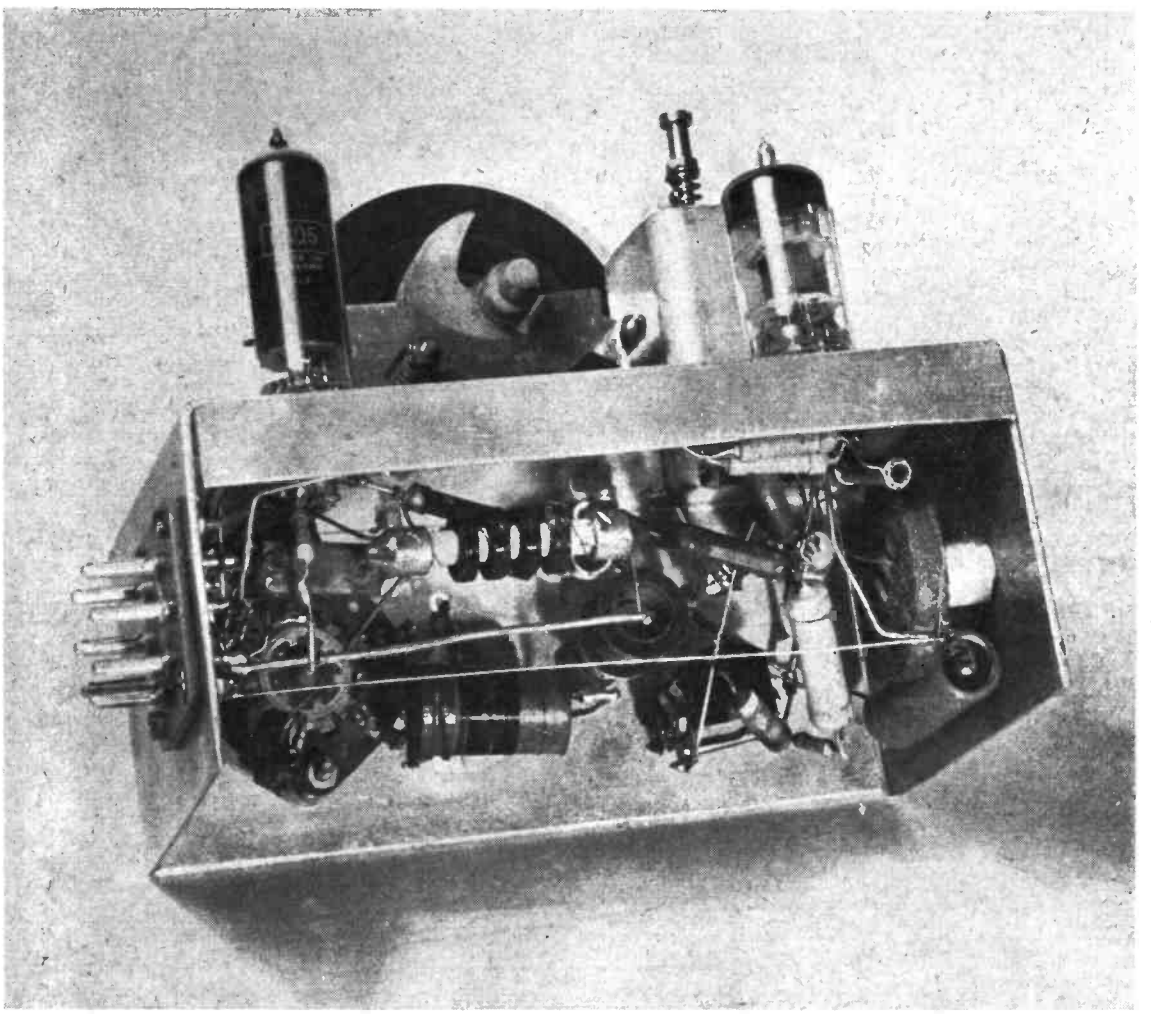
### Keying

Many a good VFO is spoilt by poor keying arrangements. It has been shown many times in the pages of this *Magazine* that it is not good practice to key an oscillator; by far the best results are achieved if the oscillator is left running continuously, and some subsequent low-power stage is keyed. Unfortunately, this is not an ideal solution. Even with good screening, if the VFO is located in close proximity to the receiver (as is generally the case), and if the two are tuned to the same frequency (as frequently happens), a limited amount of pick-up from VFO into receiver is inevitable; this can be very irritating, particularly on a weak signal or on one which is being modulated.

As it happens, the writer has always been reasonably successful with oscillator keying. Because of its obvious advantages for break-in (BK) working, this system has once more been adopted in the VFO design which is described here.

### Output Response

Under band conditions as they are to-day, rapid changes of frequency are often required—especially so in contest work. The re-tuning operation should, therefore, be as simple as possible—preferably one-knob control, at least over a reasonable band of



**Underside view of the Beginner's VFO. On the left is the plug for coupling in power and taking input; this plug registers with the crystal socket on the chassis drop of the Beginner's Transmitter described in our September issue. At bottom left is S1, and next to it is L3, masking C13. Above is RFC2 and just below and to the right L2, with jack J beneath; RFC3 goes across the jack and was fitted after this photograph was taken.**

frequencies of, perhaps, 100 kc or so. This calls for reasonably flat output from the unit; the writer has attempted a happy compromise in the present design without the sacrifice of too much RF output power.

**Circuit Design**

Having outlined the salient features that go towards the making of a good VFO, we can now turn to the finalised circuit, which is shown in Fig. 1.

It will be seen that V1A is one half of a 12AT7 twin triode, operating along the lines of the Tesla circuit, so interestingly described by G3FRV in the September issue of SHORT WAVE MAGAZINE. L1 is part of a slug-tuned IF transformer unit taken from some ex-Service equipment, the components L1, C1 and C2 all being contained in the cut-down screening can which is bolted to the top of the chassis. It will be seen that the key jack is placed in the cathode return of this valve, across which is a small RF choke; with this arrangement the keying characteristics are excellent, without any appearance of key-clicks, chirps or bloops. In the key-up position the current drain is 6 mA, and about 3½ mA when the key is closed and V1A is oscillating.

Output is taken *via* C6 to the grid of V1B—the second half of the 12AT7—which is functioning as a cathode-follower. It will be seen that the anodes of these two sections are fed from a stabilized HT source, the oscillator at 105 volts and the cathode-follower at 255 volts.

Output from this stage is taken from the cathode load resistor R4 *via* C7 to the grid of V2, which is a 6AQ5, a miniature valve having similar characteristics to the well-known 6V6. R5 functions as the

grid resistor, by-passed by C9, whilst the combination L2, C8 is tuned fairly broadly to the oscillator frequency.

With the switch S1 in the open position, V2 functions as a conventional buffer with an aperiodic anode circuit formed by the choke RFC2, and drive is fed through C12 to the grid of the PA. The combination L3, C13 is tuned to twice the oscillator frequency so that, when S1 is closed, V2 functions as a doubler, and drive is then available in the 3.5 mc band, through C12 as before.

**Construction**

This unit has been designed to work from the Power Pack (July issue) and to drive the Transmitter (September) previously described in this series. For this reason, all power leads and the output lead are terminated in the 7-pin plug situated on the side of the chassis; this is so aligned that it mates with the corresponding socket on the chassis of the Transmitter. The VFO chassis measures 2½ x 4 x 6 inches, which is a convenient size to fit into one of the metal instrument cabinets which can be obtained for a reasonable sum. The tuning condenser C3 is fixed to a rigid L-bracket bolted to the top of the chassis, the choice of direct or slow-motion drive being left to the individual. Personally, for a VFO the writer does not attach a great deal of importance either to calibration charts or slow-motion drives. Accurate set-up of frequency is quite feasible with direct drive in conjunction with either the receiver or the heterodyne frequency meter (November issue) or both. L1 is pre-set during initial tuning-up operations and need not be touched thereafter. The remaining controls L2, C13 and S1 are adjustable from the front, and the key jack, of course, is also brought out to the front.

**Setting Up**

The setting up of any radio circuit is greatly facilitated if means are readily available for checking current consumption of the different stages. This can be done very easily if small resistors of, say, 47 ohms, are wired-in at strategic points, as, for example, at points marked "X" in Fig. 1. The test prods of a milliameter touched across these resistors when the circuit is under test will indicate the current flowing.

## Table of Values

VFO for the LF Bands

C1 = 315 μμF silver mica
C2 = 400 μμF silver mica
C3 = 75 μμF variable
C4 = 20 μμF ceramic
C5 = 135 μμF silver mica
C6, C7 = 100 μμF silver mica
C8 = 400 μμF silver mica
C9, C10, C11 = 680 μμF mica
C12 = 200 μμF mica
C13 = 35 μμF variable
C14 = .01 μF mica
R1 = 82,000 ohms
R2 = 180,000 ohms
R3 = 47,000 ohms
R4 = 4,000 ohms 1 watt
R5 = 27,000 ohms
R6 = 1,000 ohms 1 watt
R7 = 5,000 ohms

*All resistors ½ watt except where specified.*

J = closed circuit key jack
RFC1, RFC2 = 2.5 mH chokes
RFC3 = 150 turns 36 SWG ¼in. dia. former
S1 = Single pole two-way wafer
V1 = 12AT7
V2 = 6AQ5

COIL DATA

L1 100 turns 40 SWG on ¼in. dia. x ¾in. slug-tuned former.
L2 40 turns 36 SWG on ¼in. dia. x ¾in. slug-tuned former.
L3 50 turns 36 SWG on ¼in. dia. x ¼in. former, scramble wound.

*All coils should be given an application of Durofix or similar cement after winding.*

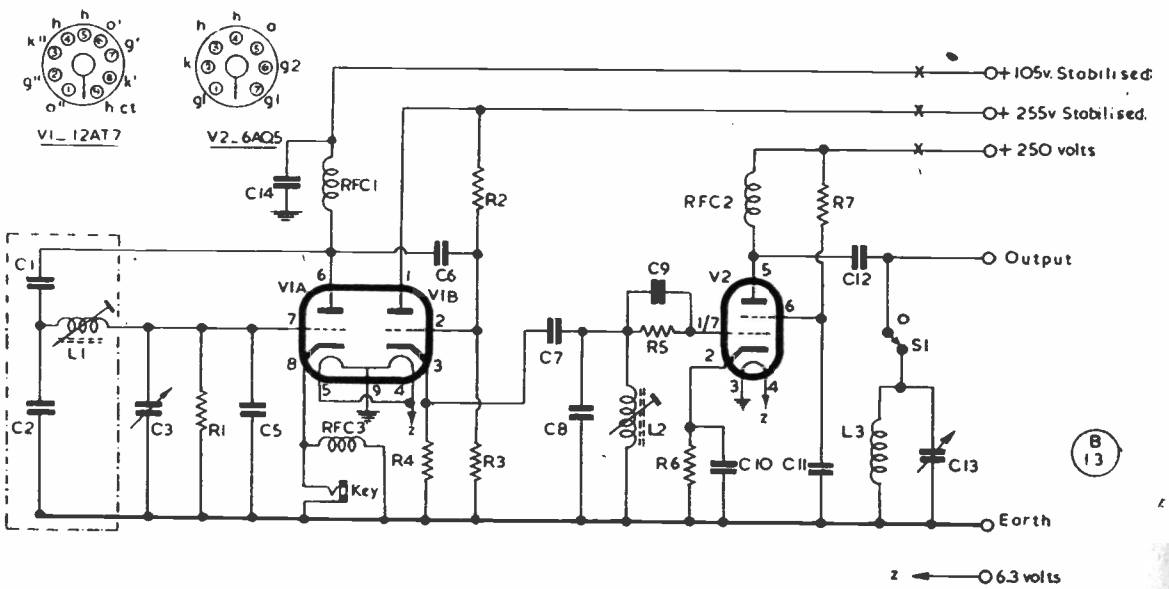



**Fig. 1. Circuit of the Beginner's VFO, in which V1a-V1b is the oscillator section with cathode follower output, into V2, the buffer-doubler. The oscillator circuit is the Tesla and the method of keying shown—while allowing for break-in working—does not affect the stability of the oscillator nor the quality of the note. V1a-V1b is a 12AT7 twin-triode and V2 a 6AQ5; both are miniature valves. Ample drive output is given on both 160 and 80 metres, with full band coverage.**

in the relative circuit, the resistor acting as a high resistance shunt to the meter without appreciably affecting the reading and without any effect on the load at these low powers. Care should be taken, of course, to remember that these circuits are "live," and insulated prods *must* be used.

With the heaters on, connect HT to V1A and check, by means of the receiver or frequency meter, that the circuit is oscillating. The current reading to this stage should be in the region of 3½ mA. Set C3 to half-mesh and adjust L1 until oscillation takes place around 1875-1900 kc. Check the frequency produced at minimum and maximum settings of C3. These should be above 2000 and below 1750 kc. Further slight adjustment of L1 may be desirable so that about the same overlap occurs at each end. The aim is to get the whole range 1750-2000 kc on the full swing of C3.

Next, connect HT to V1B and check that the current reading in this circuit is approximately 10½ mA, with 2 mA through the voltage divider R2/R3 and the remainder through V1B. Connect HT to V2 and check the current drain to be in the region of 17 mA at point "X" in the 250v. line.

Put a 47-ohm resistor in series with the earthy end of the grid resistor of the transmitter PA stage. and, with HT off the PA but with the heater on, connect the negative end of the milliameter at the junction of these two resistors with the positive prod earthed, and set the meter to the "25 mA" scale. Couple up the VFO output to the grid of the PA, set C3 to approximately 1825 kc; open S1 and adjust L2 for maximum grid drive, as shown by the meter. (It may be necessary to use the 1 mA scale if the grid resistor is on the high side.) Close S1 and tune C13 for maximum grid drive. The reading obtained should be approximately twice the previous one.

Finally, with a dummy load across the transmitter PA output and the appropriate coil in its anode circuit, switch on the PA HT, and tune the PA for maximum dip. Plug the key in and listen to the note and keying characteristics on the station receiver or frequency meter-monitor. Check that tuning the PA, through resonance, has *no* effect on the frequency, *i.e.* no "pulling." After making this test on both bands, and getting the right answer, the VFO unit can be passed as OK and the Transmitter can go on the air.

Fig. 3 gives the relative power output curves for both bands. From these, it will be seen that adequate RF drive power is available over 50-75 kc across any mid-frequency on Top Band, and across 150 kc on 80 metres, *without any readjustment of L2 or C13 being required.* Operation beyond these ranges may call for a touch on either of these controls if peak drive is necessary. In practice, the ranges given are seldom likely to be exceeded during any particular operating session, a shift of perhaps 20 kc being adequate in most cases. Nevertheless, it is only a matter of a moment to peak the output in any desired section of the band.

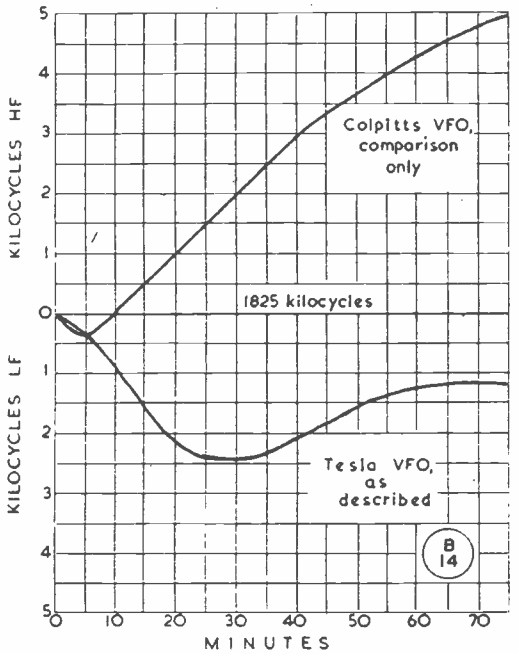



**Fig. 2. Curves showing drift against warm-up and running time for the Beginner's VFO (Tesla circuit), as described in this article, against a Colpitts VFO. It should be noted that the Colpitts curve is not necessarily typical of the type; it is shown for comparison purposes only, using a Colpitts unit that happened to be available. Both curves could probably be improved by the use of better components and more screening, but the performance of the Tesla as shown here can be regarded as good enough for operation on the 160 and 80-metre bands; in practice, after the initial warm-up movement, the drift during the usual transmitting period of a few minutes would be negligible. These curves, and the discussion in the article on the subject of drift, show how easy it is to check up on any VFO—and how instructive the results can be!**

### Drift

As stated at the beginning, drift in a VFO is a very important factor, and, as a matter of fact, is a very interesting subject. Drift figures can readily be obtained by using the Frequency Meter described last month. The procedure is to warm-up the meter, switch on the VFO and quickly tune for zero beat in the headphones, at the same time making a note of the time. Leave both units running and re-tune the Meter every five or ten minutes, noting down the new reading on each occasion. Longer periods can be taken after the first half-hour or so. The result is then graphed and the actual measurements taken on the VFO described in this article are shown in Fig. 2 above.

As a comparison, a further set of measurements were taken at the same time on another VFO belonging to the writer, using the Colpitts circuit, and which for a long time has been regarded as quite satisfactory. The results were most illuminating, as will be seen from a study of Fig. 2! What happens in the first ten minutes is, perhaps, no criterion of the "goodness" of a VFO, and on this score should really be neglected. As a matter of general interest,

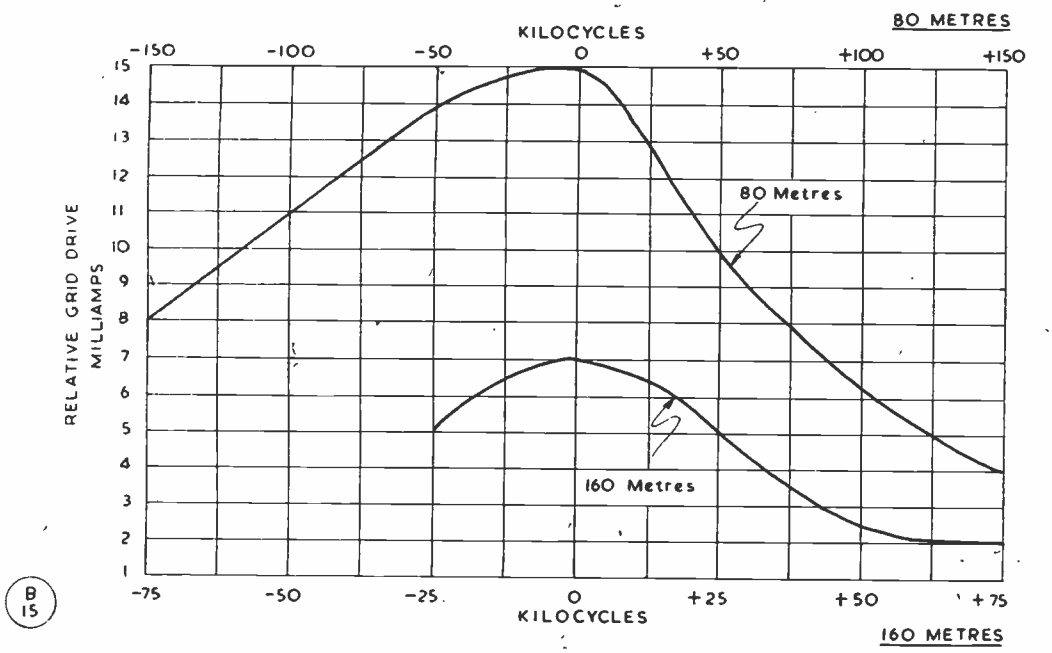



**Fig. 3. Curves showing relative power output (into a dummy load) from V2 in Fig. 1 on the 160 and 80-metre bands, with the frequency range over which output remains reasonably flat. In other words, with the VFO set up for, say, 1830 kc, enough drive for an 807 to 10w. is obtainable over about 1800-1870 kc on C3 without having to peak up on L2. Similarly, if set up for 3600 kc, ample output for an 807 at 25-30w. is given over the range 3525-3675 kc without having to touch C13 in Fig. 1. These curves were taken on the model as described in the article, though it should be noted that values are with an artificial load ; figures actually obtained, in mA, into any usual PA would be about half, or less, those given here.**

however, they are included in the graph. It will be seen that the Colpitts circuit, after an initial shift in an LF direction, starts to drift steadily HF and was continuing to do so after 75 minutes, at an approximate rate of 70 cycles per minute! Let us hasten to add, for the benefit of Colpitts supporters, that the writer is not condemning the basic circuit on the strength of these results ; his version is probably a bad one! The curve in Fig. 2 refers only to one particular Colpitts VFO, and the figures are included purely for purposes of comparison with the Tesla described here.

The Tesla circuit, on the other hand, starts off in an LF direction, and for the first 25 minutes drifts rather more rapidly than its counterpart, but thereafter, for almost the next hour, goes very slowly HF at the rate of approximately 25 cycles per minute. At a frequency of 1800 kc, this represents a very small drift indeed. Since ex-Government equipment was utilised in the construction of this unit, it is probable that, had new, good-quality components been used, as recommended in the Table of Values, these figures would have been improved upon.

### General Observations

It will be noticed that the output obtainable at 3.5 mc is considerably greater than at 1.8 mc, which is desirable in that we are limited to 10 watts for Top Band working. Actually, the output is ample to drive an 807 over the 10-watt limit on Top Band, and to the full capacity of the Power Pack on 3.5 mc.

The unit can, of course, be used to drive any suitable medium-powered transmitter, but, for those who intend it to drive the Transmitter described by the writer in the September issue of SHORT WAVE MAGAZINE, one or two slight modifications to the latter are recommended for best results.

The grid resistor should be replaced by one of lower value—47,000 ohms is satisfactory—and the little 47-ohm meter shunt resistor should be wired in series at the earthy end at the same time. It was found that some 807's were inclined to be prone to parasitic oscillation when undriven, and a small resistor of about 100 ohms inserted right at the end of the lead where it is attached to the top cap will clear this up without any trouble.

Reference to Fig. 1 will show that the 6AQ5 buffer/doubler is fed from a 250-volt unstabilized supply. This is because if the feed were taken from the stabilized supply the latter would overload, and voltage control would be lost, having regard to the requirements of the other circuits connected to it. A 10,000 ohm 5-watt resistor (or two 5,000 ohm 2½-watt in series) should be wired up to the 450-volt line at one end, and to a spare pin on the 7-pin socket at the other. After all initial tests have been concluded, the 450-volt end can be transferred to the dead side of the stand-by switch, so that the 6AQ5 only draws current when the PA is switched over to the "transmit" position.

# High Gain Audio Stage

## SINGLE-VALVE MICROPHONE AMPLIFIER

ANY usual type of crystal microphone calls for a first stage in the speech amplifier which is capable of producing a usable voltage gain from the minute output given by the microphone. A high lift in this first stage is essential if a good speech amplifier is to be produced, capable of making the most of the quality characteristics of the crystal microphone.

Conventionally, this first-stage gain is obtained by the use of a pentode followed by a triode (6SJ7-6J5 is a popular combination), or a pair of single triodes, which could be expected to give an overall gain of about 60 dB at best.

The circuit herewith is of a high-gain voltage amplifier using only a single valve—a Brimar 12AX7 twin-triode. It can be shown that this circuit as it stands will give a gain of about 63 dB; with the average crystal microphone this means that a peak voltage on ordinary speech of about 55v. would be available as AF drive. With a 25 $\mu$F condenser C across the second cathode resistor, the gain would be increased to nearly 70 dB and the peak output to about 75v. Under these latter conditions, the response curve of the amplifier would be substantially flat over 300 to about 6000 cycles — an ample range for good speech transmission.

### Simplified Amplifier-Modulator

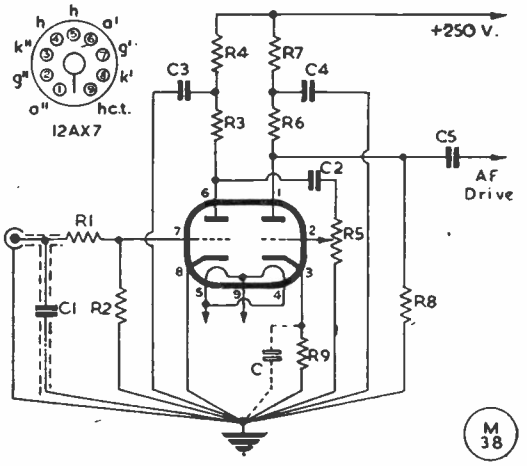
With such an amplifier, the succeeding stages to produce audio power can be simplified. So much so, in fact, that by following the circuit as shown here by a single Brimar 12AU7 with its triode sections paralleled, enough AF drive is obtainable for a pair of 807's in push-pull AB2 with 750 volts on their plates, giving about 100 watts of audio modulating power !

Thus, the whole speech amplifier-modulator becomes a matter of four valves only. Incidentally, this is a good example of how the high efficiency miniature types, now readily obtainable, can, and should, be used.

### Some Constructional Points

With a high-gain first stage amplifier of the type discussed here, it is of the utmost importance that the input grid should be fully screened. As is well known, high gain can mean instability and a distressing tendency enormously to amplify the hum frequencies ! Hence, C1, R1, R2, should be connected by the shortest possible screened lead, with the braiding earthed, and all earth returns made to one point near the valve-holder. As the 12AX7 is a single-ended type, it is easy to meet this requirement. The heater supply (wired in parallel) should have one side earthed to this same point, with the leads twisted, run straight from the valve-holder to the wall of the chassis, and round the wall to the LT supply connection, in such a way that they are as far as possible from the rest of the circuit.

The network C1, R1, constitutes an RF filter, to keep stray RF fields off the grid. The microphone input should be a shielded socket and, without the microphone plugged in, it ought to be possible to open R5 fairly wide before any hum appears in the output. Similarly, the microphone lead must be screened cable with the outer sheathing earthed, in the usual way. It is the input grid that will be




**Circuit of the high-gain audio amplifier discussed in the text. It consists of a single Brimar 12AX7 twin-triode and, taking only 2-3 mA at 250v., gives more voltage gain than the conventional 6SJ7-6J5 speech amplifier arrangement.**

### Table of Values

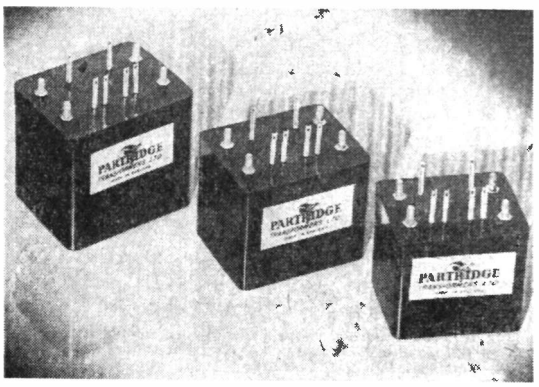
**The 12AX7 Audio High Gain Amplifier**

| | | | |
|---|---|---|---|
| C | = *see text* | R3, R6, | |
| C1 | = 50 $\mu\mu$F | R8 | = 470,000 ohms |
| C2, C5 | = .005 $\mu$F | R4, R7 | = 47,000 ohms |
| C3, C4 | = 0.25 $\mu$F | R5 | = 0.5 megohm pot'meter (gain control) |
| R1, R9 | = 4,700 ohms | | |
| R2 | = 3 megohms, or as specified for microphone | | |

*(C1, R1 comprise an input filter to RF).*

found sensitive to hum, and it is at this point that the screening must be good. The valve itself should be fitted with the screening can for which it is intended.

With an HT supply of 250v. the total current drain will be no more than 2-3 mA, which makes this an extremely economical amplifier, in addition to its high gain characteristic.




**Partridge Transformers in the new miniature potted range, available either oil or compound filled or in resin cast construction, as illustrated here. Standard items available from stock include high-fidelity and microphone transformers in ratios of from 20:1 to 80:1, with primary impedances from 6.25 to 600 ohms; they have a flat response characteristic over the range 20-20,000 cycles.**

## BOOK REVIEW

### *Second Thoughts on Radio Theory*

This book is by "Cathode Ray," who has contributed articles on radio theory to the *Wireless World* for twenty years. In fact, *Second Thoughts* is a selection of these articles in book form. One might feel discouraged on learning this, as it would appear unlikely to form even the basis of a well-constructed book. At the same time, it would seem a pity that some of the author's gems of exposition should lie buried in twenty years of back numbers.

Considerable care has been given to the selection and sequence of the material, and the result is a book which, within its limits, could be used for reference or as a text. However, if one said "But there are many such books already," one would miss the whole point of this one. "Cathode Ray" has not maintained his popularity for so long without good reason. He has the ability to get to the root of a difficult subject, see it through the eyes of a scientist rather than with the more limited vision of an electrical engineer, and lead the reader from really-fundamental first principles to a clear grasp of what, previously, was but poorly understood or merely taken for granted. Bearing in mind the source of the material, to start with it is necessary to assume some familiarity with much of the subject matter; even so, it is not only the experienced practitioner who will benefit by going back to school, but equally the enthusiastic beginner who has had a little experience and has mastered, shall we say, *Foundations of Wireless* by M. G. Scroggie.

The subjects covered are numerous and are divided into three sections. Ohm's Law, Waves, Harmonics and Beats, for example, are under the heading of "Basic Ideas," while "Circuit Elements and Technique" includes Resonance, Q, Negative Feedback, Super-Regenerative Receivers and Cavity Resonators. Under "Circuit Calculation" we have Differential Calculus, "j," Duals, Tolerances and Errors. These are only a few of the subjects covered, but indicate their wide variety. Problems are included from time to time at the end of chapters. The solutions and a comprehensive index complete the book.

A text book, pure and simple, can be very dull and uninspiring. In this case, the writer has given us a small section devoted to the lighter side of radio, and alleviated the burden of facts and figures in the main text with his light and easy style. He leads us as a kindly master would a class of keen but dim-witted students—not taking too much for granted and always ready to liven the proceedings with a timely joke.

*Second Thoughts on Radio Theory*, pp.409, by "Cathode Ray," published for *Wireless World* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, price 25s.

*J.M.O.*

## RHODESIAN MOBILES ON 32 mc

ZE3JJ writes that he is interested in getting reception reports on the signals of the radio network operated by the firm by which he is employed in Southern Rhodesia. The frequency is 32.215 mc, and the network comprises a number of fixed and mobile stations, announcing themselves simply as "fixed" or "mobile" and occasionally giving a position; transmission is FM telephony. With the opening of the 10-metre band, DX reception of these stations is quite possible—a Brazilian network on 36 mc has been heard in Southern Rhodesia. Reports should be sent to I. J. Wood, ZE3JJ, c/o RSSR, Box 2377, Salisbury, Southern Rhodesia.

## XTAL XCHANGE

Those wishing to exchange crystals have free use of this space. Notices should be set out in the form shown below, headed "Xtal Xchange—Free Insertion," and all negotiations conducted direct.

**G3IXO, The Cottage, Stidham Farm, Keynsham, Som.**

Has FT-171 type 3525 kc crystal, ½-in. pin spacing. Wants similar type for 3507 or 3508 kc.

**G3JBI, 49 Charlton Crescent, Barking, Essex.**

Has 500 kc bar, ½-in. mounting, and 3700 kc crystal, ¼-in. pins. Wants frequencies 3510-3535 kc, and 7010-7085 kc, ½-in. mounting.

# DX COMMENTARY

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

PAØVD

ANOTHER very interesting month, but without the phenomenal conditions reported last time. The DX on the HF bands seemed to reach its peak at the CW week-end of the International DX Contest (October 29-30) and has fallen off noticeably since then. Even so, conditions are extraordinarily good compared with anything we experienced last year, or even during the early part of this year.

Stations we haven't heard of for ages are now re-appearing; there seems to be a general move towards 21 and 28 mc; and the outlook is pretty bright all round.

Just to confirm the accent on HF-band DX, we will open this month's report at the highest frequency and work downwards, so here is the news of 28 mc.

### The DX on Ten

The band was wide open for the Contest week-ends, and has been on many occasions since then, even if in rather a patchy manner. The fact remains that it *is* feasible for an East-West opening to occur in a big way, as has already happened quite a few times. The U.S.A. stations, on both phone and CW, have already attained greater strengths, at times, than they are in the habit of doing on 21 or even 14 mc.

G4ZU (Croydon) reports that he is even piling up some new ones on *Ten*, and quotes ZD6RM, VP8AI, ZC5CT and PJ2AA. In addition to these, he worked the usual VK's and ZL's, as well as CR9AH, an old friend from the last ten-metre sessions. (All phone except VP8AI).

## CALLS HEARD, WORKED and QSL'd

G3FXB (Southwick) confirms that the band has opened with a bang, but he is unlucky, having a 31-mc navigational aid station pushing out a megawatt, only four miles away. So he is getting busy on a 3-element beam, hopefully! G6VC (Northfleet) reports hearing some nice signals, but nearly all phone, and he hopes the CW end will come to life soon. (It *did* during the Contest!)

G2YS (Filey) managed to work W and ZS on phone with only an indoor dipole—his "Old Faithful" of 1946-50 re-erected. G3GGS (Preston) reports plenty of openings but little activity, chiefly due to TVI. W's and a VO on phone, plus LZ on CW, staked his claim on the band. G3IGW (Halifax) mentions working "many W's."

G5BZ (Croydon) put his CW into VQ 2 and 4, ZE, ZS, HZ, KP4, PJ, VO, PY, CR6 and 5A; with the mike he collected ZS, CX, LU, CT, VQ4, ZD6, LZ and VP9. He noted that when 28 mc has been wide open, the lower frequencies have not been so good. In other words, there has usually been a marginal frequency, which, in each case, has been the highest frequency on which DX signals have been coming through.

G3IDG (London, S.W.12) still only has 10 watts and an indoor dipole on Ten Metres, but with these he raised K2CWJ and ZC4FF. Time spent at the receiver has resulted in the logging of 39 countries, compared with 27 last month. Some 25 of them were DX, and included EA8, HC, HZ, KP4, LU, OQ5, PY, UJ8, VP7, 8 and 9, VQ2, 3 and 4, YV, ZD3, ZE and ZS, plus SM8BID/MM and W2ZXM/MM.

GW3AHN (Cardiff) had a good time on phone, with CR6, CX, CO, KG4AV, KP4, OA4ED, OQ5, TI2ES, TG9AD and 9JW, VP6JR and 6WR, VQ2, ZS9, 5A and many less rare specimens. On CW he netted stations in CR6, CX, PJ2, HZ, SV, ZD6, ZE and VQ4.

### The DX on Fifteen

It is probably right to say that 21 mc has been the star turn of the month, with new DX countries showing up, as well as more and more stations really settling down

on the band instead of paying fleeting visits.

A welcome visitor during the Contest was KC6CG, on CW. We heard him call CQ DX three times without a reply, after which we obliged! Following a 569/579 QSO he called CQ again, and still no one seemed to want him. (No, we can't explain this one!) Others a little off the beaten track, same week-end, were KL7, VK9DB, UB5KAB and UA9CC, HR, TG, TI and VQ5.

G2NS (Southbourne) has been trying to work Mexico for 23 years, and it took XE1PJ and 21 mc to fix him up! This station is on most days around 21050 at 1400 GMT; we have heard him many times. G2NS thinks the "Scatter-back" phenomenon that used to be so prominent on Ten is now showing up on Fifteen. He has no rotary beam to prove it, but often hears G stations with what he calls a "magnetic North ring" on them—sounding like W6's, in other words.

G4ZU collected a whole host of new countries—enough to put him on the top of the 21 mc ladder with his score of 138! Among them were CT3, YV, CR9, VP9, FM7, VP2, 7 and 8, VK9, KL7, HR, VR2, KR6, KC6, TG and XE. For all this DX he uses his own three-band "minibeam"—which covers Ten, Fifteen and Twenty and is also used as a vertical on 80 and 160. Practically all the DX is on phone, by the way.

New phone contacts for G3HCU (Chiddingfold) were HE9, KC6, TG, VP7, AP, KR6, VK9, JA and TF, bringing him to 115 phone, despite his recent absence in VE-land. Incidentally, he asks us to convey his appreciation of terrific hospitality to VE3ATU and all the lads at VE3RCS, as well as VE3AGB, 3BXK, 3ASH, 3DXE and 3GH. Most of them have been worked on 21 mc phone since he returned home.

G3JZK (Cambridge) deserted the Top Band to work W8EBK on Fifteen, using a CO-tripler-doubler with 20 watts and a "piece of damp string" indoors for an aerial. G6VC has been active with his 136-ft. wire and has got himself up to 36 countries; he heard a YN on the band, but he got away.

G2YS raised HA5KBA, YO3RF, VS6DG, IT1TAI, ZE6JY and 4X4BX—all CW. G3GGS worked most W districts as well as VK, VP6, VS6, ZC4 and had several lunch-time contacts with KZ5KA. G3IGW, on phone, collected EA8BO and VK5EN.

G3FXB had many nice phone QSO's, such as CR9AH, HC1ES, HR1LW, JA, KV4BB, KH6ZA, ET2AB, VK9DB, VS1, 2 and 6, VP8AQ, TG9AD, TF5TP and ZS9G. CW activity brought him ET3AH and VP7NG. And he only wants Nevada for WAS on the band.

G3DO (Sutton Coldfield) added the following, all on phone: YN1JO, JA4AH, CR9AH, KC6CG, TG9AD, ZD6RM, OH and HA, bringing his total up to 106.

G5BZ had a good time on CW, with VS6, JA, KG6, VP5, 3V8, CR6, KP4, HZ, AP, EA6, KZ5 and many others; on phone he made YI, CO, VP6, VS6, VE8, ZS9, EA8, HR, HC, 3V8 and other choice items. He bemoans the fact that he is screened from the North and North-East, but it doesn't appear to cramp his style too much!

GW3AHN says he didn't work all that we credited him with last month—some were only heard. Many nice ones were also heard at his place of business, where he has a receiver only—very tantalising! This month he added VS2BD and HA5KBA for new ones on phone, but most of his time was spent on 28 mc.

G3IDG, though not yet transmitting on 21 mc, has been doing some good turns by logging the U.S.A. novices (WN and KN

## SHORT WAVE MAGAZINE DX CERTIFICATES

**WNACA (Worked North American Call Areas)**

Twenty-two cards to be submitted, for contacts with stations in ten U.S. Districts (W1-Ø); nine Canadian (VE1-8 with one 8 in Yukon, one in North-West Territories); Alaska (KL7), Newfoundland (VO) and Labrador (VO). Contacts may have been on any bands, phone or CW. Operators in W, VE, VO or KL7 are *not* eligible for this Award. (87 *WNACA Certificates issued to November*, 1955).

**FBA (Four Band Award)**

Cards to be submitted with confirmation of contacts with 20 different countries, *each* country to have been worked on four different bands. Any bands will qualify *e.g.* 160-80-40-20, or 80-40-20-10, or 160-40-20-15 — and so on. Entrant's own country may count as one of the 20 countries. (53 *FBA Certificates issued to November*, 1955).

**WFE (Worked Far East)**

Eighteen cards to be submitted, for 18 different countries selected from among the following: C (China), C3 (Formosa), C9 (Manchuria), CR9 (Macao), CR10 (Timor), DU (Philippines), FI (French Indo-China), HL (Korea), HS (Siam), JA/KA (Japan), KR6 (Ryukyu Is.), PK1-2-3 (Java), PK4 (Sumatra), PK5 (Dutch Borneo), PK6 (Moluccas), UAØ (USSR in Zone 19), VS1 (Singapore), VS2 (Malaya), VS4 (British North Borneo), VS5 (Brunei), VS5 (Sarawak), VS6 (Hong Kong) and XZ (Burma). All or any bands count. (20 *WFE Certificates issued to November*, 1955).

**WABC (Worked All British Counties)**

Sixty cards required, from sixty counties of the British Isles, all to have been worked on the 160-metre band since January 1, 1952. Counties to be as shown in any standard atlas, *not* "administrative counties" such as the three Ridings of Yorkshire, East and West Sussex, County of Bristol, and so on. Isle of Wight counts as Hampshire — not separately. Isle of Man does score separately, as do all the Channel Islands. Scilly Isles also count separately. For London, the L.C.C. area scores as one County. (109 *WABC Certificates issued to November*, 1955).

**WBC (Worked British Counties)**

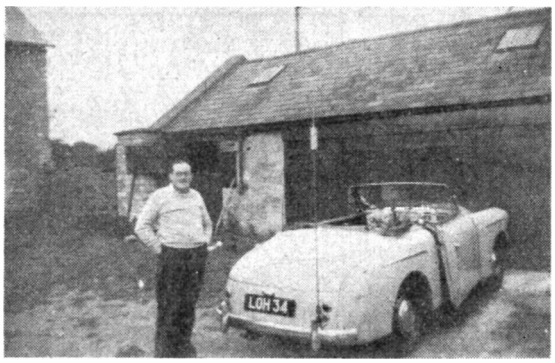
Open only to claimants *outside* the United Kingdom and Eire. Cards required from 50 different counties of the British Isles, worked on any band 3.5 to 28 mc inclusive, phone or CW. Stickers will be issued to claimants showing proof of contact with 60, 70, 80 or 90 counties. The definition of U.K. counties is the same as for the WABC Certificate above. (*New award, instituted December*, 1955).

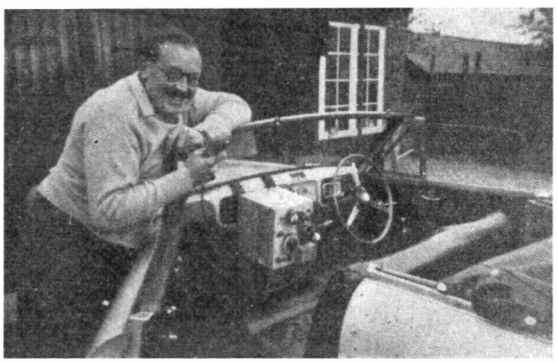
**MDXA (Magazine DX Award)**

To qualify for this Award it is necessary to have worked 3 continents, 15 countries on 160 metres; 5 continents, 40 countries on 80 metres; 6 continents, 80 countries on 40 metres; 6 continents, 180 countries on 20 metres; and 6 continents, 90 countries on 10 metres.

This involves a total of 405 QSL cards, which should *not* be sent. A list of all qualifying contacts should be given in the first instance when claiming the Award, after which certain selected cards will be requested for scrutiny.

**Claims for all the above-mentioned certificates should be addressed "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.**





**G3GJX of Oxford is /M on Top Band in his Austin Sports. The photograph on the right shows the fitting of the transmitter/receiver unit in front of the passenger seat, and on the left can be seen the aerial arrangement — a loaded whip with the resonating coil clearly visible. This aerial assembly is sufficiently pliable to avoid damage in motion. Mounting is simple but efficient—the butt of the whip is held in a drill-chuck fitted to a bracket on the bumper bar. It is the work of a moment to slack off the chuck and withdraw the aerial, the top section of which is sleeved into the loading coil. The two sections then go into the boot.**

prefixes) between 21100 and 21250 kc, and sending lists of them across for publication. He heard 39 of them in three weeks, including a KNØ. Those who want to work DX and are not rock-bound congregate around 21100 kc, trying to raise stations working just below that frequency.

Watch the intruders on this band! One day recently we logged jammers, or their whiskers, on 21050, 21160, 21200, 21390, 21410 and 21440 kc (all at once), and we recently heard a fully-fledged broadcasting station on 21280. It's the old story—once things are good, everybody wants to get into the act. The jammers, we presume, are parked there ready to squash anyone ambitious enough to start up a broadcast channel.

### The 21 mc Ladder

At the suggestion of many readers (including some of those near the top of the 21 mc Ladder) we are suspending the all-time 21-mc scores for next year. The first suggestion was that we should run a 1956 21-mc marathon, starting on January 1, to give everyone an equal chance of a clean start on the band. After much thought, we have decided to try to encourage the use of our two highest-frequency bands by making it a combined effort, using the 21 *and* 28 mc bands.

Starting on January 1, log your country scores on both 28 *and* 21 mc, and send them in month by month. Placings on the ladder will be made, in regular rotation, by (*a*) The highest total for the two bands; (*b*) The highest figure on 21 mc; and (*c*) The highest figure on 28 mc. If enough entries are received for Phone Only, we will run a separate ladder for them. Otherwise we will simply annotate the entries on the main ladder accordingly. We do not want a CW-only entry; one for "all-in" (CW and Phone) and one for Phone-only. We hope this will stir up some feverish activity on both Ten and Fifteen metres. The 21-mc Marathon Table, in its present form, will appear for the last time in next month's issue, giving final scores up to the dead-line date in December. (We shall probably bring it back in 1957!)

### Twenty-Metre DX

The doings on the HF bands have quietened down the 14-mc party quite a lot, but the fact remains that the 'chasers who are seriously after new countries, although their score is already 230 or more, just can't afford to let Twenty go. YA1AM, XW8AB and several other elusive types are still only to be found on that band, and sundry promised DX-peditions are more likely to show up on Twenty than anywhere else.

G3FXB reports working ET, FM7, HK, KC6, MP4, VE8, VQ6 and TG9, all on phone, as well as FY7, VR2, XW8, ZC5, ZD6 and 3A2 on CW. G5BZ's list (CW only) includes 3A2, KL7, VQ8AG, VK3, 5 and 7, VE4 and W6.

G3GGS finally caught DU7SV, and other new ones were FF8, VQ6, CR6, ST2 and FY7, topping the hundred for him at last. G2HKU (Sheerness) tried hard to get CR10AN, who was a terrific signal during the contest, but we are informed that he is a phoney and that CR10AA, at present inactive, is still the only one on Timor. XW8AB was also terrific —*and* genuine.

G6VC winkled out YN1PM for a new one. G4ZU managed four new countries on this band alone —KC6CG, KC6UZ, VS5CT and XW8AB; in addition, he worked VK9OK and 9RH (Norfolk Island) and KS4AW.

Many other correspondents

**TRANS-ATLANTIC TOP-BAND TESTS, 1955/56**

*Dates:* Every Sunday, December-March inclusive.

*Times:* No set limits, but peak activity 0500-0800 GMT.

*Frequencies:* American stations will be listening for Europe between 1830 and 1870 kc. *DO NOT* call W/VE stations on or near their own frequencies, as they will not be listening there.

U.S.A. stations will be mostly on 1800-1825 kc, also 1875-1900 (East Central States) and 1900-1925 and 1975-2000 kc (West Coast and West Central States).

mention Twenty, but only to say that they are still working "bread-and-butter DX!" of the W6-VK-ZL-VS6 type.

### Forty-Metre Doings

Forty, naturally, is not very popular with this spate of HF DX rolling in. G3IDW (Swindon) thinks it is a pity that so many have abandoned this band, and suggests that we ought to use it more for local ragchews instead of sticking to 160 or Two. Further, he suggests that the 7200-7300 kc region should be used for them, and that during the day contacts could be made there without too much QRM. He has been working W's on CW, mornings and evenings—at the LF end, of course.

G2HKU called OY7ML, who was coming in at 589, but was not lucky. G3GGS kept "looking," and getting the impression that the band was open, although little DX was heard. UG6, UA9 and the like were often very good in the evenings, and reports were exchanged with one UA9. SV1AB was worked, and FG7XB was a sad case of a gotaway!

G3FXB, during the Contest, raised CT3AB, EA6AF, YI2AM, PJ2AA and KP4KD on CW, as well as W's, HR3HH, FA8RJ, KP4KD and 4X4 on phone. Since then he reports working ZD3BFC on the band.

### 21 mc MARATHON

*(Starting July 1, 1952)*

| STATION | COUNTRIES |
|---|---|
| G4ZU | 138 |
| VQ4RF | 137 |
| VQ4RF (Phone) | 135 |
| GW3AHN | 134 |
| G4ZU (Phone) | 133 |
| G5BZ | 125 |
| G5HCU (Phone) | 115 |
| G3FXB | 113 |
| DL7AA | 109 |
| GW3AHN (Phone) | 108 |
| G3DO | 106 |
| G3FXB (Phone) | 104 |
| G3FPQ | 100 |
| G6QB | 100 |
| G3TR (Phone) | 98 |
| ZS2AT | 92 |
| G2YS | 84 |
| G2BJY | 83 |
| GM2DBX | 81 |
| G2VD | 80 |
| GM2DBX (Phone) | 79 |
| G3CMH | 71 |
| ZB1KQ | 64 |
| 5A2CA (Phone) | 60 |

### Activity on Eighty

Another neglected band, and who can wonder? The creepy-crawlies multiply almost daily, the clicks and chirps are always with us, and you never know what you are going to find under the next stone! However, G3FXB managed to pull out CT3AB, FA and W. G2YS also got CT3AB, plus HA5BU.

G3KNU (Scunthorpe) raised 3A2BH up there, as well as CT2BO and UA3KAE, who vanished after exchanging reports. G3JAF (Lymington) worked many W's, the best period being October 22-23, when he raised all districts except W7. K6CIT gave him a half-hour contact and arranged a further sked, but no more luck. 3A2BH was also put in the bag. 'JAF will be on the band most mornings, looking for DX with his 50 watts and 132-ft. wire.

G3JHH, with less than 15 watts, raised EA4FI for a new one and is gunning for SM1's, 2's and 3's to get his WASM award. He recently got his QSL from SP9CS, worked on this band six months ago.

### Top-Band Topics

And so, at last, to dear old One-Sixty, which still has its devotees whatever the other bands may be doing. Some of them are truly a race apart, not even listening anywhere else or even having the gear with which to radiate anything but Ten Watts on Top Band. It certainly has an atmosphere of its own, even if cynics call it slightly Oldy-Worldy. (Anyone seen a helix or a loose-coupler lately?)

Last month's news of DX with New Zealand put the band firmly on the DX map for the coming season, and already we hear of Trans-Atlantic contacts at week-ends. Mostly, though, it is the county-chasers and GDX'ers who maintain the activity.

G2CZU (Bath) is up to 57/59 and hopes to claim a WABC almost any day; and he says he would like to see more of the Scottish Lowlands, not to mention

### TOP BAND COUNTIES LADDER

*(Starting Jan. 1, 1952)*

| Station | Confirmed | Worked |
|---|---|---|
| G5JM | 97 | 97 |
| G2NJ | 97 | 97 |
| G3HIS | 95 | 95 |
| GM3EFS | 94 | 94 |
| GM3OM | 93 | 95 |
| GI6YW | 93 | 93 |
| G3JEL | 92 | 94 |
| G3HIW | 92 | 93 |
| G6VC | 92 | 92 |
| G5LH | 92 | 92 |
| G3JEQ | 92 | 92 |
| G3EUK | 90 | 93 |
| G3CO | 89 | 92 |
| G3GZB | 89 | 91 |
| G3HYJ | 84 | 85 |
| G2AYG | 83 | 84 |
| G3JHH | 80 | 81 |
| G3BRL | 79 | 80 |
| G3GGS | 77 | 80 |
| G3JKO | 73 | 85 |
| G3DO | 72 | 72 |
| GM3DOD | 70 | 71 |
| G3FAS | 69 | 80 |
| G3KEP | 69 | 74 |
| G3JBK | 67 | 71 |
| G3HZM | 67 | 69 |
| G2CGL | 63 | 70 |
| G3JVL | 62 | 77 |
| G3JAM | 62 | 70 |
| G2HKU | 62 | 62 |
| G3JJG | 61 | 68 |
| G3AKX | 60 | 71 |
| G3DGN | 60 | 64 |
| GW3HZZ | 60 | 63 |
| G2CZU | 57 | 59 |
| G3FNV | 55 | 70 |
| G8CO | 54 | 66 |
| G3JZK | 43 | 48 |
| G3HQT | 39 | 41 |
| G3ICH | 8 | 33 |

**ANNOUNCING THE WBC CERTIFICATE**

We have pleasure in making available a new award, open only to claimants outside the United Kingdom and Eire, to be known as the "WBC" (Worked British Counties). This Certificate will be granted to overseas stations sending proof of contact, phone or CW, with at least 50 different British Counties, *i.e.* counties within England, Wales, Scotland, Northern Ireland, and also the four Channel Islands and the Isle of Man. A full list will be published in due course.

Stickers will be available for 60, 70, 80 and 90 counties. All bands, 3.5 - 28 mc, may be used.

The necessary fifty QSL's should be forwarded to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, England.

Rutland and Cumberland; he recently worked EI8J for his eighth country on the band. G3ICH (Leighton Buzzard) reports for the first time as a G—he used to be DL2SU. He is on Top Band only and has worked six countries, best DX being GM3KLA in Shetland. G8CO (Grays) also worked Britain's most northerly amateur, making his score 54/66.

G2HKU maintains his cross-band sked (160/80) with PAØPN. G3HIS (Cubley) says he will have to withdraw temporarily from the race, for business reasons, but as his score is 95/95, he is in a creditable position if he never works 160m. again!

G3HYJ (Norwich) says the band gets more like Eighty from the QRM point of view, and he has a particular grouse about the station on 1877 kc, using a T3 note and signing MTO. Not to mention the music, with no carrier apparent, on 1863 kc and the bubble-gum noises on 1840 kc! Other locals report similar noises, so 'HYJ doesn't think it can be his receiver.

G3IGW has been stepping outside the U.K. with EI3R, HB9CM and OK's. G3GGS has not been so active, having been making use of four other bands—but he has notched up 77/80.

G3JXE, aboard the trawler *St. Nectan*, continues his trips up to Bear Island and Spitzbergen, and is not home long enough to get himself organised on the band. However, he does a lot of listening and has heard 60 counties during his trips. He hears G's any time after 1730 nowadays. Between September 18 and October 1, near Bear Island and Spitzbergen, he logged G5PP/P (569), G3KKP (549), GM3KHJ (569), G3KIA (56/79), G6ZR (56/89), G3KMD (55/69), GI3JEX (569), G3KTX (339), G3KLP (54/69), GM3EDU (559), G3PN (449), GM3EFS (349), G3BEC (549), G2DAG (559), G3JMB (439), G3LP (559), G3GGS (439), G3ELZ (569), G3CEE, G3KML (549), G2FIX (549), G8TR (579), HB9CM and OK's. And in case you didn't realise it, Bear Island is more than 1300 miles to the north of Aberdeen!

**New One for Top-Banders**

HB9CM has figured in both the last two paragraphs; he is well-known as a keen Top-Band man with a special licence. He now writes to say that he will be operating from Liechtenstein with an HE call on January 14 and 15. He will start up at 1600 GMT on the 14th and continue "to the end of propagation" on Sunday. Frequencies will be 1850 to 1890, and 1915 crystal, listening over the whole band and giving instructions (QMH or QML).

From 0430 to 0730 on the Sunday morning he will be interested in DX only, and *will not answer* any European calls. He *begs* European stations to leave the U.S.A. band, 1800-1825 kc, alone during this period, so that he can try to give some of the W's a new country.

This sounds like a worthy and genuine DX-pedition, so let's see if we can all co-operate to make things easy and pleasant for HB9CM.

**Sunspots!**

GW3FYR (Aberporth) heard and worked W's on Ten with considerable surprise and excitement on October 29, after which he dashed out to his astronomical telescope and, with the help of a proper dark filter, counted twelve giant sunspots consisting of three pairs and six individuals. One group was in a very high solar latitude, proving definitely that they belong to the new cycle.

He has also found Aurora propagation (which often follows Solar flares) fairly prevalent, and one night on Twenty he worked a whole string of W6's starting at 0145 BST. They sounded very peculiar (their phone was unintelligible) and many of them said their beams were headed in the wrong direction, so it was almost certainly a batch of Aurora-assisted QSO's.

**The Overseas Mail**

G. A. Doran, an SWL in New South Wales, writes to correct the old "VK8" misprint in our announcement of the WAVKCA Certificate. This was spotted and corrected the following month, but we are grateful for the check straight from VK! He adds that FW8AB on Wallis Island is genuine, and skeds VR2BZ, 14040 kc, Saturday nights at 2200 GMT. Another spot of news is that VK3WR recently worked CP5EF on what is believed to be the first SSB contact between the two countries.

G3KKX (Plymouth) is by now in Southern Rhodesia, hoping for his ZE call. He has a tri-tet driving an 807 and hopes for "some sort of output" on 7, 14, 21 and 28 mc, where he will be looking for G's, especially from his home town.

W2QHH (Hamilton, N.Y.) is hot on the trail of his WFE, and others may be glad to learn that we will accept XW8 (Laos) as a country *instead of* FI8—but not as an additional one. 'QHH is well-known as a Certificate-chaser, and he recently pulled in a Six-Band WAC (Top Band included, naturally) and the first Six-Band WAS.

VE2LI (Montreal) is, of course, that well-known 'chaser ex-G5LI,

and a very long letter from him gives news of the conditions, and particularly the QRM, out there. He has the old G5LI rig, now equipped with a 2500-volt transformer and 700 watts input, but he only uses this QRO outside TV hours. Inside them he has a Ranger (75 watts) which sounds pretty potent on 21 mc. George has hopes of an alternative QTH, 60 miles out of the city and up in the mountains, from which a Vee-beam on 160 metres might be a possibility! In any case, he promises full support for this season's Top Band Tests; he will be there every Sunday morning from 0500 GMT onwards, on a frequency between 1820 and 1825 kc, and will be looking for G's above 1825 kc.

K2GMO (East Orange) is an ex-G who hails from Derby, as well as being ex-VE7ACN and ex-DL4OZ. In his first ten months as a K2 he has worked 161 countries, all on Twenty CW. He owns two home-built kilowatt rigs and a new Collins KWS1, a three-element beam for Twenty, and dipoles for the other bands, with a ten-metre beam on the way. He is 15 miles from New York City and says the TV aerials look like sparrows on the roof-tops!

**DX Strays**

The following come from near and far, including our old friends the West Gulf Club, the North and South Calif. DX Clubs, and KV4AA, not to mention our own networks of tame spies.

ZD9AC has been working Europe (21 mc, 0900); YA1AM continues to stir them up, 14 mc only, all sort of times and frequencies — genuine and QSL's. LB8A is said to be active on 14 mc CW.

CR9AH is on 21 mc phone, also FO8AD . . . OY2Z is on 14 mc phone, OY2H on 14 mc CW, and OY4XX on 7 mc CW. OY3IGO is at present QRT . . . There are reports of a group of VR2's being transferred to VR5 shortly . . . HR3HH is on phone, 14135 kc . . . BV1US, Formosa, on 14040 CW.

FP8AP works phone on 14343 kc at 1500 GMT, Saturdays and Sundays, when his telegraph duty doesn't prevent it . . . AC5PN, the first and only station in Bhutan, hopes to be on with a better rig before long. At present he has a B.2 . . . MP4QAL is closing his Bahrain station and should have reappeared from Qatar by the time you read this.

ZC5VR has closed and is now VS2EW . . . AR1EW is active on 14022 kc CW at 0300 GMT . . . KAØIJ should be active again by now, following an accident suffered while erecting masts . . . CR6AI is said to be on 3510 kc, but looking for W contacts.

**Certificates and Awards**

On looking through all the available literature on the subject of Certificates, we were staggered to find that over 120 of them are available throughout the world. This is not, in itself, a bad thing, but it does seem to us that an awful lot of them are small local affairs that could fairly be described as either frivolous or trivial. It only needs a step in the same direction to bring us to "Worked all Forty-Metre Phone Stations in Wigan," or the "London, S.E.27 Award." There's no end to it, though.

EA4CR, of Madrid, claiming his WNACA, says "As you can see by my card, I am award-crazy and have earned quite a lot of them." And on his card, showing 42 of them, are the following at which you might like to have a guess: CAA, 101, DRB, Altamira, DUIMP, CIA Oro, CYA, TPA, Torino 7 mc, W.K25, CCC, R.Dario. (How many marks do you get for that lot?) From an article in *CQ* by W2QHH, we quote a few more: TPG, CDM, WFJS, Conch Net, Lad 'n Lassie, LARK, WVT, TT-100, White Rose Award.

If you know how to go about claiming those, you can be said to be fairly knowledgeable in the shack-decorating game.

However, and not just to swell the numbers, we are adding another to our own select few awards. This is the *WBC*, not to be confused with the WABC, and it is available only to stations *outside the U.K. and Eire.* The qualification for it is to work at least 50 British Counties (using any band or bands, 3.5 to 28 mc), and stickers will be available for 60, 70, 80 and 90 counties.

This should help to make individual G's more interesting to DX stations, but, of course, the news will take some time to get round to the rarer parts. When it does, you will doubtless find overseas types taking an extra interest in your QTH—and if you have the good fortune to live in a rare one you may even find yourself sought-after DX!

**Miscellany**

G3IUR (Blaby) wonders if anyone alse noted an apparent black-out of all bands on November 12, 1130-1140 GMT. He was working a G on Forty and the signals went right out, as did all others on the band. Twenty, Eighty and One-Sixty all sounded the same, but the QSO was resumed after ten minutes or so. Probably this ties up with abnormal solar activity.

GM2DBX (Methilhill) would like to see a 1956 Five-Band Table, washing out or at least supplementing the present one. We have already announced the *1956 Marathon* for 21 and 28 mc, Phone Only or All-In, and we hope this will prove sufficient to keep him busy! He didn't take part in the DX Contest this year owing to domestic worries, but he has been very highly placed for the preceding four years in the Phone section, being first GM

**Short Wave Magazine**
**DX CERTIFICATES**

*The following have been awarded since the publication of our last list, in the September issue:*

FBA
No. 52 F9IL (Aubencheul)
53 HB9DB (Berne)

WNACA
No. 84 F9IL (Aubencheul)
85 GM3AXX (Glasgow)
86 G6VQ (Kendal)
87 EA4CR (Madrid)

WABC
No. 106 G2CGL (Hull)
107 G3JVL (Heston)
108 GW3HZZ (Rhigos)
109 G3AKX (Sale)

Details of MAGAZINE DX AWARDS and CERTIFICATES, and the claims required for them, appear on p. 538 of this issue.

twice and second GM twice—also first U.K. station once and second twice. So it was hard luck having to miss this year's event, and we hope to see him back on top in 1956.

G2HDR (Bristol) is newly-licensed, and he hopes that people will not be suspicious about his call, which is, of course, his old "Artificial Aerial" call from pre-war days, now re-issued with all the trimmings. He is on Top Band only, most evenings until 2200 GMT, with 8 watts.

**1955 DX Contest**

The following scores are to hand for this year's DX Contest. Phone Section: W6YY, 175,000; W6AM, 162,360; VQ4RF, 174,000; G3AWZ, 150,000; 4X4FV, 135,000; G3FXB, 67,000; YU1AD, 60,000.

In the CW Section we have W6AM (multiple-operator), 279,744; W9IOP (multiple-operator), 219,515; YU1AD, 147,000; G3FXB, 131,000; and 4X4FV, 130,000.

We haven't worked out a formula for converting all those noughts into hours, watts and multipliers—but if all that QRM were let loose on one band on Sunday morning there would be some quiet spots on the other bands . . .

**Late Flashes**

For the many who worked 3A2BH on various bands, we have the following gen. The equipment was built by HB9KB (except the 75A receiver); they had a ground-plane for 14 and 21 mc and a "piece of wire" for Forty and Eighty. In the fourteen days following October 6, over *two thousand* contacts were made! All QSL's should be sent *via* USKA; if return postage is attached they will be answered direct; otherwise through the Bureau.

We gather that ZD3BFC and GD3UB recently had a sked on *Top Band*, but we have not heard of any result, negative or otherwise.

That just about sums up the news for this month. Remember that the next dead-line is early on account of the erratic behaviour of the postal service at Christmas-tide, and your offerings for the next issue must be with us by **first post on December 14.** Address them, as always, to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. There is not much time after publication date, so *Do It Now*. Until next time we wish you 73 and Good Hunting, to which we must add our sincerest wishes for a Happy Christmas, 1955, and the best of all DX years for 1956. See you all in the New Year!

# GB2SM AT THE SCIENCE MUSEUM

## NOW ON THE AIR

As noted on p.499 of the November issue of SHORT WAVE MAGAZINE, the specially licensed and equipped radio amateur station at the Science Museum, South Kensington, London, S.W.7, is now on the air under call-sign GB2SM.

In keeping with educational policy at the Museum—which is just as important as entertaining the casual visitor or assisting the serious student or research worker—it was decided that an active Amateur Radio station should be added to the exhibits in the Communications Section. It should be remembered that the Science Museum is concerned not only with the past but with the present and the future as well. To this end, many special exhibitions and demonstrations are arranged in the various Sections, so that a working radio station in the Communications Section is a natural expression of this policy. Apart from that, GB2SM should become an important factor in encouraging and developing practical interest in radionics among young visitors and the many students who regularly use the Museum, thus helping to bring more people into the radionics industry.

**Layout and Equipment**

The station is located in an annexe to the Communications Section; the walls and ceiling of the room have been specially treated, acoustically speaking, to damp down noise from the receivers, so that operation of GB2SM will cause no disturbance in the main galleries.

Electrical noise is, however, quite another matter and is a serious problem at the moment. The intention is to instal a noise-free receiving aerial system, but in the meantime GB2SM suffers the serious disability of a very high local noise-level, making signals of anything less than about S8 difficult to copy. This must mean that many calls go unanswered, and is, thereby, something of an embarrassment to the operators.

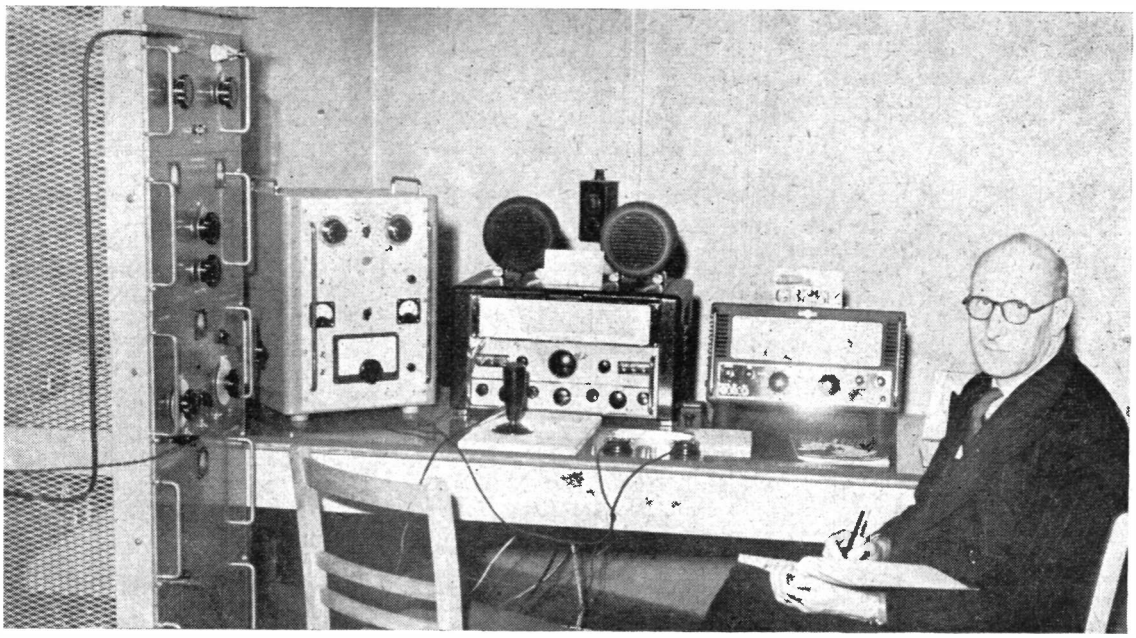
Our photograph gives a general impression of the station. The transmitters are both by Labgear—a rack-built 150-watt CW/phone band-switching one, on the left, which will eventually become the stand-by set, and an LG.300 Mk. II (as discussed in the November issue of SHORT WAVE MAGAZINE) which is to be provided with a matching power supply unit and modulator, and will be operated as the main transmitter.

The receivers are a G.E.C. BRT-400E and an Eddystone 680X. Both are capable of giving very good performance over the whole range of amateur communication frequencies, but until they are working with a relatively noise-free aerial input, cannot do themselves or GB2SM full justice.

For transmission, aerials are folded dipoles, at the roof height of the main building.

**Activity and Results**

At present, GB2SM is operational on the 14 and 28 mc bands, and in terms of DX worked in a few weeks on the air, countries in the log include PY, VE, VK and ZL, as well as numerous W stations. Several demonstration-QSO's have been made, and



**GB2SM at the Science Museum, South Kensington, showing equipment layout. On the left is the rack-and-panel Labgear 150-watt transmitter, with an LG.300 on the operating table. Receivers are a G.E.C. BRT-400E (centre) and an Eddystone 680X. At right is Mr. G. R. M. Garratt, under whose direction GB2SM operates and who is himself G5CS.**

the operators are already acquiring a record of unexpected happenings and a repertoire of unusual experiences—and they keep a visitors' book! The QSL card, now in hand, embodies a very fine view of the Museum, reproduced from an old drawing.

Operators on GB2SM are G5CS, G3JUL and G3KAB—all members of the staff of the Science Museum. The station is under the direction of G5CS (Mr. G. R. M. Garratt, Deputy Keeper), who is in charge of the Communications Section and is himself an old timer of many years' standing in Amateur Radio.

**Future Development**

It is the intention that GB2SM, in the nature of things a show station, should be in every way up to the minute and representative of all that is best in British Amateur Radio—not only in regard to its equipment, but also in operation on the air. Indeed, if it is to fulfil its "educational" function and be in keeping with the high standard always set by the directorate of the Science Museum, these must be its objectives.

Development plans in hand include the erection of an aerial tower on the roof of the Museum, which will be equipped with beam arrays for the 14, 21 and 28 mc bands. Equipment for 160-metre operation is also envisaged, and as soon as GB2SM is established on the communication bands, a separate VHF installation—for operation on two metres and 70 centimetres—will be added to the equipment line.

Though the Science Museum has first-class facilities for constructional work of every kind and working apparatus could be provided from these resources, quite rightly the official policy is to use available commercial amateur-band equipment as far as possible.

We have no doubt that the enthusiasm of G5CS and his staff will not only make GB2SM a very fine station, but that in due course their efforts will also result in a useful contribution in the field of education for radionics. The authorities at the Science Museum are to be congratulated on their enterprising approach to the whole project.

And, by the way, remember that you can visit the Science Museum any day of the week, and that admission is free.

## NEW MULTICORE GIFT PACK

Multicore Solders, Ltd., announce that they have supplemented their Bib lines with a new 5/- Gift Pack containing a Bib Wire Stripper, Electrician's Insulated Screwdriver and a card of Ersin Multicore Match Melting Tape Solder. The three items are attractively mounted on a gift card and packed in a cellophane envelope. Designed primarily as a permanent gift line, it will have particular appeal for home electricians and handymen at Christmas time, although due to the prevailing steel shortage, supplies for this year are limited.

## PAYING THE POSTAGE

With the forthcoming heavy increase in postage rates, it is more than ever necessary to include a stamped addressed envelope with any enquiry to which an answer is expected.

# AMATEUR RADIO EXHIBITION

NOVEMBER 23-26, 1955

THE ninth Amateur Radio Exhibition was held in London during November 23-26, under the auspices of the Radio Society of Great Britain, with P. A. Thorogood (G4KD) as exhibition manager. The official opening ceremony was performed by Vice-Admiral J. W. S. Dorling, C.B., director of the Radio Industry Council, who indulged in some amusing reminiscences of the early days of what many of us knew as "wireless." Principal guests at the luncheon following the opening included Sir Harold Bishop, of the B.B.C.; Mr. T. E. Goldup, of Mullards; and Mr. Ian Orr-Ewing, Member for North Hendon and at one time himself active on the air as G5OG.

While the Exhibition itself was very interesting and reflected the high standard now achieved in the techniques of Amateur Radio—no visitor can fail to have been impressed by the excellence of the wide range of home-constructed apparatus—the attendance was disappointing. Once again, this was because the Exhibition is not properly advertised and no attempt is made to bring in the radio-interested public. A total attendance of about 2,200 over four days is not enough; it compares poorly with the number of visitors to a one-day local town hall trade fair or "arts and crafts exhibition" almost anywhere in the country.

For ourselves, year after year at this Exhibition we have been "preaching to the converted." While this is a pleasant way of passing the time, it can do little or nothing to attract recruits for Amateur Radio.

**Round the Stands**

Your correspondent toured the stands and noted many things to catch the eye of anyone at all interested in radio communication or experimental work. All four amateur-band transmitter manufacturers—Labgear, Minimitter, Panda and P.C.A.—were present, now well established in the market and showing an excellent range of transmitter units, with ancillary apparatus.

The G.E.C. stand included many items of Amateur Radio interest, and the Brimar valve display was also very useful, particularly as it covered so many of their miniature types; included here was a 1200 mc cavity oscillator, using an air-cooled 2C39A. Other trade exhibitors were Avo and Pullin, showing test meters and measuring instruments; Multicore Solders; Cleminson's Agencies with an interesting range of transformers, filters and converter units; J-Beam Aerials; Philpotts Metalworks; and Harwin Engineers.

G2HCG, of J-Beams, had arranged a comprehensive display, including a 24-element two-metre array, fully assembled. As in previous years, the Philpotts range of cabinets, chassis and metal-work, attractively finished and most competitively priced, attracted much attention. Harwins do mainly tag boards and connector panels in manufacturer's quantities, but also offered a very useful, low-priced neon universal tester, for AC, DC or RF; their representative at the stand was G3HT, a well-known old timer who was first licensed in 1911 as PZX.

The BBC outside broadcast department made a recording of a two-metre QSO between GB3RS at the Exhibition and G5KW/M, and this was put out as a short programme feature on November 26. The equipment in use at GB3RS was G6AG's mobile transmitter/receiver, with which a number of contacts were made during the Exhibition period, while G5KW used the /M gear with which so many VHF operators are familiar. This year, the ATV demonstration was in the hands of G2DUS, on closed circuit.

**Exhibition Meetings.**

Since the Amateur Radio Exhibition has taken on so much the character of a convention rather than a public exhibition, it has become convenient to arrange various meetings concurrently with the Exhibition. On the Friday, the RAF Amateur Radio Society, of which G2LR is one of the moving spirits, held a well-attended AGM. Here it should be said that the RAF—the only Service represented at the Exhibition this year—put on a particularly interesting display, over which a great deal of trouble had been taken. It included a Morse speed test bench, at which one could listen to auto-sending at 12, 18, 25 and 35 w.p.m. (and write it down, if one could!).

On the Saturday evening, there were no less than four dinner-meetings: The First Class Operators' Club, with G5PS in the chair, held their annual dinner with an attendance of 62; the RAF Amateur Radio Society had a beer-and-sandwich party for members; while the SSB and VHF groups arranged informal dinners which were well attended.

It was, as always, a great pleasure to us to meet many old friends as readers of SHORT WAVE MAGAZINE, and before the Exhibition ended seven pages of our visitors' book had been filled.

## BRITISH AMATEUR TELEVISION CLUB — BIRMINGHAM

A meeting of amateurs interested in television transmission was held in Birmingham on October 16. M. Barlow, G3CVO/T, of the BATC's Chelmsford group and a leading spirit in the ATV field, was there and, with the aid of tape recordings and film, gave a talk on progress in amateur television transmission. It was decided to form a BATC group in Birmingham; those interested should get in touch with: G. Flanner, 194 Aston Brook Street, Birmingham, 6.

# VHF BANDS

A. J. DEVON

**Activity Down, Conditions Variable—**
**Station Reports and News—**
**Progress on 25 Centimetres—**
**News from VE, VQ and ZL—**

THOUGH nearly all reports this month speak of "low activity," they also draw attention to periods of "good conditions." There are also those who say that they can find someone on the band to work at almost any time.

Every winter season, we have what amounts to a partial shutting down on the VHF bands, though this does not mean loss of interest or any intention permanently to abandon operations. It just means that a certain number of people, though they may listen round to see if there is anything doing, do not come on unless they hear someone they want to work. But let out a CQ on an apparently dead band, and almost always it will have a chain-reaction effect. Just try it a few times, and see what happens.

GDX conditions have again been very good on various occasions during the period, and new contacts are being made (and new stations are appearing) quite frequently. We are not here trying to conjure up activity that does not exist—what we are saying is that the two-metre band is never as dead as it sounds, and seldom as quiet as it is made out to be. For instance, for the two evenings of November 21 and 22, which was not a week-end, be it noted, G3WW lists 28 different stations heard or worked, and SWL Drybrough logged a total of 75S in the month to November 18—his calls-heard list shows 34 stations only because he has not included those in Warwickshire and adjoining counties. Similarly, G3GPT remarks that "activity is still high in the North-West" and mentions nearly 20 stations in that area as making regular appearances. In the same context, G3JWQ shows 66S worked during the period.

Very few Europeans are reported this month, and then mainly by southerly stations well placed to work across to F, ON and PA. But G2HCG is still keeping a daily schedule with PE1PL from Northampton, and, even more remarkable, G3GPT can likewise work PE1PL from up near Preston, Lancs.

So your A.J.D. maintains that really activity is a good deal better than some of our correspondents have suggested and, in any case, justifies not only listening round more often, but also putting out a call or three.

We are pleased to see, again this month, new claims for Annual Counties and good progress in that Table. It seems that colleague L.H.T. will now have to compile a List of Counties in connection with the new WBC Award (*see* "DX Commentary" this issue), so we can wait for that, and from it, *perhaps*, get out a list of active VHF stations by counties; this will interest the several readers who have been prodding us for such a list during the last few months.

### London VHF Dinner

We are asked to say that the annual dinner of the London VHF Group takes place on Thursday, January 5, at the Bedford Corner Hotel, Tottenham Court Road, London, W.1, proceedings commencing at 7.15 p.m. Tickets, at 12s. 6d. each, can be obtained from P. A. Thorogood, G4KD, 35 Gibbs Green, Edgware, Middlesex. Though this event is fixed for "next year," the time to apply is now.

### Some of the Reports

G3IOO (Oswestry) found conditions good during November, and though he lost all his aerials in a gale, is now reorganised for both VHF bands at what he calls "half-mast." No EDX was heard, but GDX stations were strong on two metres and 70 cm in the last fortnight of the period.

From Northern Ireland, GI3GXP using a 6/6 Slot is reported as a very good signal by G3GPT, who has also worked EI6A and EI9C. In addition to PE1PL, G3GPT keeps a weekly schedule with G2ADZ (Woolacombe, N. Devon); GDX reported as heard or worked in Preston during the period includes G3FAN, G6AG and GM3EGW. And for good measure, G3GPT claims 7 more counties for the Annual.

G3JZG (Willenhall, Staffs.) goes to 32C for the Annual, which he thinks is "quite surprising," as his all-time total is only 35C; he suggests the reason may be that he is now on phone! G2BRR (Wootton Bassett) says "little to report," and G3DO (Sutton Coldfield) goes to 21C in the Annual. G3CKQ (Rugby) has something to say about operators who work long BK contacts without disclosing identity, mentioning one station he held on to for 45 minutes in the hope of hearing a call-sign! G2CIW (Cambridge) was getting strong signals from the 150-mile stations during the early part of November, and sends a calls h/w list. G5MR (Hythe, Kent) says that things have been very quiet with him—he is still trying to find a solution to the mystery of his reception of GI3GXP, discussed in this space last month.

G5BM, one of our old timers and a keen VHF operator ever since five-metre days, is now on from a new QTH at Highnam, Glos.; he finds this better in all directions—except, perhaps, to the north—than the old location in Cheltenham. The beam is a 12-ele stack, remotely controlled from the operating position, with a skylight in the roof immediately below the stack, "to make main-

## TWO-METRE ACTIVITY REPORT

***(Lists of stations heard and worked are requested for this section, set out in the form shown below, with callsigns in alphabetical and numerical order).***

**G3JZG, Willenhall, Staffs.**

*WORKED :* G2ADZ, 2AIW, 2CZS, 2DJM, 2FJR, 2WS, 3DLU, 3FAN, 3GJZ, 3IEX, 3IRA, 5BD, 5KW, 6AG, 6OX, 8AL, 8IL. (*All over* 100 *miles October* 15 *to November* 19).

**G3CKQ, Rugby, Warks.**

*WORKED :* G3BA, 3BJQ, 3CCH, 3DKF, 3DLU, 3GSO, 3HAZ, 3HHD, 3IVF, 3JWQ, 3JZN, 3KBL, 5BM, 5SV, 6SN, 6TA, 6XM, 8VN.

*HEARD :* G2AIW, 2ANS, 2BVW, 2COP, 2FNW, 2HCG, 2HOP, 3DO, 3DMU, 3EJO, 3FAN, 3FIH, 3FUW, 3GHO, 3IOO, 3JZG, 5BD, 5YV, 6AG, 6YU.

**G2CIW, Cambridge.**

*WORKED :* G3ARX, 3CCH, 3DLU, 3ENY, 3FIH, 3GPT, 3IOO, 3IVF, 3JFR, 3JZG, 3KFD, 3KFT, 3KHA, 3YH, 4JJ/A, 5BM, 5YV, 6XM, 6XX, 8IL.

*HEARD :* G2ADZ, 2FXK, 3EGV, 3HCU, 3IRS, 3ITF, 5ML, 6FO, 6SN, 8PX, 8VZ.

**G3JWQ, Ripley, Derbys.**

*WORKED :* G2ATK, 2ATK/M, 2BVW, 2CIW, 2COP, 2CZS, 2DJM, 2FJR, 2FNW, 2FXK, 2HCG, 2HOP, 2MV, 2XV, 3BA, 3CCH, 3CKQ, 3COD, 3DKF, 3DLU, 3DMU, 3DTG/A, 3EGE, 3EGV/A, 3FAN, 3FIH, 3FUA, 3GHO, 3GJZ, 3GPT, 3GSO, 3GVF, 3HAZ, 3HIQ, 3IIT, 3IUK, 3IOO, 3IRA, 3IVF, 3JFT, 3JZG, 3JZN, 3KBL, 3KFD, 3NL, 3OZ, 3VI, 3WW, 3YZ, 4JJ/A, 5BM, 5CP, 5DS, 5HK, 5KW, 5YV, 6AG, 6LL, 6PJ, 6TA, 6XM, 6YU, 8AL, 8VN, 8VZ, PE1PL. (*October* 14 *to November* 22).

**SWL Lee, Bridgend, Glam.**

*HEARD :* G2ADZ, 2AIW, 2DVD, 3AUS, 3CQC, 3DLU, 3FAN, 3FIH, 3FRY, 3GNJ, 3GOP, 3HSD, 3JGJ, 3KEQ, 3KHA, 3YH, 5BM, 5US, 6AG, 6NB, 6OX, 8IL, GW3FXR, 8SU. (*October* 16 *to November* 18).

**SWL Cox, London, S.W.18.**

*HEARD :* G2ABD, 2AHP, 2BWS, 2HCG, 2HDY, 2MV, 3BBR, 3CAS, 3DF, 3EYV, 3FAN, 3FD, 3FQS, 3FUH, 3GDR, 3GHI, 3GXG, 3IAM, 3IOO, 3IUL, 3JEP, 3JHW, 3JR, 3JXN, 3KEQ, 3KHA, 4FB, 5BC, 5BM, 5DS, 5KW, 5UM, 5YH, 5YV, 6AG, 6LL, 6NB, 6OH, 6OX, 6TA, 8AL, 8RW, 8TB, 8TV.

**SWL Drybrough, Coventry, Warks.**

*HEARD :* G2AHX, 2CIW, 2FJR, 2HOP, 2MV, 3CAD, 3CCH, 3DLU, 3DMU, 3FAN, 3FIH, 3GJZ, 3GNJ, 3GPT, 3GSO, 3IIT, 3IRA, 3IRS, 3IWJ, 3JZN, 3KEQ, 3KFD, 3KFT, 3OO, 5BD, 5DB, 5YV, 6OX, 6XM, 6XX, 8IL, 8SB, 8UQ/P, 8VZ. (*October* 19 *to November* 18).

tenance easy," as G5BM says. He gives several dates when conditions were good for GDX, and mentions that on the morning of November 20 he was getting a good signal from G3BW, but couldn't attract his attention.

G3AEP moved to Morecambe, Lancs., in the spring, but has only just found time to get back on the air; he has 18w. to an 832, with a G2IQ converter, and the beam is a slot. G3DLU (Weston-s-Mare) thought the evening of November 19 the best for conditions, when he worked G2CIW (Cambridge), G3FQS (Chesham) and G3JWQ (Ripley) on phone, at S9 both ways. G3DLU now has a most elaborate aerial system —a stack of five dipoles, spaced ⅝th wave vertically with coax phasing lines, having a feed system consisting of 35 ft. of coax and 120 ft. of open-wire line, involving three baluns and two quarter-wave transformers; this array is at a height of 53 ft. and fixed to fire E-W, as G3DLU is trying for EI4E (Killarney).

G3JWQ (Ripley) still uses a T.1143 with only 8w. input, the beam being a 6-ele Yagi at 50 ft.; the converter is the G6UH, as described in SHORT WAVE MAGAZINE for May last. into an HRO tuning 24-26 mc. G3JWQ is making good progress on two metres, and in eight weeks from September 14, worked 100 different stations.

G3WW (Wimblington, Cambs.) has not had much time for it just recently, apart from which he has had speech-amplifier trouble which involved him in a good many wasted hours "trying to put the brute right"; however, some good GDX contacts were obtained during the period, including G6ZP in Malvern, while, as mentioned earlier, quite a number of stations were logged on November 21-22.

Bill of G6XM (York) says that his activity is rather restricted at the moment, due to re-building, and that when he *is* on it is "very rare to hear or work anyone in the London area"; this, he thinks, may be because of CTV . . . Since starting up from York in February '54, G6XM has worked 70 counties and 13 countries on two metres. G2DRA (Harrogate) feels he has had a good year on 144 mc, having worked GM2FHH to the north, G3FAN to the south, and several Continentals; he is going in for a new rotatable 4/4 on a 30-ft. wooden tower, as he feels that he has about exhausted the possibilities of the fixed 6-ele stack, in use during the last three years.

### 25-Centimetre Items

Though there is not much news of actual results on 1250 mc, what we have heard is good. G2HCG is ready with a receiver; G5RZ (Leighton Buzzard) is at work on the receiving side; G2BVW (Leicester) is collaborating with G2HCG; G3CGQ in Luton can transmit and receive; and G3FUL (also Luton) has done a series of interesting tests with G3CGQ. Having built a slightly modified version of the G3CGQ receiver, affecting only the aerial input side, numerous tests have been carried out on aerials of every description, with G3FUL receiving and G3CGQ transmitting. The best arrangement, and the most easy to match, is a stack of Yagis with slots, to the G2HCG pattern, fed with 46-ohm air-spaced coaxial cable.

We might also mention here that G3FUL is probably the first amateur in the U.K. to have a beam assembly consisting of arrays for two metres, 70 centimetres *and* 25 centimetres, all on the same mast; moreover, he can work QSO's on all three bands, though so far on 25 cm they have only been locally with G3CGQ.

Those who went to the Amateur Radio Exhibition were no doubt as impressed as your A.J.D. by the very fine 25 cm gear shown by G5DT, with a 2C39A feeding directly into a dish. G3HBW also had some nice bits on show for 1250 mc working. The weakness at the moment is on the receiving side, but we hope shortly to be in a position to remedy this.

SHORT WAVE MAGAZINE

VHF CONTESTS

**U.K. Two-Band VHF Contest:**

**MARCH 10—11, 1956**

*(Rules January issue)*

**All-European VHF Contest:**

**JULY 14—15, JULY 21—22, 1956**

*(Rules May issue)*

## TWO METRES

### ALL-TIME COUNTIES WORKED LIST

**Starting Figure, 14**

**From Fixed QTH Only**

| Worked | Station |
|---|---|
| 75 | G5YV |
| 70 | G6NB, G6XM |
| 68 | G3BW |
| 66 | G3IUD (302) |
| 64 | G3CCH, G5BD (435) |
| 63 | EI2W (258), G3GHO |
| 62 | G3BLP (630) |
| 60 | G2OI (402), G3DMU |
| 59 | G2FJR (427), G3EHY, G4SA |
| 58 | G8OU |
| 57 | G8SB |
| 56 | G3WW, G5DS (654) |
| 55 | G2HDZ, G2HIF, G5BM, GW5MQ |
| 54 | G3IOO |
| 53 | G2AJ (519), G2HDZ (416), G3FAN, G4CI |
| 52 | G2NH, G6RH, G6XX, GW2ADZ |
| 50 | G3ABA, G3GSE (518) |
| 49 | G5MA |
| 48 | G6TA (487) |
| 47 | G5ML, G5WP |
| 46 | G3HAZ (315), G4HT (476), G5BY, G6YU (205) |
| 45 | G2XC, G5JU |
| 44 | G3BJQ, G3BK, G8DA |
| 43 | G2AHP (500), G3BA, G3COJ, G3HWJ, G4RO, G5DF |
| 42 | G2DVD, G3BNC, G3DLU*, G3FIH, GM3EGW (146) |
| 41 | G2FQP, G3DO, G3HBW, G3WS (255), G6CI (184) |
| 40 | G2DD, G3CGQ, G8KL |
| 39 | G2IQ, G3GBO (434), G3VM, G8IL (325) |
| 38 | G2FCL (234), G3APY, G8VN (190) |
| 37 | G2FNW, G2FZU (180), G3DLU, G3DVK (175), G3IER |
| 36 | G2DCI (155), G2HOP (161), G3CXD, G3IIT, G6CB (312), G8IP |
| 35 | G3FZL, G3FYY (235), G3HCU (224), G5MR (305) |
| 34 | G2CZS (243), G3AEP, G3BKQ, G8IC |
| 33 | G3HHY (125), GC3EBK |
| 32 | G2FVD, G8QY, G8VR |

### Some SWL Notes

SWL Lee (Bridgend, Glam.) remarks that if it had not been for the November GDX breaks, it would have been one of the poorest months—in terms of stations heard — for a very long time. He says G3JGJ (Plympton, S. Devon) is the most active operator in that area, and that GW8SU deserves to be remembered as having a difficult location. SWL Burman (Richmond, Sy.) heard very little during the month "apart from the hiss of my rig," and thinks there ought to have been a good deal more activity; he reports having got his G5RZ kettle completed and working up to 27 cm, and is also thinking about getting going on 70 cm.

| Worked | Station |
|---|---|
| 31 | G3HXO, G5RP |
| 30 | G3CKQ (122), G3FRY, G3GOP (208), G3GVF (129), G3IRA, G5NF, GM3DIQ, GW8UH |
| 29 | G3AGS, G3AKU, G3FIJ (194) |
| 28 | G2CIW*, G3ITF, G8DL, GM3BDA |
| 27 | G3CVO (231), G3DAH, G3ISA (160), G6GR, GI3GQB, GW3GWA |
| 26 | G3CFR (125), G3SM (211), G4LX, G4MR (189) |
| 25 | G3JMA, G3JXN (191), G5SK, G6PJ |
| 24 | G3FD, G3FXG, G3FXR |
| 23 | G3CWW (260), G3HSD, G3YH, G5PY |
| 22 | G2DRA, G3AGR (135), G3ASG (150), G3BPM, G3HIL, G3JHM (113), G5AM, G8NM |
| 21 | G2AOL (110), G3DVQ, G3IWJ, G6XY |
| 20 | G2BRR, G3EYV, G3IOE, GC2FZC |
| 19 | G3FEX (118), G3GCX, G5LQ (176) |
| 18 | G3DBP, G3JGY, GC2CNC |
| 17 | G3EGG |
| 16 | G2AHY, G3FRE |
| 15 | G3IWA |
| 14 | G2DHV, G3CYY |

***Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties are worked.***

* New QTH

SWL Cox (London, S.W.18) puts in a calls-heard and says his big moan is lack of activity.

How different is the story from SWL Drybrough (Coventry) with 75S heard in the month, and 126 different stations logged since September 1st, when we started the new Annual Counties table; the 126S represent 29 counties. As indicated in this space last month, SWL Drybrough is busy doing computations on activity against conditions and predicted conditions, on which we may have more to say later on.

### From VE, VQ and ZL

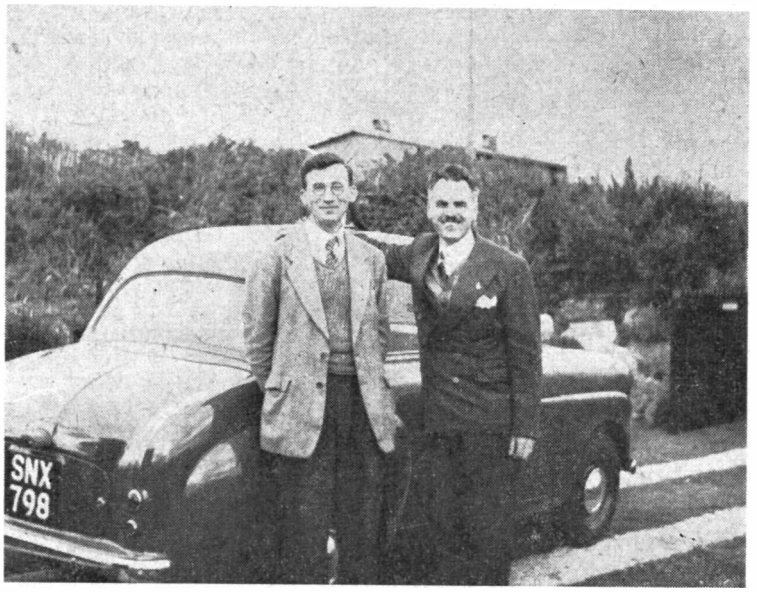
In a long and interesting letter, VE3DIR (Toronto) writes of much that is of VHF interest; he is himself a migrant from Wolverhampton and has been licensed as a VE3 for about four years. Two-metre activity is good in the populated areas of New York and Ontario, with a number of key stations — VE3DIR mentions W1HDQ, W1FZJ, W1RFU, W2AZL, W3BGT, W3TDF and W4AO—all running inputs of at least 400w. and some up to a kilowatt and, in the way of beam assemblies, anything up to 64 elements in Yagi groups. Such operators are what VE3DIR calls "dedicated VHF men" — they work no other band, are always on, and never miss anything. Contrary to our experience in Northern Europe, Auroral reflection produces quite a lot of good DX in the autumn, winter and spring seasons; in the autumn, DX by tropospheric reflection is experienced, as we know it here, and on October 11, VE3DIR himself worked four new states (Alabama, Arkansas, Mississippi and Missouri) under such conditions, making him the leading VHF DX operator in Canada; actually, VE3DIR's best contact was with W4TLV at 910 miles.

There is no VHF zoning or band-planning in North America, which, says VE3DIR, tends to "make things rough"; at his normal working frequency of 144.2 mc he finds himself HF, as everyone aims to pack into the first 200 kc or so of the band. However, as an established station on a known frequency, he gets his

share of what is going, because people know where to find him.

The beam at VE3DIR is a most elaborate affair—a 5/5 beside 5/5, wavelength spacing, with a separate set of arrays for all three bands, 144, 220 and 420 mc. His converter is Cascode WE-417A into WE-404A mixer and 2C51 crystal osc., into a BC-455 much modified, with double conversion to 112 kc and a peaked audio filter; the converter front end has an NF of 3 dB. His transmitter is VFO 4 mc, 5763 chain, 2E26, 832A, 829B culminating—and we feel this is the right word!—in a pair of 4-125A's run at 600 watts input.

The present policy among the dedicated over there is beams as big as they can be built to stay up in the air, as much power as possible, and converters with front-end gain, double conversion and IF band-width of about 500-800 c.p.s. with steep sides; the feeling at the moment is that everything is in hand and under control except the IF strip. As to results, with only scatter propagation to go on, *i.e.*, when there is no Aurora display and the troposphere is not giving, VE3DIR can work W2AZL at 300 miles and W1FZJ at 400 miles on CW *at any time*—this is, of course, by virtue of the high power and high gain beams, which is the only way in which the scatter phenomenon can be brought into play.




**Two very well-known VHF personalities, photographed together for the first time: G2ADZ (left), with G3BA, taken at Morthoe when G3BA/M, accompanied by G3EJO, called at G2ADZ when touring in North Devon at the end of September. It will be remembered that G3BA was recently appointed engineer-in-charge of the BBC's TV transmitting station at Sutton Coldfield.**

## TWO METRES

**COUNTIES WORKED SINCE SEPTEMBER 1, 1955**

**Starting Figure, 14**

***From Home QTH only***

| Worked | Station |
|---|---|
| 34 | G3GPT |
| 32 | G3JZG |
| 29 | G3IOO, G3WW, G5BM |
| 27 | G3JWQ |
| 24 | G3DLU |
| 23 | G8VN |
| 21 | G3CKQ, G3DO |
| 20 | G3BJQ, G3HWJ, G5DS |
| 19 | G3JXN |
| 18 | G3WS |
| 17 | G3ITF |
| 16 | G3BW |
| 15 | G3IEX, G3KHA |
| 14 | G3IRA |

***This Annual Counties Worked Table opened on September 1st, 1955 and will run for the 12 months to August 31st, 1956. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. The first list sent should give stations worked for the counties claimed; thereafter, additional claims need show only counties worked as they accrue. QSL cards are not required for entry in this Table.***

Writing from Kenya, VQ4EV—who will be G3GBO in Denham again by the time he reads this—says the following are on two metres out there: VQ4AA, VQ4AQ, VQ4BP, VQ4CH, VQ4EI, VQ4EV, VQ4FB, VQ4SS and VQ4VL. Portable activity and DX-peditions are planned, to extend range.

The VK's and ZL's are involved in frequency changes in the 6-metre region by reason of the proposed New Zealand TV service in the 49-56 mc band. It seems that amateurs will go to 56-60 mc, and will lose the 50-54 mc allocation they have at present. Well, all we can say is that while frequency changes of this sort are most irritating, especially to make way for TV, the ZL's and VK's are very lucky to have a band at all in this frequency area. What we over here couldn't do with a 50 mc allocation! It would even be possible to work the F's cross-band to 72 mc, where they also are lucky enough to have a small slice of ether which, we gather, is well used.

### VHFCC Elections

We are very glad to be able to issue VHF Century Club Certificate No. 189 to T. Sheppard, VE3DIR, Toronto, who actually showed cards for 115 W's worked in 26 States of the American Union, in the W1-W5, W8-WØ call areas, as well as in VE2 and VE3. His total of stations worked is 462. In general, distances covered over there are greater than with us, and, as indicated in some preceding paragraphs, they certainly make full use of the two-metre band. All cards shown by VE3DIR were for 144 mc contacts, practically all were sent him direct, and for many W's he is either best DX or first VE station worked.

The second VHFCC election this month is of C. A. M. Blizzard, G3HSD, Bristol, 3, who gains

### 70-CENTIMETRE FIRSTS

| | | |
|---|---|---|
| G/DL | G2WJ-DL3FM | 10/8/53 |
| G/EI | G5YV-EI2W | 14/7/55 |
| G/F | G3DIV/A-F8GH | 5/9/51 |
| G/GD | G2JT-GD3DA/P | 26/8/51 |
| G/GW | G4LU-GW2ADZ | 5/7/50 |
| G/ON | G3DIV/A-ON4UV | 15/10/51 |
| G/PA | G3DIV/A-PAØPN | 15/10/51 |
| GD/GW | GD3DA/P-GW5MQ | 29/7/51 |
| GI/GD | GI3GQB-GD3DA/P | 14/6/53 |
| GM/GI | GM6WL/P-GI3FWF/P | 9/9/53 |
| GW/EI | GW2ADZ-EI2W | 10/7/54 |
| GW/ON | GW2ADZ-ON4UV | 3/3/53 |
| GW/PA | GW2ADZ-PAØNL | 1/7/53 |

### BRITISH ISLES TWO-METRE ZONE PLAN

**(This is reproduced here for the benefit of newcomers to the band).**

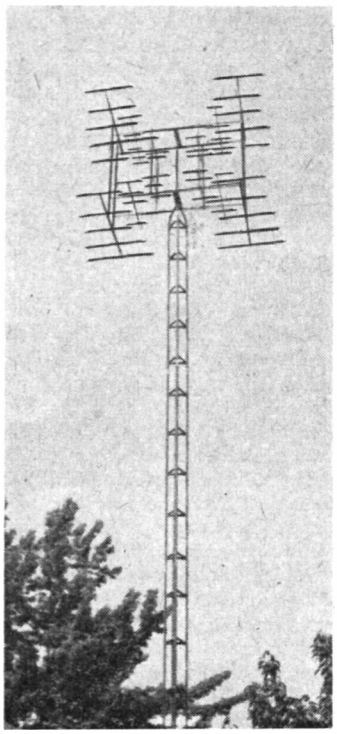
| | |
|---|---|
| ***Zone A & B:*** **144.0 to 144.2 mc.** | All Scotland. |
| ***Zone C:*** **144.2 to 144.4 mc.** | All England from Lancs. Yorks., northward. |
| ***Zone D:*** **145.8 to 146 mc.** | All Ireland. |
| ***Zone E:*** **144.4 to 144.65 mc.** | Cheshire, Derby, Notts., Lincs., Rutland, Leics., Warwick and Staffs. |
| ***Zone F:*** **145.65 to 145.8 mc.** | Flint, Denbigh, Shrops., Worcs., Hereford, Monmouth and West. |
| ***Zone G:*** **144.65 to 144.85 mc.** | Northants., Bucks., Herts., Beds., Hunts., Cambs., Norfolk, Suffolk. |
| ***Zone H:*** **145.25 to 145.5 mc.** | Dorset, Wilts., Glos., Oxon., Berks. and Hants |
| ***Zone I:*** **145.5 to 145.65 mc.** | Cornwall, Devon, Somerset. |
| ***Zone J:*** **144.85 to 145.25 mc.** | London, Essex, Middlesex, Surrey, Kent, Sussex. |

VHFCC Certificate No. 190, all his contacts being with G's on two metres.

**Conclusion——**

And that brings us to the end of it again, for this month—rather a shorter offering than usual, but we are at that period of the year when "VHF Bands" does tend to become somewhat attenuated.

However, it is much to be hoped that the faithful will help us to keep the lamps lit, and we look forward to hearing from you—even if you *are* inactive, tell us about it—by **Friday, December 16,** at the very latest (and this really means writing almost immediately after you have read this, having regard to the vagaries of the Christmas mails), addressing it to: A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. And once again, too, your old A.J.D., his grey head bent over his machine, gropes for the keys that send you personal greetings for Christmas and the New Year, with all the promise that it holds for yet another wonderful DX season on VHF. So, till we meet again on January 6, 1956, every good wish for your happiness and content.



**How they do it in Canada. VE3DIR, Toronto, has an all-VHF-band beam assembly, consisting of a 5/5 by 5/5 for each of the bands 144, 220 and 430 mc. Bays and arrays are at wavelength spacing and the whole erection, on a home-built mast about 40 ft. high, is rotated about the point of balance.**

### BROADCAST RECEIVING LICENCES

During September, the number of television licences increased by 97,434. 14,154,439 broadcast receiving licences, including 4,883,849 for television, and 284,549 for sets fitted in cars, were current in Great Britain and Northern Ireland at the end of September, 1955.

### CRYSTAL PALACE TELEVISION STATION

The Television Advisory Committee has informed the Postmaster-General that the best technical solution of the problem of siting television stations in the London area is a single tower to carry the aerials for all the television services of the BBC and ITA. The BBC has accordingly agreed to make provision for the ITA's requirements on the tower now in course of erection by the BBC at its new television station at Crystal Palace. The BBC's offer has been welcomed by the General Post Office, which is responsible for approving the sites of all BBC and ITA stations, and by the ITA itself.

The new arrangements will involve halving the size of the BBC's Band I aerial. The top 250 feet of the tower will have to be re-designed, and this will delay its completion by 18 months. It will not, therefore, be possible for the new tower to be brought into service early next year as had been planned. However, in order that the new high-power transmitter which is being installed at Crystal Palace may be brought into service as soon as possible, the BBC will erect a temporary mast and aerial, 250 ft. high. This temporary mast and aerial system will be capable of a radiated power of 60 kilowatts instead of the 200 kW which the BBC had hoped to be able to radiate initially from Crystal Palace. The next step will be an increase in power to 125 kW, when the new tower comes into service about May, 1957, to be increased later to 500 kW, which is the maximum permitted power.

### BBC COLOUR TV

As is well known, the BBC is conducting some very interesting, and quite successful, experiments in Colour Television, using the Alexandra Palace transmitter late at night. We hope to publish in an early issue a short technical description, by the BBC Engineering Division, on the equipment with which the tests are being carried out.

## LIST OF ACTIVE AMATEUR RADIO CLUBS AND SOCIETIES

### WITH NAME AND ADDRESS OF PRESENT HON. SECRETARY

ACTON, BRENTFORD AND CHISWICK Radio Club : R. G. Hindes, G3IGM, 51 Rusthall Avenue, Bedford Park, London, W.4.
BARNSLEY and District Radio Club : P. Carbutt, G2AFV, 33 Woodstock Road, Barnsley.
BELFAST CO-OP Radio Society : D. Wilson, 189 Cregagh Street, Belfast.
BOURNEMOUTH Amateur Radio Society : J. Ashford, 119 Petersfield Road, Boscombe East, Bournemouth.
BRADFORD Amateur Radio Society : F. J. Davies, 39 Pullan Avenue, Bradford 2.
BRADFORD Grammar School Amateur Radio Club : D. M. Pratt, G3KEP, 27 Woodlands Grove, Cottingley, Bingley, Yorks.
BRISTOL Amateur Radio Society : J. H. Britton, G3IGR, 2 Chatterton Square, Bristol, 1.
BRITISH Amateur Television Club : D. W. E. Wheele, G3AKJ, 56 Burlington Gardens, Chadwell Heath, Essex.
BRITISH Two-Call Club : G. V. Haylock, G2DHV, 63 Lewisham Hill, London, S.E.13.
CAMBRIDGE and District Amateur Radio Club : F. A. E. Porter, 38 Montague Road, Cambridge.
CAMBRIDGE University Wireless Society : A. Brunnschweiler, Pembroke College, Cambridge.
CARDIFF and District Radio Club : R. Morris, GW3HJR, The Shack, St. Cenydd Road, Caerphilly, Glam.
CHELTENHAM Amateur Radio Society : B. King, G3CEG, 126 Brooklyn Gardens, Cheltenham.
CHESTER and District Amateur Radio Club : N. Richardson, 23 St. Mary's Road, Dodleston, Chester.
CLACTON Radio Club : R. J. Appleby, G3INU, 95 Oxford Road, Clacton.
CLIFTON Amateur Radio Society : C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
COVENTRY Amateur Radio Society : J. H. Whitby, G3HDB, 24 Thornby Avenue, Kenilworth, Warwicks.
DEAL and District Amateur Radio Club : J. O'Connell, 31 Celtic Road, Deal.
DERBY and District Amateur Radio Society : F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
DORKING and District Radio Society : J. Greenwell, G3AEZ, 7 Sondes Place Drive, Dorking.
EAST GRINSTEAD and District Amateur Radio Club : R. A. Burnett, 19 Stockwell Road, East Grinstead.
EAST KENT Radio Society : D. Williams, G3JES, Llandogo, Bridge, Canterbury.
EAST SURREY Radio Club : L. Knight, G5LK, Radiohme, Madeira Walk, Reigate.
GRAFTON Radio Society : A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middlesex.
Radio Society of HARROW : S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
HASTINGS and District Amateur Radio Club : W. E. Thompson, 8 Coventry Road, St. Leonards-on-Sea.
HAWICK Radio Society : G. Shankie, 17 Ettrick Terrace, Hawick, Roxburghshire.
ILKESTON and District Radio Society : J. Eaton, G3EZZ, 74a Station Road, Langley Mill, Nottingham.
ISLE OF MAN Radio Society : M. R. Thompson, GD3JIU, 146 Ballabrooie Drive, Douglas.
LEEDS Amateur Radio Society : J. M. Gale, G3JMG, 104 Bentley Lane, Leeds 6.
LIVERPOOL and District Amateur Radio Club : A. D. H. Looney, 81 Alstonfield Road, Knotty Ash, Liverpool 14.
LOTHIANS Radio Society : J. Good, GM3EWL, 24 Mansionhouse Road, Edinburgh 9.
MALVERN and District Radio Society : W. N. Walker, Park View, Abbey Road, Malvern.
MEDWAY Amateur Radio Transmitters' Society : H. G. Cheeseman, G3KNO, 265 Cliffe Road, Strood, Rochester.
MIDLAND Amateur Radio Society : D. Hall, 144 Hill Village Road, Sutton Coldfield.
MITCHAM and District Radio Society : D. Tilcock, G3JYV, 16 Taffey's How, Love Lane, Mitcham, Surrey.
NEWARK Amateur Radio Society : J. R. Clayton, 160 Wolsey Road, Newark.
NORTH KENT Radio Society : A. Wills, 42 Anne of Cleves Road, Dartford.
NORWICH and District Radio Club : P. J. Gowen, 71 Links Avenue, Hellesdon, Norwich.
NOTTINGHAM and District Amateur Radio Society : M. Dransfield, G3JKO, 1 Cavendish Crescent South, The Park, Nottingham.
PLYMOUTH Radio Club : C. Teale, G3JYB, 3 Berrow Park Road, Peverell, Plymouth.
PURLEY and District Radio Club : E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
QRP Society : J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames.
RAVENSBOURNE Amateur Radio Club : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
READING Radio Society : L. Hensford, G2BHS, 30 Boston Avenue, Reading.
ROMFORD and District Amateur Radio Society : N. Miller, 55 Kingston Road, Romford.
SCARBOROUGH Amateur Radio Society : P. Briscombe, G8KU, Roseacre, Irton, Scarborough.
SHEFFORD and District Amateur Radio Society : G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford, Beds.
SLADE Radio Society : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHEND and District Radio Society : P. C. Baldwin, 13 Inverness Avenue, Westcliff-on-Sea.
SOUTH MANCHESTER Radio Club : M. Barnsley, G3HZM, 17 Score Street, Bradford, Manchester 11.
SOUTHPORT Radio Society : F. H. P. Cawson, G2ART, 113 Waterloo Road, Southport.
SPEN VALLEY and District Radio and Television Society : N. Pride, 100 Raikes Lane, Birstall, near Leeds.
STOCKPORT Radio Society : D. Hall, 13 Hallam Street, Heavily, Stockport.
STOKE-ON-TRENT Amateur Radio Society : A. Rowley, G3JWZ, 37 Leveson Road, Hanford, Stoke-on-Trent.
SURREY Radio Contact Club : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SUTTON AND CHEAM Radio Society : F. J. Harris, G2BOF, 143 Collingwood Road, Sutton, Surrey.
TORBAY Amateur Radio Society : L. D. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot.
WALSALL and District Radio Society : F. J. Merriman, G2FPR, 123 Wolverhampton Road, Walsall.
WEST CORNWALL Radio Club : J. N. Watson, 24 St. John's Terrace, Decoran, Truro.
WEST HARTLEPOOL Amateur Radio Club : J. Thompson, 27 Chester Road, West Hartlepool.
WEST KENT Radio Society : H. F. Richards, Culverden House, Culverden Park Road, Tunbridge Wells.
WEST LANCS Radio Society : S. Turner, G3JUB, 5 Balfe Street, Seaforth, Liverpool 21.
WIRRAL Amateur Radio Society : L. I. Powell, 549 Woodchurch Road, Prenton, Birkenhead.
WORTHING and District Amateur Radio Club : J. F. Wells, Atickwa, 37 Salvington Gardens, Worthing.
YEOVIL Amateur Radio Club : D. L. McLean, 9 Cedar Grove, Yeovil.

## OPERATION OF BCM/QSL

We are frequently asked by readers what the rules are for the use of our QSL Bureau. They are simple: If you are a direct subscriber—that is to say, getting SHORT WAVE MAGAZINE direct from us by payment of an annual subscription of 24s. (or 12s. for the half-year) in advance—you can send in your cards, as often as you like and either singly or in batches, for distribution to any part of the world. Similarly, all cards received for you are posted on to you from the Bureau at fortnightly intervals.

If you are not a direct subscriber, *e.g.* buying the Magazine at a bookstall, we cannot accept your cards for distribution outwards, but any cards we receive addressed to you will be sent on.

Additionally, users of the QSL Bureau, either one-way or both ways, are asked to keep a small supply of stamped, self-addressed envelopes, big enough to take the usual QSL card, at the Bureau; these are used for posting on cards received for you.

The sole address of our Bureau is: BCM/QSL, London, W.C.1. This is a sufficient address to reach it from anywhere in the world. As "BCM/QSL" has been functioning for many years now, and is known and recognised throughout the world, you can ask your contact to QSL *via* this address with the certainty that his card will reach you.

# NEW QTH's

**This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the quarterly issue of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.**

**G2FQW,** K. R. Jones, 16 Langton Road, Worthing, Sussex.

**G2HDR,** C. N. Chapman, Yeovil, Stoke Hill, Stoke Bishop, Bristol, 9.

**G3JUV,** J. B. Kitchin, 48 Rothwell Road, Gosforth, Newcastle-upon-Tyne, 3, Northumberland.

**G3KAN,** A. T. Shrewsbury, 50 Danefield Road, Northampton, Northants.

**G3KBT,** R. T. G. Davis, 38 Marlborough Road, Tuebrook, Liverpool, 13.

**G3KCU,** R. Greenough, 6 Brock Mill Lane, Wigan, Lancs.

**G3KDB,** P. A. Miles, 176 Sarehole Road, Hall Green, Birmingham, 28.

**G3KEB,** C. E. Heywood, 91 Beckway Street, Walworth, London, S.E.17.

**G3KIX,** 588866 AA, Eslor, R., Hut 357, C Squad., 1 Wing, R.A.F. Station, Locking, Weston-super-Mare, Somerset.

**G3KKU,** H. Roberts, 67 Parthenon Drive, Liverpool, 11. *(Tel.: STAnley 1445).*

**G3KKX,** G. W. Rowe, 105 Ocean Street, Keyham, Plymouth, Devon.

**GM3KLA,** W. A. Sinclair, 2 Hamars, Haroldswick, Isle of Unst, Lerwick, Shetlands.

**G3KLB,** A. H. Jones, 62 Woodlands Road, Cheetham, Manchester, 8.

**G3KLM,** P. J. Lealoine, Crab & Lobster Inn, Mill Hamlet, Sidlesham, Chichester, Sussex. *(Tel.: Sidlesham 233).*

**G3KMZ,** P. W. F. Porter, 130 York Road, Southend-on-Sea, Essex.

**G3KNB,** K. A. Ballance, 153 Burntwood Road, Norton Canes, Cannock, Staffs.

**G3KNM,** A. N. McTighe, 14 Eastlands Close, Stafford.

**G3KNU,** P. Jackson, 119 East Common Lane, Scunthorpe, Lincs.

**GW3KNZ,** A. W. Eccles, 13 Church View, Pentre, Queens Ferry, nr. Chester.

**G3KOC,** J. D. Pearson, Sheffield Villas, New Holland, Barrow-on-Humber, Lincs.

**G3KOE,** E. P. Parry, 22 Rosebery Avenue, South Harrow, Middlesex.

**G3KOG,** W. J. Blanchard, Coronation Road, Ulceby, Lincs.

**G3KOO,** J. Craddy, Newlands, Lead Lane, Ripon, Yorkshire.

**G3KOQ,** B. Parker, 125 Regent Road, Morecambe, Lancs.

**G3KOZ,** W. D. Henderson, 160 Headstone Lane, North Harrow, Middlesex. *(Tel.: Hatch End 2365).*

**G3KPB,** S. A. Moore, 127 Aslett Street, Wandsworth, London, S.W.18.

**G3KPC,** G. A. Davy, 3 Church Street, Wellingborough, Northants.

**G3KPK,** S. Appleby, Sgts.' Mess, R.A.F. Compton Bassett, nr. Calne, Wilts.

**G3KPM,** V. E. Oliva, 12 Hartham Road, Holloway, London, N.7.

**G3KPN,** Sgt. W. M. Nicholson, R.A.F. Chigwell, Essex.

**GC3KPO,** D. Byrne, 3 St. Saviour's Road, St. Helier, Jersey, Channel Isles.

**G3KQF,** J. Anthony, 56 Sherwood Street, Derby.

### *CHANGE OF ADDRESS*

**G2AQN,** C. Renshaw, 24 Trafalgar Square, Scarborough, Yorkshire. *(Tel.: Scarborough 4775).*

**GW2BBF,** W. E. G. Bartlett, 19 King Edward Street, Whitland, Carms.

**G2BPW,** I. W. K. Smith, Helmsleigh, Charterhouse Road, Godalming, Surrey. *(Tel.: Godalming 56).*

**G2BTY,** L. J. T. Lewis, Little Western, Duffield Road, Woodley, Berks.

**G2CIW,** J. F. Moseley *(ex-EK1CW/CN2AP),* 17 Priams Way, Stapleford, Cambridge, Cambs.

**G2CQO,** G. Harrison, 6 Thorntree Drive, West Monkseaton, Whitley Bay, Northumberland.

**G3AHV,** G. W. Ripley, 15 Buckstone Road, Alwoodley Park, Leeds, 17.

**G3ATM,** D. Nasey, 8 Greenway, Botham Hall, Longwood, Huddersfield, Yorks.

**G3COV,** G. B. Woffinden, 36 Tavistock Avenue, Didcot, Berkshire.

**G3DAM,** A. H. Barnett, 71 Lichfield Avenue, Evesham, Worcs.

**G3DFR,** Capt. P. J. English, R.Sigs., 188 King's Ride, Camberley, Surrey.

**G3DLG,** H. G. Curtis, 27 Weymouth Bay Avenue, Weymouth, Dorset.

**G3ELB,** A. R. Tungate, Beaumont, 481 High Road, South Benfleet, Essex. *(Tel.: South Benfleet 3346).*

**G3FUR,** F. K. Parker, 64 Tinwell Road, Stamford, Lincs.

**GW3GO,** S. Waters, Brynhyfryd, Pyle-Cross, Pyle, nr. Bridgend, Glam.

**G3HMC,** L. H. Waine, 33 Summerleaze Park, Yeovil, Somerset. *(Tel.: Yeovil 1572).*

**G3IPD,** C. W. Oakley, Westfield, Westerley Lane, Shelley, nr. Huddersfield, Yorkshire. *(Tel.: Kirkburton 368).*

**G3JLO,** J. M. Bell, 45 Newlands Lane, Chichester, Sussex.

**G3JOM,** R. H. Bland, Flat 1, 1a Princess Terrace, North Road, Ripon, Yorkshire.

**G4IK,** R. A. F. Farquharson, c/o Westminster Bank, 2 Hendford, Yeovil, Somerset.

**G5LS,** H. G. Effemey, 34 Pine Gardens, Eastcote, Ruislip, Middlesex. *(Tel.: Field End 8009).*

**G6GK,** G. H. Kitley *(ex-ZD2GHK),* 4 Lullingstone Crescent, St. Paul's Cray, Orpington, Kent. *(Tel.: FOO 1809).*

**G8SA,** Dr. E. S. G. K. Vance, 43 Blackwell Road, Huthwaite, Sutton-in-Ashfield, Notts.

### *CORRECTION*

**G3CZ,** G. F. Shepherd, 78 Yarborough Crescent, Lincoln, Lincs.

# THE MONTH WITH THE CLUBS

## By *"Club Secretary"*

**(Dead-line for February Issue : JANUARY 13)**

THE added excitement of the Tenth MCC kept many Clubs busy during the last two week-ends in November, and all the logs should be in our possession before this appears in print. Secretaries are asked to note, therefore, that *no* Club Reports in the *usual form* will be printed in the next issue (January), since this space will be given up, as usual, to discussing the results, with a complete report, of MCC. Normal Club Reports will be resumed in the February, 1956, issue, with the deadline as given above. Here are the reports of current activity:

**Bristol** once more notify us of their doings after an absence of several months. They meet at 8 p.m. every Friday in Redcliffe Community Centre, Guinea Street, and the December events include a talk by G3JMY on Oscilloscopes, an auction sale by G3IYW, and an evening with the Club transmitter (G3GIS) on the air. Facilities are offered for the loan of the Club's equipment, from a signal generator to a chassis cutter, and "incentives" are provided by an SWL Award and a Constructors' Cup. Service personnel and prospective members will be welcome at any meeting.

The **British Amateur Television Club** (Chelmsford Group) has opened its winter programme and meets on the second Thursday of each month at 10 Baddow Place Avenue, Great Baddow. A warm welcome is extended to all interested in amateur TV.

**Cardiff** recently held a very successful Junk Sale. Not only did members go away with as much as they brought along, but the Club did well out of it, too! They meet on January 9 at the British Volunteer, The Hayes, Cardiff, for a talk on Aerials by GW3AHN.

**Clifton** meet at 225 New Cross Road, London, S.E.14, every Friday night. On December 9 and 23 they have Constructional Evenings, on the 16th their Christmas Party, and on the 30th a Junk Sale. At a recent meeting they had a TCC lecture on RF Cables and the principles of impedance matching.

**Nottingham** held a Junk Sale on November 4, and heard G3JKO lecture on the History of Radio on November 18. On December 16, G5QZ will discuss Beam Aerials, and on each third Tuesday the Club meets, 7.30 p.m., at the Sherwood Community Centre. December 4 was the occasion of a three-way Quiz held at Newark, with the **Newark, Nottingham** and **Lincoln** Clubs taking part.

**South Manchester** are running an RAE Course at 8 p.m. on Mondays. Anyone interested should write to the Hon. Sec., or pay him a visit at the Club on Fridays. All the officials were re-elected at the AGM, and the future programme includes a Junk Sale on December 16, an Open Evening on December 30, and Hints on Soldering (aluminium included) on January 13.

**Coventry** hold their Members' Christmas Party on December 19, a Children's Christmas Party on January 7, and lectures on January 2, 16 and 30. **Slade** meet on December 9 for a lecture (Callender's Cables) on Wires and Cables, and on December 23 they hold an Exhibition of Members' Equipment. On December 16 they have their monthly RAE lecture-meeting, and the Club station is open every day of the week for members' use, with instructional classes every Monday, Tuesday and Wednesday, in addition to the RAE lecture every fourth Friday. Their Annual Dinner on November 5 was a great success.

**Derby** have a talk on Relays on December 14, their Annual Christmas Social on December 16, and the Grand Christmas Prize Draw at 8.30 p.m. on December 21. **Lothians** will hear GM6WL on his "70-cm DX-pedition to Drummore" on December 15 (postponed from November 17); on January 12 they have a recorded tape lecture on Mobile Opera-

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

BRISTOL : J. H. Britton, G3IGR, 2 Chatterton Square, Bristol 1.
BRITISH AMATEUR TELEVISION CLUB : D. W. E. Wheele, G3AKJ, 56 Burlington Gardens, Chadwell Heath, Romford, Essex.
CARDIFF : R. Morris, GW3HJR, The Shack, St. Cenydd Road, Caerphilly, Glam.
CLIFTON : C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
COVENTRY : J. H. Whitby, G3HDB, 24 Thornby Avenue, Kenilworth.
DERBY : F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
GRAFTON : A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
LOTHIANS : J. Good, GM3EWL, 24 Mansionhouse Road, Edinburgh 9.
NOTTINGHAM : M. Dransfield, G3JKO, 1 Cavendish Crescent South, The Park, Nottingham.
PURLEY : E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
QRP SOCIETY : J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames.
RAVENSBOURNE : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
SHEFFORD : G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford, Beds.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTH MANCHESTER : M. Barnsley, G3HZM, 17 Score Street, Bradford, Manchester 11.
SPEN VALLEY : N. Pride, 100 Raikes Lane, Birstall, Nr. Leeds.
SURREY (CROYDON) : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SUTTON AND CHEAM : F. J. Harris, G2BOF, 143 Collingwood Road, Sutton.
TWO-CALL : G. V. Haylock, G2DHV, 63 Lewisham Hill, London, S.E.13.
WIRRAL : L. I. Powell, 549 Woodchurch Road, Prenton, Birkenhead.
WORTHING : J. F. Wells, 37 Salvington Gardens, Worthing, Sussex.

tion (G8TL), and on January 26 a talk on Band III Converters, by GM3BBW. RAE and Morse classes are now running; new members are welcomed.

**Grafton** continue with full activity, recent events having been lectures by G6CJ (Scale Model Aerials); G4LS (75-watt Table-Topper); G5FA (Ins and Outs of DX Working); a Junk Sale, "Any Questions" and a QSL Display. The usual stand was manned at the Islington Handicrafts Exhibition, and the RAE Course continues on Mondays and Wednesdays. The Club will be closed for the Christmas period, between December 17 and January 8.

**Wirral** visited the Mersey Tunnel on December 3 and heard the third lecture on FM Tuners (G2FNI) on December 7. On the 21st they will be having a Film Show. All meetings are at the YMCA, Whetstone Lane, 7.45 p.m., on alternate Wednesdays.

**Surrey (Croydon)** had a very successful November meeting, to which members of **Clifton** were invited to discuss D-F events. On December 13 they hope to have a lecture by G3DFP (International Marine Radio) on their new lifeboat equipment, but this depends on the availability of a sound-film projector. The Annual Dinner, at the end of January, will mark the coming-of-age of the Club, founded in 1935 and suspended only for the war years.

**Purley** met for a "Surprise Item" (still not disclosed!) on November 18; the previous meeting took the form of a Junk Sale. It is hoped that it will soon be possible to operate a small station, for which the equipment is already being collected.

Members attending the lecture at **Sutton and Cheam** on November 15 heard a most interesting talk on High-Quality Sound Reproduction from a representative of the G.E.C. Next meeting is on December 20, 7.30 p.m., at the Harrow Inn, Cheam Village, when the Annual Christmas Junk Sale will be held, with G2CZH as auctioneer; all visitors welcome.

**The QRP Society** announce the results of their Portable Equipment Contest. The winner was G3CGD (Portable Transmitter and Receiver); next came G3JNB (Single-Valve Transmitter) and G3HMR (Crystal Check Oscillator). Prizes were donated by well-known firms. The journal, *QRP*, will be published in a new form, enabling members to build up a loose-leaf handbook.

At **Ravensbourne**, meetings are held every Wednesday evening, 8.0 p.m., at Durham Hill School, Downham, under the chairmanship of G2DHV. The next meeting for **Worthing** is on December 12, at 8.0 p.m., and on January 21 **Spen Valley** hold their annual dinner at Dewsbury, for which the hon. secretary is now ready to receive "applications for tickets and further details."

**Shefford** have a meeting every Friday (except on December 23 and 30), at 8.0 p.m., at Digswell House. the next being on the 16th with what is described as a technical film show. The **British Two-Call** club lists seven new members, including ZC5CT, who has held calls in G, VS4, VS5 and VU.

## SMALL ADVERTISEMENTS

**9d. per word, minimum charge 12/-. No series discount ; all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1**

### TRADE

**QSL CARDS AND LOG BOOKS. APPROVED G.P.O. SAMPLES FREE. — ATKINSON BROS., PRINTERS, ELLAND, YORKS.**

**WANTED : TUNING UNITS** TN17, TN18, TN19 and R54/APR4 ; £50 each offered.—Box 1383, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**LEARN IT AS YOU DO IT.**—We provide practical equipment combined with instruction in Radio, Television, Electricity, Mechanics, Chemistry, Photography, etc.—Write for full details to E.M.I. Institutes, Dept. SW47, London, W.4.

**QSL's and LOGS by MINERVA.** The best there are.—Samples from Minerva Press, 48 Queen's Road, Brentwood, Essex.

**WANTED**: BC-610 Hallicrafters, ET-4336 Transmitters and spare parts for same. Best prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6.

**G3CGD QSL'S.** Fixed or Mobile samples on request. Mislaid enquiry—please repeat.—30 St. Luke's Road, Cheltenham.

### APPOINTMENTS

RADIO MECHANICS

**FERRANTI, LIMITED**, have vacancies for Skilled Radio Mechanics, preferably with Radar experience, for a variety of work in production and research departments. Good opportunities exist, especially for those who have, or are willing to study for, the City and Guilds Certificates.—Please write, giving details of career to date, to the Personnel Officer, Ferranti, Limited, Ferry Road, Edinburgh, 5, quoting Ref. RM/113.

**ASSISTANT TECHNICAL SUPERVISORS** required by the NIGERIAN BROADCASTING SERVICE for one tour of 12-24 months in the first instance. Candidates may be appointed (*a*) On agreement with prospect of permanent and pensionable employment in the salary scale (including inducement addition), £750 rising to £1,284 a year ; or (*b*) On contract terms with salary scale (including inducement addition), £810 rising to £1,386 a year, with a gratuity of £100/£150 a year. Outfit allowance £60. Free

SMALL ADVERTISEMENTS, APPOINTMENTS—*continued*

passages for the officer and his wife, with assistance towards the cost of children's passages and their maintenance in this country. Candidates should have administrative ability and have had wide theoretical and practical experience of low-frequency amplifiers and radio equipment.—Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience, and quote M2C/30482/SQ.

TRINITY HOUSE, LONDON

RADIO MAINTENANCE ASSISTANTS WANTED: Radio Maintenance Assistants are required to maintain radio and radar equipment in Lighthouses and Light Vessels. Candidates must possess a knowledge of the fundamental principles of radio and radar and must have had practical experience in the maintenance and use of such equipment. When not engaged at out-stations, successful candidates will be required to work at the Trinity House Depot, Blackwall, London, E.14. Salary scales £595, rising to £725 (minimum linked to age 28) or £473 10s., rising to £640 (minimum linked to age 25), depending on qualifications and experience. —Applications to be made in writing to The Secretary, Trinity House, London, E.C.3, not later than 19th December, 1955, stating age, present occupation, qualifications, experience and enclosing copies of testimonials.

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TECHNICAL ASSISTANTS, of British Nationality, with experience in the operation and maintenance of medium-power M.F. or H.F. transmitters, are required for the Forces Broadcasting Service in the Middle East and East Africa. City and Guilds Certificates (or equivalents) an advantage. Duties include the operation of studio or transmitter equipment, carrying out minor repairs, balance and control of programmes, recording on either tape or disc, and installation of equipment for outside broadcasting work. Salary scale £400 to £600 per annum, plus pay supplement of £43 10s. at the minimum of the range, rising to £55 at the maximum of the range, according to age and experience, plus a Foreign Service Allowance depending upon the station and whether the officer is married or single.—Full details may be obtained at any Employment Exchange. Reference CMP.3042/55, Sheet No. 444, should be quoted.

## READERS' ADVERTISEMENTS

**3d. per word, min. charge 5/-, payable with order. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.**

FOR SALE: Eddystone S640, £16.—Any trial at 35 Kennington Palace Court, Sancroft Street, London, S.E.11. (*Phone Reliance 3925*, G3JYT).

TWO Stabilized Power Packs; HT 350v. at 150 mA; LT 6.3v. at 3A; plus stabilized voltages of 280, 210, 140, 70v. at 55 mA max.; complete in metal cabinet; £5 each. Also Wavemeter-Type W1191, 100 kc-20 mc, complete with spare set of valves, 50/-.—Brown, 72 St. Mary's Road, Ilford, Essex.

DST100 MANUAL wanted. Purchase for £1, or 10/- for six weeks' loan.—G3JYG, Hall Cottage, Holt, Norfolk.

TX and Rx COMPONENTS for sale, including power packs, etc.; s.a.e. for list, please.—Webber, Goonbell, Cainscross Road, Stroud, Glos.

SMALL ADVERTISEMENTS. READERS—*continued*

WANTED: Collins 75A1 or 75A2 Receiver; for cash, or would part-exchange new 680X.—*Tel. Bradley 293.*

WANTED: Mk. III 19 Rx Tx, mint original condition; also 80-metre crystals, 3.6-3.7 mc approx.—Box 1631, Short Wave Magazine. Ltd., 55 Victoria Street, S.W.1.

BC-221 MODULATOR, stabilised power pack; all built into CAY tuning unit case. Sell or exchange for good multimeter. Offers?—Lumb, 13 Byerley Street, Wallasey, Cheshire.

SALE: HRO-M Senior, power pack, fused and AC metered; coil container, 10 coils (two B/S), speaker, handbook; mounted 3ft. rack; £26. Set spare valves to buyer, 30/-. Buyer collects or arranges for transport. R.1155 and power pack; speaker optional; £7. MCR1 and power pack, all coils, £5. Hanovia Sun Lamp, new arc tube, perfect, £15.—Catterall, 6 Kane Street, Ashton, Preston, Lancs.

HAM SW CLEARANCE: Limited quantity SW m/bat. receivers; TRF all bands, hardly used; bargain prices (*e.g.*, from 35/- only). About 10/- worth new FREE GEAR given away with orders. Unrepeatable.—Send large s.a.e. without delay to: Box 1634, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

ROTHERMEL-BRUSH BR2S crystal sound cell microphone, £5; and D104 crystal microphone, £3; both excellent condition. — Box 1632, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AR 88LF, S-meter, handbook; excellent performance; prefer buyer collects; £45.—G5HB, 1 South Street, Watchfield, nr. Swindon, Wilts.

MODIFIED HRO, double conversion, 85 kc IF; bandspread coils 160, 80, 40, 20, 10 metres, £25. Eddystone 750, mint, S-meter and speaker, £50. Components, valves. CV90 mountings; s.a.e. details. —G5RP, Old Gaol House, Abingdon, Berks.

BC-224F, brand-new, with AC, P/Pack, S-meter, 8in. speaker in chrome. This outfit cost over £40; £25 (o.n.o.).—4 Spring Gardens. Atherton, Manchester.

RECEIVERS FOR SALE: AR88, HRO Senior, SX24, TBY8, P40; Jefferson-Travis Transceivers; Taylor signal generator.—17 Kent Road, Atherton, Manchester.

BC-312, excellent order, stabilised BFO. noise limiter, £9; power pack, £1; home-built 2½in. 'scope, £4.—Bowen, 31 The Crescent, Donnington, Shrops.

WANTED: Panda, or Minimitter Tx. cash. or part-exchange AR88, 348, 10, 15, 20-metre Tx. Offers?—Box 1633, Short Wave Magazine, Ltd.. 55 Victoria Street, London, S.W.1.

FOR SALE: CR100 Rx, S-meter fitted, £19; Hallicrafter S27, £15. As-new Pye Service Workshop Rack, £27 (or nearest). New 813's with ceramic valve bases, 50/- each; new 35T's, 15/-; 829B, 60/- each; 1143 Tx/Rx, complete with 12v. power unit, offers?—144 Creswick Street, Walkley, Sheffield.

NEW boxed: 35T at 30/-; 829B at 40/-; 866A at 12/-; 813 at 50/-; 805 at 35/-; 6L6M at 10/-; 801A at 7/6; PX4 at 7/6; 8011 at 15/-; U19 at 7/6. New unboxed: PT15 at 15/-; 832 at 30/-; DET19 at 10/-.—68 Whitfield Road, Norton, Stoke-on-Trent.

SMALL ADVERTISEMENTS, READERS—*continued*

TRANSMITTER, G5RV, 75-watt, VFO, switched 7-28 mc, built-in power pack, commercial metal-work, Eddystone cabinet; genuine bargain, £12 10s. HRO Senior, nine GC coils, 6C4 oscillator, noise limiter, power pack, National speaker, excellent, £25. GEC VHF Transmitter-type 7A, with circuit, £2 10s. —Chorley, 6 Calton Road, New Barnet, Herts.

BC-348R Receiver with separate mains power unit; exceptionally good condition; £14.—114 Mildmay Road, Chelmsford, Essex. (*Phone Chelmsford 51866*).

WANTED: Converter for 14, 21, 28 mc. SALE OR SWOP: Type 54A T9 VFO, covering 3.5 to over 3.8 mc, with aerial coupling coil; makes excellent transmitter; £2. "G2IQ" 2-metre converter, £2 10s.; Denco CT7 coil pack and chassis, brand-new, £5.—V. Westmoreland, 29 School Road, Langold, Worksop, Notts.

HRO RECEIVER and power pack, rack mounting, 500 kc-30 mc, six coils, bandspread on 20 and 40 metres; excellent condition; speaker, manual, etc.; £25.—Tyrrell, 70 Middlefield, Ormsgill, Barrow-in-Furness, Lancs.

WANTED: G.E.C. Miniscope; must be in good condition, unmodified, with instruction book.—Watts, 62 Belmore Road, Thorpe, Norwich.

AR 88D, fitted illuminated S-meter, chrome handles, high-pass filter, manual; excellent condition; £65 (o.n.o.).—16 Chauncey House, Sish Lane, Stevenage.

NEW Communication Receiver, 1 mc-16 mc; three wavebands, BFO, RF, gain speaker, unmodified; cost £25; £16 10s.—V. Wright, 42 Malvern Crescent, Spring View, Wigan.

B2, complete, £12; Gardner's output transformer, multi-ratio, 30w., 30/-.—Box 1638, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SENSATIONAL CLEARANCE.—If you want a small, portable, easy-to-use SW Receiver that pulls in DX at a give-away price, plus 10/- worth of FREE GEAR, send large s.a.e. to Box 1639, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SX 24 FOR SALE, continuous 0.5-42 mc; S-meter, xtal, etc.; just re-crackled; £20.—G3COI, 65 Hurst Street, Birmingham.

NATIONAL HRO Senior, power pack, 3.5-28 mc, B/S coils; front end hotted up for 28 mc; £12 10s. Hallicrafters Sky Buddy, 550 kc-50 mc, £8. —(*Ring Battersea 9523*).

WANTED: Receiver-type R1116, or R1224A, with general data.—A. B. Durnford, 2 Milner Road, Ashley Down Road, Bristol, 7.

TWO-METRE Receiver (American), complete power pack and speaker; professional finish; excellent performance; £11 10s.; s.a.e. for details. R1392A, tunable 100-156 mc, with Type 234A power pack; as new and perfect order; £10 the pair. Two-metre skeleton slot (J.-Beam, 2-Stack), as new, 50/-. All items plus carriage.—Box 1636, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CLEARING THE SHACK: Still plenty of gear left; lowest prices. Dozens of satisfied customers. Send for list. Callers welcome.—G3ABG, Morris, 24 Walhouse Street, Cannock, Staffs.

GOING QRT: G8VB *Tiger* 100w. Table Topper, all bands, TVI-proof, perfect; cost £120; offers around £75.—28 Ivanhoe Road, Plymouth.

SMALL ADVERTISEMENTS, READERS—*continued*

HALLICRAFTERS SX28, £45; CR100, £22 10s.; S640, £22 10s.; all mint condition; manuals. German portable, £14 10s. Buyer collects.—Fawkes, St. Chloe, Amberley, Stroud, Glos. (*Phone Amberley 3130*).

WANTED: Service Sheets & Manuals of broadcast receivers, especially pre-war models.—Full details with price per sheet to: Watts, 62 Belmore Road, Thorpe, Norwich.

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AR 88D, in good condition, with manual and spare set of valves, £40; BC-221AH with manual, in excellent condition, £17 10s.; 40ft. sectional mast in 2in. aluminium, £3. Buyer collects. —24 Garden Lane, Chester.

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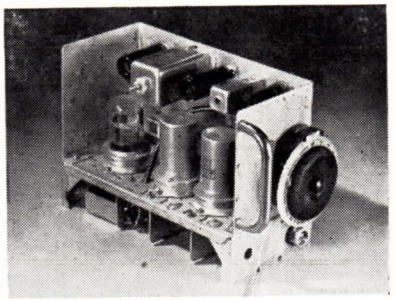

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