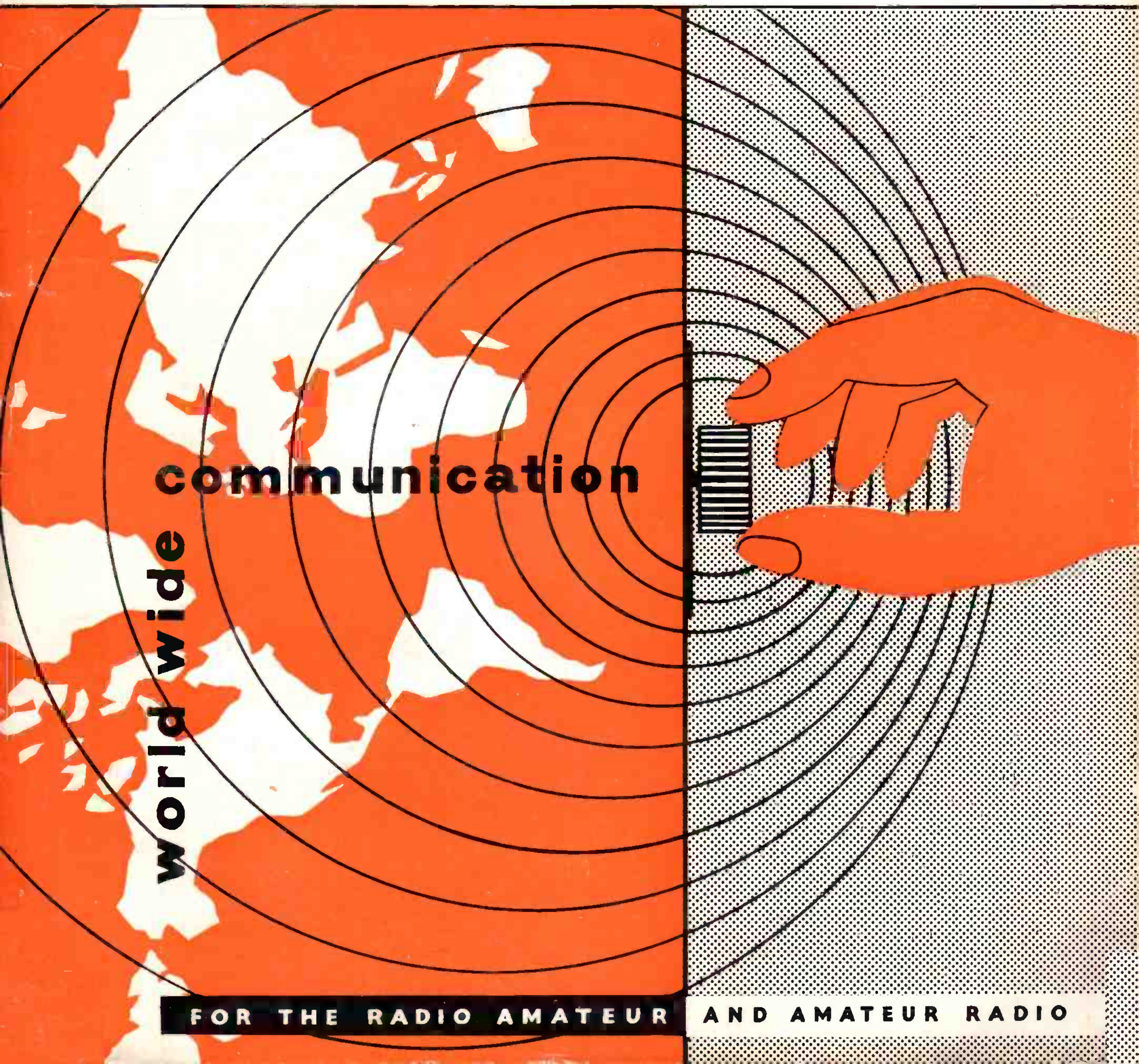
The SHORT WAVE Magazine

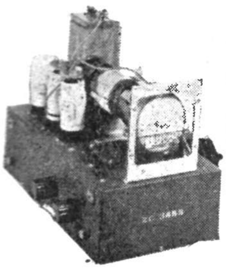
2/6

VOL. XV — MAY, 1957 — NUMBER 3



INDICATOR UNIT

SLC No. 5



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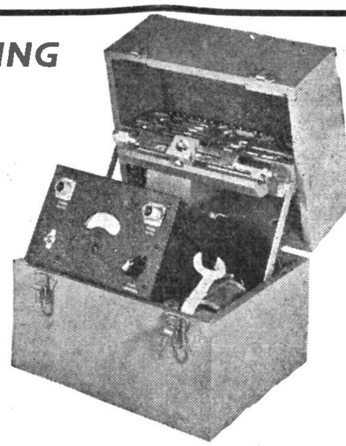

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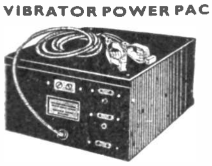

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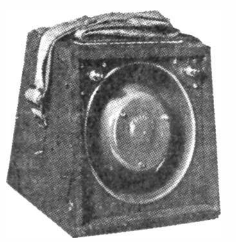

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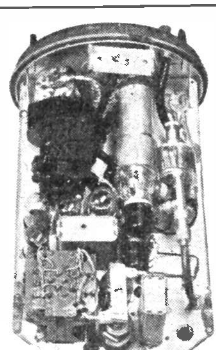

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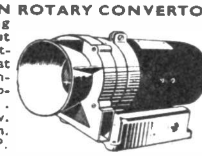

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Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO)

Advertisement Manager: P. H. FALKNER

Published the Friday following the first Wednesday each month at 55 Victoria Street, London, S.W.1. *Telephone: Abbey 5341/2*

Annual Subscription: Home and Overseas 30s. post paid.

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

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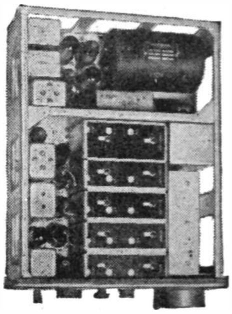

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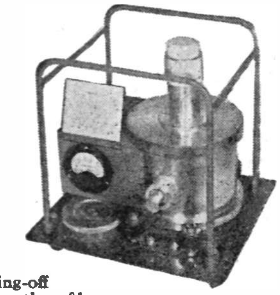

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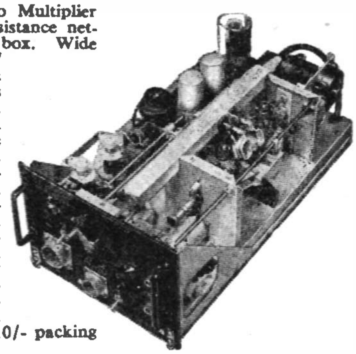

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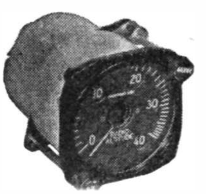

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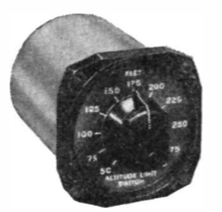

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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Assuagement

In the April issue, in this space, we drew attention to the potentialities inherent in the plans announced by the Central Electricity Authority and British Railways to proceed with new HV overhead systems—the C.E.A. to use a transmitting voltage of 275 kV for the Super-Grid, and B.R. to electrify main-line track at 25 kV A.C. It was suggested that these schemes—however desirable from an engineering point of view—would turn out to be a serious menace in terms of adding to the already high general radio noise level.

Not unnaturally, these comments have drawn appropriate official replies from both Authorities, which we are glad to reproduce here, in the interests and for the information of all concerned. The statement by the Central Electricity Authority is as follows:

> " I am happy to assure you that extensive practical and theoretical research has in fact been carried out on the radio interference characteristics of the 275 kV Supergrid system. Measurements have been made on the experimental high-voltage line since 1949 to study various conductor arrangements, and the twin conductor system chosen is a favourable one from the point of view of radio noise. Furthermore, investigations are continually in progress to determine the radio interference characteristics of overhead line insulators and fittings.
>
> As I am sure you appreciate, radio interference from any power line decreases rapidly as the frequency increases, so that it is unlikely to be troublesome on short waves. Bearing on this aspect of the matter, the Authority are themselves important users of VHF equipment and it is often necessary for operational reasons to use these equipments in the immediate vicinity of high-voltage lines.
>
> You will thus see that the Central Electricity Authority have constantly in mind the desirability of keeping radio noise levels low and that they have carried out very comprehensive investigations on radio interference specifically in relation to the 275 kV Supergrid line since inception."

Readers will agree that while this is a very fair statement, the fact remains that no undertaking can be given that the system will not be noisy—it is simply hoped that the precautions to be *taken will be adequate. However, the inference to be drawn from the statement is that the problem is very much in mind and everything possible is being done to minimise the radiation of noise at radio frequencies.*

The reply to our Editorial from the British Transport Commission is in the following terms:

> " So far as the 25 kV electrification is concerned, the question of possible interference with communication circuits and with radio was very carefully considered before the Commission decided to adopt the high tension AC system, and I do not think I can do better than enclose a copy of our published Report, in which I would draw your special attention to paragraphs 70-79,* on pages 14 and 15, which deal with these particular points.
>
> I would also add that before the decision to adopt this system was reached, some interference with radio reception and communication circuits was experienced in the areas served by the experimental AC electrification between Lancaster, Morecambe, and Heysham,** in the form in which it was originally installed some years ago. Our electrical engineers found it quite possible, however, simply and effectively to overcome this difficulty, and it is our experiences in the case of this experiment, also those of French Railways, which have convinced us that no such large-scale difficulties such as those suggested are likely to be encountered.
>
> The Commission are taking all possible steps to ensure that all the equipment involved in the AC electrification will be such as to minimise interference effects with communication and navigational services on the higher frequencies, including sound radio, television and radar, and in conjunction with the Post Office are carrying out the necessary tests and investigations to ensure this."

Much the same comment seems to be appropriate to this British Railways statement as that already made on the reply from the Central Electricity Authority.

Since our April issue appeared, we have been offered opinions from various qualified sources on the validity of the original argument—varying from a flat rejection of the notion that the new systems will add anything much that is noticeable to the existing noise level, to prophecies that small towns on or near the 275 kV Super-Grid route, and on the Midland Region of British Railways, will be totally blacked out in the radio sense.

From this whole boiling, one may infer that the only questions are what the interference level is going to be, and how far it will be tolerated by the public affected—when it comes to be realised what sources are responsible for the interference.

* This refers to the problem of radio noise, stating that consideration must be given to its possible effect and that no difficulty is anticipated.

** This is a 9-mile route electrified at 6,600v. AC, overhead collection, and the highest voltage so far used in railway electrification in this country.

Austin Forsyth
G6FO.

Simple SWR Bridge

CIRCUIT, CONSTRUCTION AND CALIBRATION

C. D. ABBOTT (G6TA)

In TVI areas one of the solutions is to use a balanced feeder system into the aerial. To obtain a good feeder-line characteristic—which is another way of saying a low standing-wave ratio on the feeder—it is necessary to have some instrumental method of checking up on the performance of the line. This can best be done by means of an SWR bridge, as described in this article. The method of calibrating it suggested by the author is easy and interesting and should result in an instrument reliable enough for all practical purposes. Since any improvement in SWR pays a handsome dividend in terms of increased radiating efficiency and a lower harmonic output, an SWR bridge is a sound investment.—Editor.

NOW that TV hours have been extended it is essential for the amateur wishing to work DX all round the globe to ensure that his station is TVI-proof.

Unfortunately, the area served by the London TV station, which covers about 50% of all British amateurs, is on a frequency band which is in direct harmonic relationship with all bands from 21 mc down.

Having read up the available literature on the subject, the amateur, at great trouble and expense, constructs the latest in transmitters, including refinements such as fully shielded equipment, filtering of all supply leads, wide-band coupling between stages, pi-section PA anode circuit, co-axial cable from transmitter through a Faraday screen to the ATU, and lastly a balanced line to the aerial.

He switches on his new gear, only to find that there is *still* some 42 mc harmonic output, sufficient to show on Ch.1 screens. This is not surprising as it is impossible to construct a PA working in Class-B or C which is completely free from harmonic content.

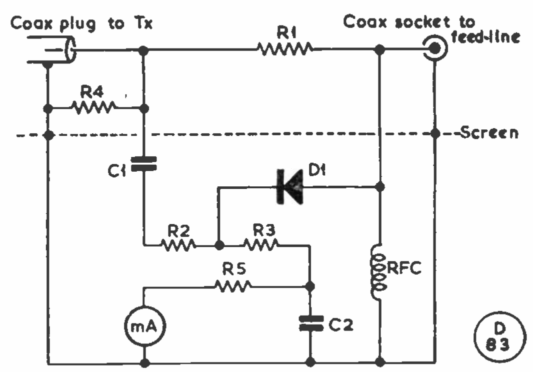
However, careful measurement will probably show that the unwanted harmonic is a comparatively small proportion of the total output, and the immediate thought is that a low-pass filter will get rid of the nuisance. In about nine cases out of ten it will be found that a filter inserted in the line between transmitter and ATU makes little or no difference, although testing this same filter by means of a signal generator working into a dummy load may have shown attenuation of perhaps 60 to 80 dB, according to the design of the filter. The reason for this apparent anomaly is the fact that a filter will only work well if the load which it "looks into" is very near that for which it is designed. Even a comparatively small mismatch will render it ineffective.

In order to ensure that the load presented by the aerial *via* the ATU and along the cable is correct a suitable measuring device is essential, and the SWR Bridge here described will do all that is required.

Circuit Arrangement

The circuit is given in the diagram. R1 must be exactly the same value as the impedance of the cable and filter with which it is to be used—in this case, 75 ohms. R2 and R3 are equal to each other, but their actual value is not critical.

The construction is very easy. Two pieces of 16 gauge aluminium are cut and drilled and then bent to form two U-shaped pieces, bolted together back-to-back, as shown in the photograph. Next the co-axial socket and plug are attached to the smaller piece with two three-way tags on the underside and a solder tag under the head of the bolt nearest the plug

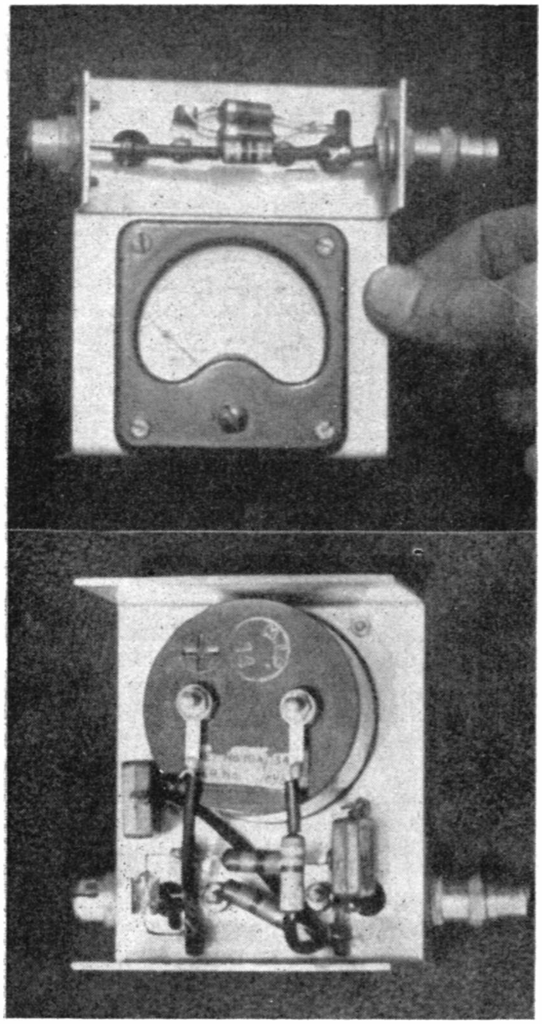


Circuit of the SWR Bridge, which is easy to construct and if calibrated by the method described by G6TA, will enable reliable estimates of standing-wave ratio to be obtained. The nearer the radiating system can be brought to read 1:1 (which is the ideal condition) the higher the transfer efficiency and the better the results on the air. A Bridge of this sort can only be used with a low RF input; the function of R4 is to dissipate a certain amount of RF when the Bridge is in circuit.

Table of Values

Circuit of the SWR Bridge

C1, C2	= .005 μF	R4	= 10 ohms, 1-w. (*see text*)
R1	= 75 ohms, 1-w.	R5	= 470 ohms, ½-w.
R2, R3	= Equal values about 50 ohms each, ½-w (*see text*)	Meter	= 0-1 mA
		RFC	= RF choke
		D1	= Germanium diode



(Above) front view of the SWR Bridge described by G6TA; the meter is read in terms of standing-wave ratio, by the method discussed in the text. (Below) a rear view of the Bridge, the composite photograph showing how the two U-shaped pieces used in the construction also provide the screening. It should be noted that this Bridge is suitable for use only with low power; that is, the necessary adjustments to the radiating system are made with the PA running at very low HT. When an SWR as near as possible to unity (1:1 ratio) has been achieved, the Bridge is removed from circuit and full power applied to the PA.

for earthing R4, which consists of two 20-ohm half-watt resistors in parallel; R1 and R4 are above the " chassis " and all other components are below. The function of R4 is simply to provide a small dummy load.

Care should be taken to avoid undue heating of R1, R2, R3 and the germanium crystal whilst they are being soldered.

Calibration

In order to calibrate the Bridge first switch on the transmitter using any band between 3·5 and 21 mc and make sure it is working normally. Next, disconnect the HT to the PA and also unplug the cable from the transmitter output socket, inserting the Bridge in its place, right up against the transmitter. The Bridge must be connected directly to the transmitter and not through a length of cable. Temporarily short-circuit the coax socket on the output side of the Bridge and apply very low HT to the PA in order to secure a full-scale deflection on the Bridge meter. Care must be taken while carrying out this operation as too much power will damage the Bridge. Only about 50 to 60 volts HT will be required.

Leaving the transmitter running on low HT the short-circuit is removed from the Bridge output socket and replaced by resistors of known value between 75 and 1000 ohms. Readings are plotted SWR-against-mA. The SWR will be the known resistor value divided by 75.

If the Bridge has been constructed properly, a 75-ohm load will give zero deflection (or 1: 1, the ideal condition) and an open circuit a full-scale deflection. If this is not the case the values of either R1, R2 or R3 are not right, possibly having been changed by overheating during soldering; they should be replaced.

A graph prepared from the data obtained by the calibration process can be stuck on the front of the instrument and given a coat of transparent varnish.

The SWR on the co-axial cable between the transmitter and the ATU can now be accurately measured by plugging the feed-line into the Bridge and suitable adjustments made to the ATU, feed-line and the aerial itself to ensure that this is as near unity (1: 1 ratio) as possible. It is to be noted that the transmitter and its temporary low HT must not be altered in any way while the Bridge is being used for checking purposes.

EXTRAORDINARY STUNT

For the South African *première* of the film " Race for Life " in Johannesburg, the local Amateur Radio Club arranged for a station to be on the air in the foyer of the theatre showing the film. The idea was that as contacts were made, they would be flagged up on a large map (supplied by Pan American Airways), to give point to the Amateur Radio interest in the film itself. The station in the cinema used the 14, 21 and 28 mc bands, and was on for one hour only. If you heard or worked ZS6SSC during 1730-1830 GMT on February 18, you will now know what it was all about.

The Design of the R.1155

GENERAL CIRCUIT ARRANGEMENT AND AMATEUR BAND APPLICATIONS

THOUGH of vintage 1940, the R.1155 has remained one of the most popular "surplus" receivers for amateur-band operation, largely because it is still easy to buy. Intended orginally for aircraft operation as the companion unit for the well-known T.1154 transmitter—discussed in some detail in the December, 1955, issue of *Short Wave Magazine* —the design of the R.1155 is basically very good. (It was prototyped by the Royal Aircraft Establishment, Farnborough, and manufactured under contract in large quantities by several well-known radio firms.) In Service use, the receiver was found to be easily adaptable for ground-station working.

A great many amateurs have since made the same discovery, and today there are few operators in this country who are not aware of the R.1155, even if they do not own one. It is also of interest to add that the design of the Radiovision "Hambander," in its time another very successful receiver, was largely inspired by the R.1155.

Circuit Arrangement

The diagram at Fig. 1 is a simplified version of the communication circuits of the R.1155—in the airborne application, it also provided direction finding and homing facilities by a direct-reading course meter, but those functions are not discussed here because they are of no practical interest from the Amateur Radio point of view.

To make it easy for those possessing an R.1155, and wishing to know more about its interior, the circuit nomenclature used in Fig. 1 follows that of the Service manual on the receiver.

The communication circuitry amounts to RF, FC and two IF stages into a detector-output valve, with separate valves for AVC operation combined with BFO, and a "magic eye" visual tuning indicator. (The latter is not shown in Fig. 1.) The audio output, while being adequate for headphones, is not sufficient for a speaker.

Since the R.1155 is a general-coverage receiver, it suffers (from the amateur viewpoint) by reason of having no band-spread. This means that the 7 and 14 mc bands cover only a few notches on the dial. Moreover, the 21 and 28 mc bands are not tuned at all, nor is 160 metres—a very severe disadvantage. The short-wave coverage is 3·0 to 18·5 mc, meaning that the R.1155 can be operated as it stands only on the 3·5, 7 and 14 mc amateur bands. It is very good on 80 metres.

Effective band-spread can be obtained by putting a small 10 or 15 $\mu\mu$F variable capacity in parallel with the oscillator tuned circuit; as this capacity will only sweep a small proportion of any one HF tuning range, tracking will not be seriously affected, though of course calibration will be put out.

To get on to 15 and 10 metres a converter arrangement is necessary — see *Short Wave Magazine*, July, 1956—while for Top Band it is possible either to employ another converter, or to modify the MF tuning range 3 (600-1500 kc) to cover 1800-2000 kc, as explained in the September, 1956, issue of the *Magazine*.

The IF of the R.1155 is 560 kc, HF side of signal frequency, with adjustable dust-iron core IF transformers.

Valve Substitution

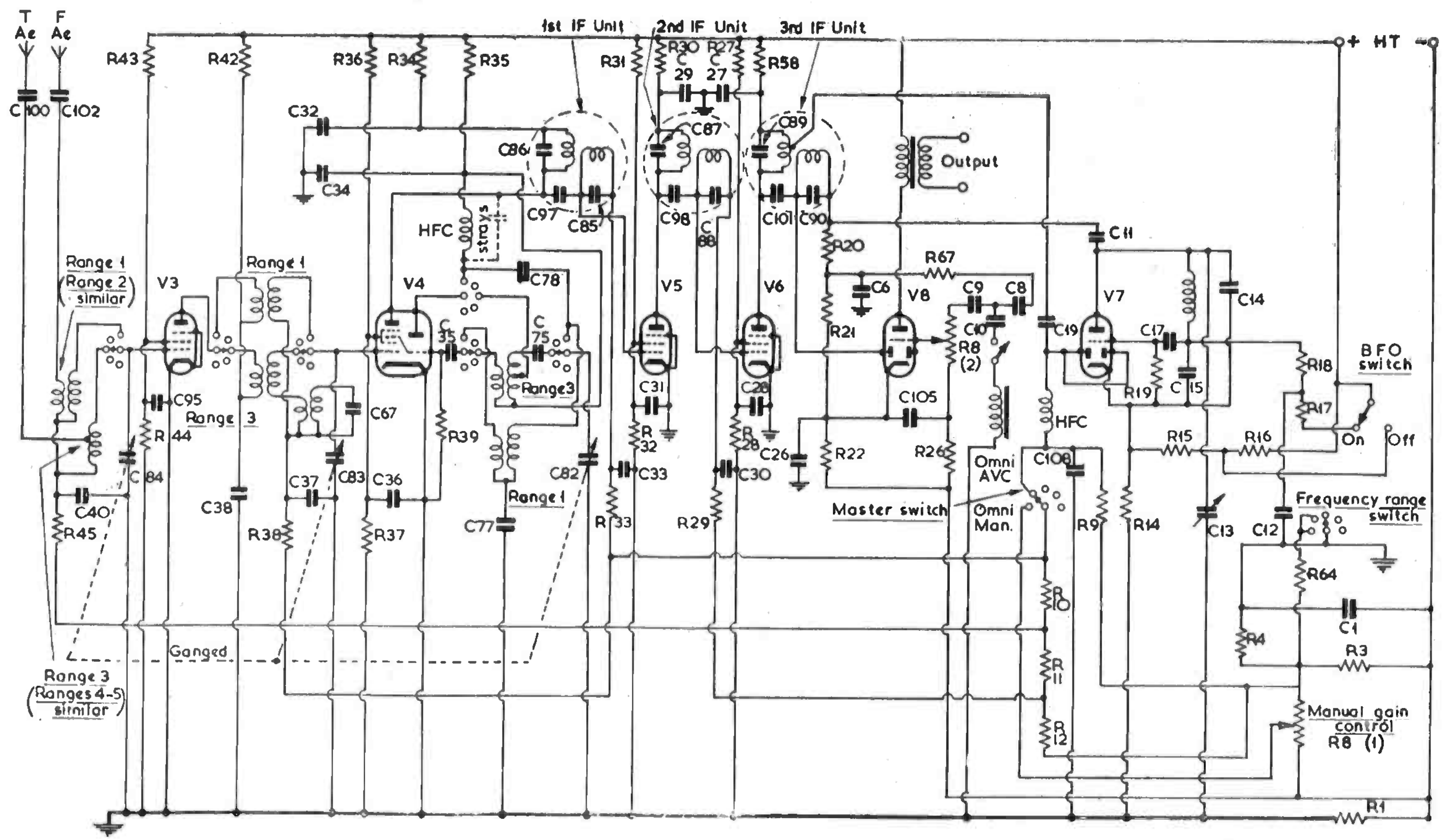
The original valve types were: VR100 for V3, V5, V6, equivalent to the CV1100, which is the old Osram KTW62, replaceable by the later G.E.C. W61 (KTW61). V4 used a VR99, also named CV1099 and actually a Z66, still in the current G.E.C. range; and for V7, V8 the type was a VR101 (CV1101) which is the original Osram MHLD6, now obsolete, but replaceable by the G.E.C. DL63 double-diode triode. (The equivalents mentioned here are directly pluggable, without re-wiring of any sort being necessary.) The "magic-eye" is a VI103, which is the same as the G.E.C. Y63 in the current range.

Unless the receiver is bought as "brand new, unused, in original packing," one of the first things to do is to give it a new suit of valves.

AVC and BFO

When the master-switch is in the "omni" position, the gain of V3-V4-V5-V6, together, can be controlled by potentiometer R8(1), the resistor network being so arranged that (at 220v. HT) any negative voltage from about −4 up to −30 volts is given by the slider of R8(1).

With the master-switch at "AVC," the gain of stages V3-V6 inclusive is controlled automatically by the level of the incoming signal,



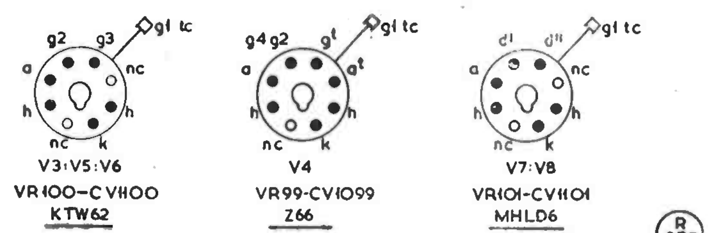


Fig. 1. Simplified diagram of the R.1155 communications circuits, discussed in the text. T.Ae is the "trailing" (long wire) aerial connection, which goes to Pin 2 of the Plug P1 (see Fig. 2) and F.Ae is the "fixed" aerial, corresponding to any short wire of 25-40 feet, going to Pin 1; in certain circumstances, better results will be obtained by trying either one of these. The KTW62 at V3, V5, V6 is now obsolete, as is the MHLD6 at V7, V8, but supplies are available from "surplus" sources. The Z66 at V4 is a current-production type (G.E.C.). Pluggable equivalents of these valves in current production are the W61 (or earlier KTW61) for V3, V5, V6, with the DL63 for V7, V8. The IF of the R.1155 is 560 kc, on the HF side of signal frequency, with a selectivity factor of 5 kc.

Table of Values

Fig. 1. Essential Circuitry, Receiver R.1155

Component	Value
C1	= 2.5 μF
C6, C11, C17	= 100 μμF
C8, C9, C19, C102	= .001 μF
C10	= .004 μF
C12, C26, C27, C28, C29, C30, C31, C32, C33, C34, C36, C37, C38, C40, C105	= 0.1 μF
C13	= 75 μμF, semi-variable (*see text*)
C14	= .0016 μF
C15	= .00455 μF
C35, C108	= 200 μμF
C67	= .002 μF
C75	= 537 μμF
C77	= .00617 μF
C78	= 15 μμF
C82, C83, C84	= Main tuning gang assembly
C85, C86, C87, C88, C90	= 300 μμF
C89	= 600 μμF
C95	= 0.5 μF

Component	Value
C97, C98	= 2 μμF
C100	= 200 μμF
C101	= 4 μμF
R1	= 2,000 ohms
R3	= 1,200 ohms
R4	= 120 ohms
R8(1), R8(2)	= 50,000/500,000 ohm dual pot-meter (*see text*)
R9	= 2 megohms
R10, R11	= 150,000 ohms
R12, R16, R27, R31, R36, R43	= 27,000 ohms
R14, R22	= 1,000 ohms
R15	= 30,000 ohms
R17	= 1,500 ohms
R18	= 10,000 ohms
R19, R20, R39	= 56,000 ohms
R21	= 470,000 ohms
R26, R29, R33, R38, R45	= 100,000 ohms
R28, R32, R35, R37, R44, R67	= 22,000 ohms
R30, R34, R42, R58	= 2,200 ohms
R64	= 200 ohms

(NOTE: *Circuit nomenclature as Service Manual*).

with R8(2) as the manual audio gain control.

Since in the actual design R8(1) and R8(2) are ganged together to the one knob marked "volume control," from a study of the circuit it is evident that with the master-switch at "omni," R8(1) only is operative—with R8(2) out of circuit—while with AVC on, audio gain R8(2) alone is available. This means that there is no manual control of *audio* gain, by itself, when AVC is off, the output being in effect controlled by R8(1), as a "manual AVC" knob.

It is for this reason that one of the modifications sometimes advocated is the physical separation of R8(1) and R8(2), so that they can be used independently; in fact, this modification is not really necessary.

In the AVC circuitry, the degree of bias is proportioned between V3-V6 in such a way as to give a sort of "graduated control," in the interests of good signal-noise ratio. That is to say, while V4, V5 take the full AVC bias volts, V3 gets half this voltage, and V6 only one-tenth. The AVC delay is about 13 volts, and the resulting AVC characteristic is such that a change in input signal of 80 dB only produces a variation in output level of 8 dB.

The triode section of V7 provides the BFO, the Colpitts oscillator being tuned to half-IF, *i.e.*, 280 kc. What should be the variable pitch BFO control is C13 in the circuit diagram. In the R.1155 it is fitted not as an independent control, but for screwdriver ("fixed") adjustment. An obvious improvement here is to put in a condenser which can be knob controlled.

Output End

The maximum attainable audio output is 100 mW which is ample for a headset, but, as already mentioned, means that an additional LF valve must be fitted for speaker operation —*see* under "Power Supply."

In the output side of the set there is incorporated an LF filter or noise limiter consisting of a choke with condensers C8, C9, C10, controlled by switch. The purpose of this is to suppress all audio frequencies below 300 cycles, which it does most effectively; it works very well on high-level peaky noise and "sharsh."

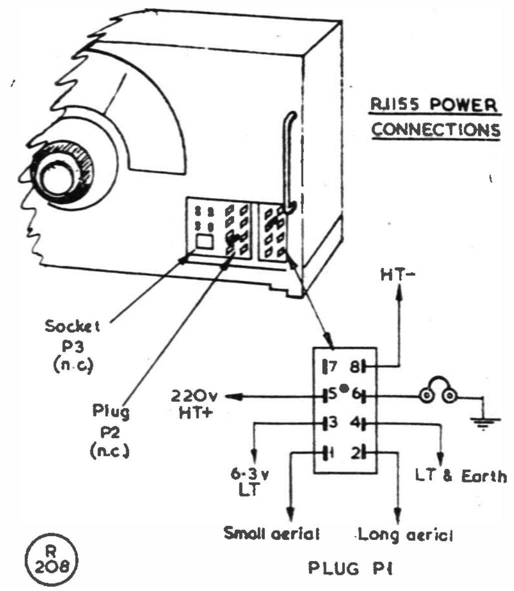


Fig. 2. This sketch is to locate the R.1155 power plug and its connections, looked at from the front (as the receiver is viewed). To operate the set as a normal communications receiver, socket P3 and plug P2 are ignored, connections as shown being made to P1. The headset can be connected across pins 6-4 or 6-8 if pin 4 is earthed, as shown here. Pin 7 connects HT+ to V1, V2 which are the D/F valves, not used at all in the communications application; these circuits are only brought in when the main (right-hand) panel switch is moved to the "balance," "visual" and "00" positions.

Also on the output side there is a tuning indicator V10—not shown in the circuit of Fig. 1—which is driven off the AVC line; hence, it could easily be replaced by an S-meter unit operating on the principle of that described in the March, 1957, issue of *Short Wave Magazine*.

The Auxiliary Circuits

The circuitry of the R.1155 also incorporates three further valves (V1, V2 and V9, not shown in Fig. 1) which are additional to the communications section of the reciver. These auxiliary circuits are there only to provide for direction finding and homing. In the sketch at Fig. 3, the circuit elements associated with the D/F functions are *un*marked ; they can, in fact, be removed altogether, to leave more space on the main chassis, since they play no part in the operation of the R.1155 as a communications receiver.

Power Supply

The R.1155 is not self-powered—in Service use, a complicated arrangement of HT and LT generators, driven off the aircraft main electrical line, was involved—so that another " modification " called for is the provision of a standard type of AC power pack. This should give about 60 mA at 220 volts HT, with 6·3 volts at 3 amps. or so for LT.

In some modifications a 6V6 (or G.E.C. KT63) as output audio amplifier is built on to the same chassis as the power pack, to form a complete unit operated externally to the main receiver. In this case, the grid connection for the output amplifier can be taken off pin 6 of the power plug P1—*see* Fig. 2.

The sketch at Fig. 2 locates the power inlet plug and its pin connections. The other two entries, plug P2 and socket P3, can be ignored ;

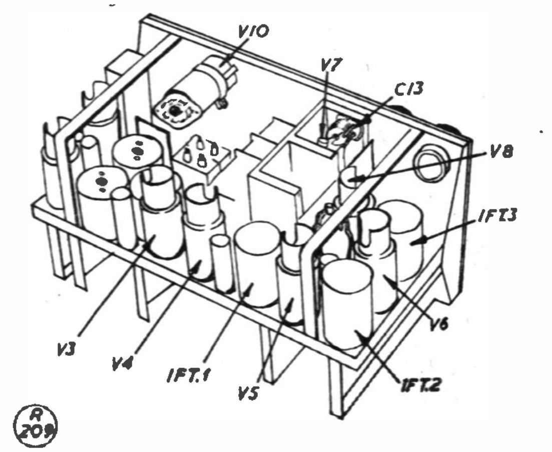


Fig. 3. Outline sketch of the R.1155 (chassis, near view) to locate main items shown in the circuit at Fig. 1. Valves and canned coils not marked here are for the D/F function of the receiver, and could well be removed, together with the connections to the "balance," "visual" and "00" positions of the main panel switch. V10 is the magic-eye tuning indicator (not shown in the Fig. 1 circuitry) and is driven off the receiver AVC line, its grid being connected to the top end of R9 in Fig. 1. V10 could be replaced by the current G.E.C. type Y63, which is pluggable, or the magic-eye assembly removed altogether and replaced by an S-meter to the design in the March issue of "Short Wave Magazine." All elements marked in this sketch correspond to the Fig. 1 nomenclature, and are as given in the Service manual on the R.1155.

they are the connection points for the D/F function of the receiver, including the remote reading visual course indicator.

Transistor DX on 40 Metres

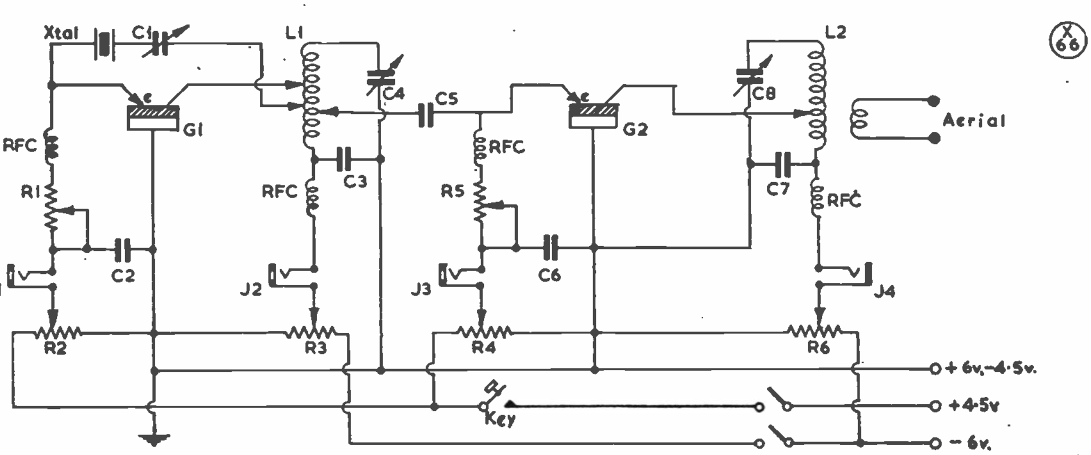
AN HF CO-PA TRANSMITTER RUNNING 120 mW

By Courtesy PHILCO (OVERSEAS), Ltd.

This very interesting description of a practical transistor transmitter — though the actual barrier-type transistors used are not yet generally available in this country—not only shows what can be done with such low power on the DX bands, but also proves the practicability of QRPP operation with this particular type of HF transistor, which has such a high factor of conversion efficiency. The circuit arrangement is very similar to that originally devised by G3HMO and described in SHORT WAVE MAGAZINE *some three years ago.—Editor.*

THE transmitter shown here is a crystal controlled oscillator-amplifier running 120 milliwatts input on the 40-metre band and employing Philco type MADT and SB100 transistors, powered by two flashlight cells. The aerial system consists of two vertical ground planes with 40-foot radiators, spaced one quarter wave-length apart. One of these verticals is driven, the second element serving as a parasitic reflector. With this equipment W3FBL of Laverock, Pennsylvania, has rolled up an impressive list of 40-metre contacts in six months' operation. His best DX so far is KH6KD and KH6BDV in Hawaii, with whom he keeps regular schedules at 2200 GMT on 7050 and 7073 kc. He has also made WAS and worked VE1, 2, 3 and 7.

The transmitter is shown in Fig. 1. Although the circuit appears to be without novelty, there are several features which make for efficiency and stability. Tank coils are large (4in. diameter in the amplifier) and of heavy wire ; in fact, this coil would be suitable for a kilowatt rig! This form of construction raises their unloaded Q, which is a very important factor in QRP operation. In fact, all connections are made as though a kilowatt were involved, to reduce losses.



40 METRE TRANSISTOR CO-PA TRANSMITTER

Fig. 1. Circuit of the two-stage transistor transmitter used by W3FBL for 40-metre CW working. The MADT in the output stage is a Philco type run at a maximum input of 120 milliwatts. In terms of DX capability the transmitter is compared, on p.128, with a transmitter running a full kilowatt input. Values used in this particular design, which is constructed on strictly low-loss and high-Q lines, are given in the table. British equivalents of the barrier-type HF transistors used are not yet generally available but are in production in laboratory quantities.

Circuit Points

Grounded-base configuration is used in the amplifier, to reduce feedback through the transistor, and for this reason, along with the relatively low capacities of the surface barrier transistor, neutralizing is not necessary. Further, the small capacity feedback present is thus regenerative instead of degenerative, as it would be if common emitter circuitry were used. No difficulty has been experienced with oscillation or instability.

Numerous potentiometers are incorporated, some of which could be omitted. They are helpful for the following reasons:

The transistor provides greatest power output at some certain collector voltage and collector current, which are not strictly predictable from the characteristic curves. Thus, as voltage and current increase, a point will be reached after which further increase of input results in no greater output, or a decrease in output. Exceeding this point is not only wasteful of realizable output but dangerously harmful to the transistor.

It is desired to use the greatest possible collector voltage, yet a point is reached where damage to the transistor occurs. This is a fracturing of the base layer, indicated by continuous high reading of collector current and by ohmic resistance of only several hundred ohms between collector and emitter. Further, a transistor having a breakdown voltage of, say, 15 volts will fail before 15 volts from the supply is applied, because the RF swing is added to the supply. Thus, when operating

Table of Values

Circuit of the W3FBL Transistor Transmitter

C1	= 100 $\mu\mu$F (*see text*)	R5, R6	= 500-ohm pot'meters
C2, C3, C5, C6, C7	= .01 μF	RFC	= RF chokes
		J1-J4	= Close-circuit meter jacks
C4, L1	= To tune 7 mc band	G1	= Philco SB100 transistor
C8, L2	= To tune 7 mc band	G2	= Philco MADT transistor
R1, R2, R3, R4	= 500 ohm pot'meters		

with high supply voltage, the tank should not be resonated without some loading, as in valve technique.

Series dropping resistors or coils in the collector supply should be minimized, since, although safe potentials may be achieved during operation, current reduction or stoppage (as in keying) causes voltage to rise. However, some resistance in the emitter is essential for temperature stability and for lessening the danger from thermal "runaway" and destruction of the transistor. About 100 ohms would result in satisfactory current feed to emitters. Excessive power input will also damage the crystal through heating.

Both tank coils are tapped at every turn, for empirical determination of proper matching, which is quite important in this attempt to squeeze out the last available milliwatt. It has been noted that in the final, with given aerial loading, *one turn* away from optimum collector tap will reduce output by two-thirds!

C1 is not a simple blocking condenser; it is a phasing adjustment to be set at the point of best stable oscillator operation under keying. Both it and its tap to the coil should be adjusted ; C1 also permits modest frequency shift to get out from under QRM.

Collector current in the amplifier should be checked, but this is not a good indication of maximum power output. Some means of measuring feeder current relatively, or (preferably) aerial excitation, should be used.

Obtaining maximum possible output is not without an element of risk. Such operation is beyond the maximum ratings of the manufacturer. It is possible that the transistor will function satisfactorily for many (even hundreds of) hours, and then give up. In this connection, the meter monitoring the collector current should be watched for a gradual (sometimes rather rapid) *increase* of current, which is the sure sign for immediate reduction of power input.

Operating Precautions

HF transistors can be used in transmitting applications if the following precautions are observed :

Always earth down the frame of the soldering iron, or gun, to the chassis when soldering around the circuit. Enough leakage voltage is present in most irons to cause damage. Even soldering with an ungrounded iron to transistor and circuitry held in one's hand is dangerous since the body has considerable capacity to ground ; *the charging of this capacity through the transistor can cause permanent damage.* This is simply because the base layer, to operate at very high frequencies, must be quite thin. The same precaution should be followed in connecting any AC-operated test equipment.

Monitor RF output and use no more collector voltage and/or current than neccessary to give maximum power output.

Keep the transistor equipment well away from close coupling to a high power rig. Enough energy may enter the transistor rig to damage the transistor, as it would any diode.

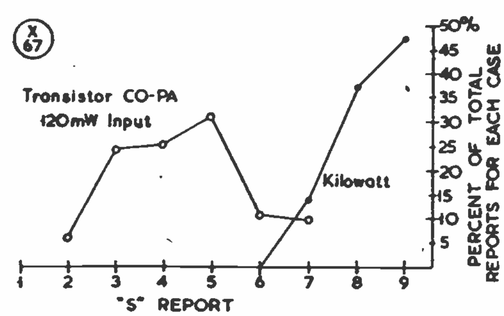
Watch collector current. If it rises during operation, back-off on collector voltage and current. The rise is evidence of thermal runaway or of altering of transistor characteristics.

If there is a choice between extra-high voltage and extra high current for given RF output, choose the current as the lesser danger.

Do not resonate the final tank, if pushing to the transistor limits, without a load.

Avoid intermittent short circuits, especially in the collector area, which may cause voltage transients to be produced.

On the other hand, if something a bit under



Graphical representation of the results obtained by W3FBL when comparing the 40-metre transistor transmitter with his kilowatt rig. The curves are plotted from reports received under identical conditions. Using a somewhat elaborate aerial system (see text) W3FBL has had some remarkable DX results on two crystal frequencies in the 7 mc band, as mentioned in the article.

maximum possible power output is satisfactory, the rig and transistors will operate indefinitely with little chance of failure.

Heat Sink

The heat sink tried at first was a tight-fitting brass tube to which fins were soldered. This slipped over the transistor case. Then, in an all-out effort, an ice bath was constructed. Since heat flows out over the leads, these too are cooled.

A tin can tank large enough to hold two ice cubes was constructed and covered with asbestos sheeting to reduce "sweating." Soldered upright, at the side of the tank, is a $\frac{3}{8}$-in. section of tubing with its bottom soldered shut to make a liquid-tight well. Coil dope is painted above the upper edge, to serve as an insulator should the transistor leads happen to touch the tubing.

Into the well is inserted the transistor which has a section of tight-fitting tubing slipped over its case. The well is then filled with silicone oil to cover the transistor assembly, including a portion of its leads. (Another version of this device uses finely divided aluminium particles in the oil to increase its thermal conductivity.)

Thus, water and ice cubes in the tank cool the oil which, in turn, cools the transistor and permits increased power input by about 30%. Even without increase of input, it is considered to be a good insurance policy against transistor failure.

The curves (above) are a plot of the results obtained on the transistor equipment against the kilowatt transmitter available at W3BFL and are strictly comparable, since the data are drawn from dual reports obtained during QSO's with individual stations.

Front-panel arrangement of the KWS-1 AM/CW/SSB Transmitter, manufactured by the world-famous Collins Company of Cedar Rapids, Iowa. The KWS-1 is a table-top design rated at one kilowatt and though designed for the American amateur market, has already found a number of commercial applications.

A Thousand Pound Transmitter

THE COLLINS KWS-1 AMATEUR BAND CW/PHONE (AM/SSB) EQUIPMENT

DESCRIPTIVE REVIEW

It may well be wondered why we are describing here a high-priced American transmitter in the "luxury" category, which is not even available in the U.K. unless payment can be made in dollars. The reason is because we feel that many of our readers—both amateur and professional—will be very interested in the general design, circuitry and construction of a modern transmitter from the famous Collins production line, simply for its own sake as a piece of electronic engineering in the communications field. A number of KWS-1/75A-4 equipments, owned by amateurs in the United States and elsewhere, can now be heard on the air.

—Editor.

IT is nearly a year since Collins introduced the KWS-1 transmitter for sale in the U.S.A. and although several models have passed through England *en route* for far-away places, so far none have appeared on the amateur bands under a G call-sign. Through the courtesy of Collins (England), Ltd., *Short Wave Magazine* has recently had the opportunity of examining and testing a specially modified version of this very desirable equipment. (For the purpose of the tests the power rating had been reduced to conform to British Licence Regulations.)

In the design of any new equipment intended specifically for the amateur market, convenience and simplicity of operation combined with reliability made possible by good engineering practice are of the utmost importance. In addition, new technical features dictated by the advancement of the communications art must be included, consistent with economy of production and reasonable selling price. In this country, the market for factory-built equipment intended solely for amateur use is comparatively small compared with the U.S.A. It

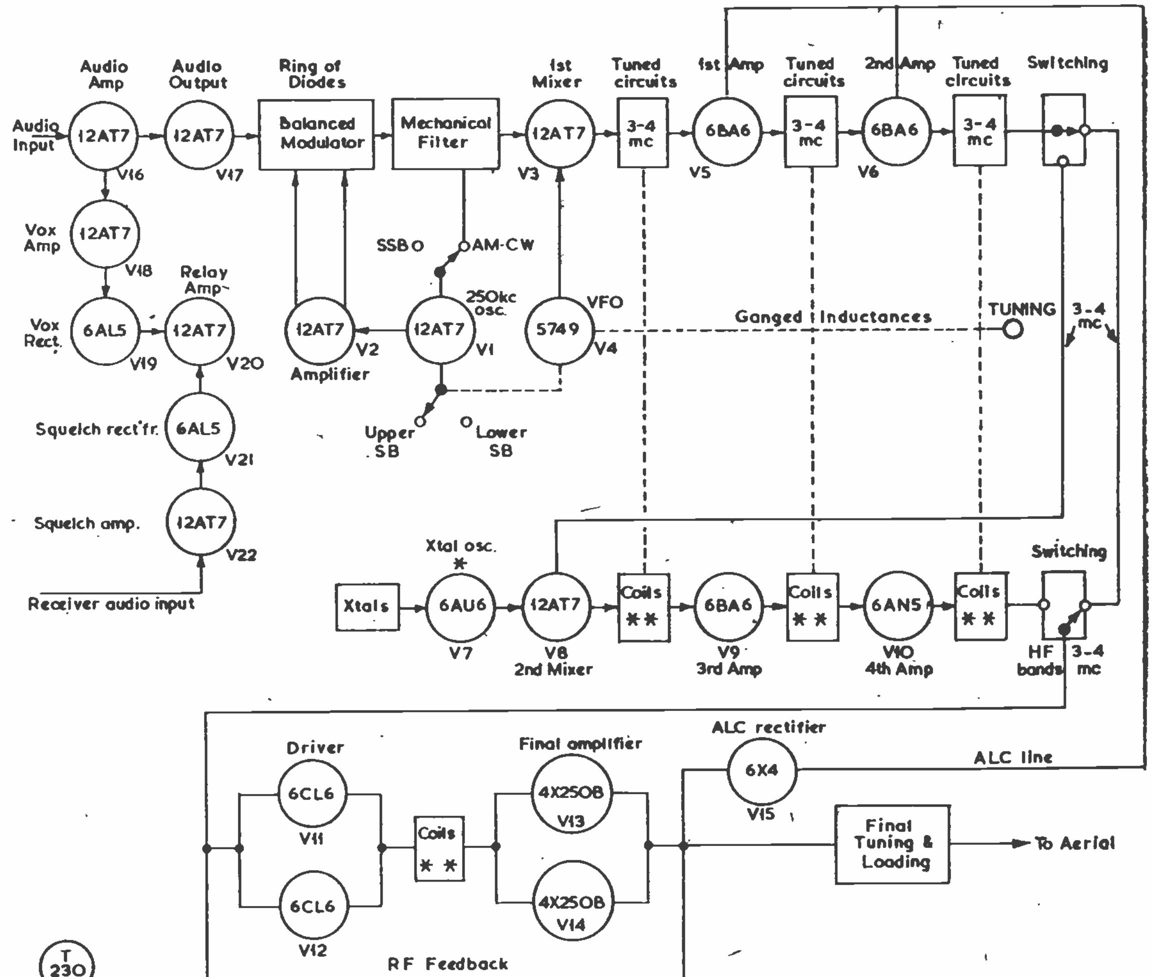


Fig. 1. Block schematic of the RF section of the Collins KWS-1 Transmitter, showing circuit sequence. The 6AU6 oscillator* develops 4 mc on 40 metres, 11 mc on 20 metres, 18 mc on 15 metres, 23.4 mc on 11 metres, and either 25 or 26 mc to cover the whole 10-metre band. The coil packs are arranged to cover 7-8 mc on 40m., 14-15 mc on 20m., 21-22 mc on 15m., 26.4-27.4 on 11m., and 28-29 or 29-30 mc for full coverage of the 10-metre band. See diagram for positions of items marked * and ** for correlation.**

might not, therefore, be an economical proposition for a British manufacturer to develop and produce a transmitter such as the KWS-1, even considering that it might have circuitry or design features similar to equipment developed for other uses.

In the U.S.A. such a situation does not exist because the potential amateur market is so large that a manufacturer can recover his development costs by proper production line planning and a big output of units. It is fair to say that the KWS-1 does include many design features and special component parts that are used in other Collins equipment developed for the commercial market and that a special version of the transmitter described here is now in current production for a U.S. Service Department.

The KWS-1 includes all the features usually found in well-constructed amateur transmitters. In addition to the provision of CW and AM outputs, particular emphasis has been placed on high grade single-sideband operation.

The transmitter is contained in two separate cabinets; the complete exciter and PA section in a table-top size case and the power supplies in a similar housing approximately 3ft. high. The interconnection cables are of sufficient length to allow the two units to be separated or stacked as convenient.

The RF cabinet contains four separate chassis; at the right front is the sideband generator with speech amplifier and audio circuits. Next to this chassis in the centre is the VFO and on the left is the assembly containing the frequency conversion circuits and the low-level amplifier and driver stages. The PA stage is located at the rear, directly behind the sideband generator and VFO chassis.

Circuit of the KWS-1

The circuit arrangement is shown in the block diagram Fig. 1, and the various features of the circuitry will be described in greater detail by reference to the photographs and the other diagrams. For ease of description the transmitter has been broken down into the following sections :

Audio circuits
The Sideband generator and VFO
Low-level Amplifier chain and Second Mixer
The Driver and Final Amplifier
Power supplies and Control circuits.

The speech amplifier channel is conventional and uses a double-triode pre-amplifier feeding a cathode-follower output stage. The audio signal is coupled from the cathode-follower at low-impedance to the balanced-modulator and mechanical-filter.

Full voice operated break-in (VOX), together with receiver muting and anti-trip facilities, are provided by a separate audio channel which is connected in parallel with the speech amplifier.

The Sideband Generator

The heart of the sideband generator is the 250 kc mechanical filter. (See *QST* February, June and August, 1953, for principle of operation.) Unlike the more widely known crystal-lattice arrangement which usually has some loss of symmetry in the pass-band characteristic, the mechanical type has the idealised flat-topped steep skirted shape. Having a band-width of 3 kc the filter greatly attenuates signals falling outside the pass-band. Thus, if the double-sideband input is centred on the edge of the symmetrical filter characteristic, one sideband is accepted and the other rejected.

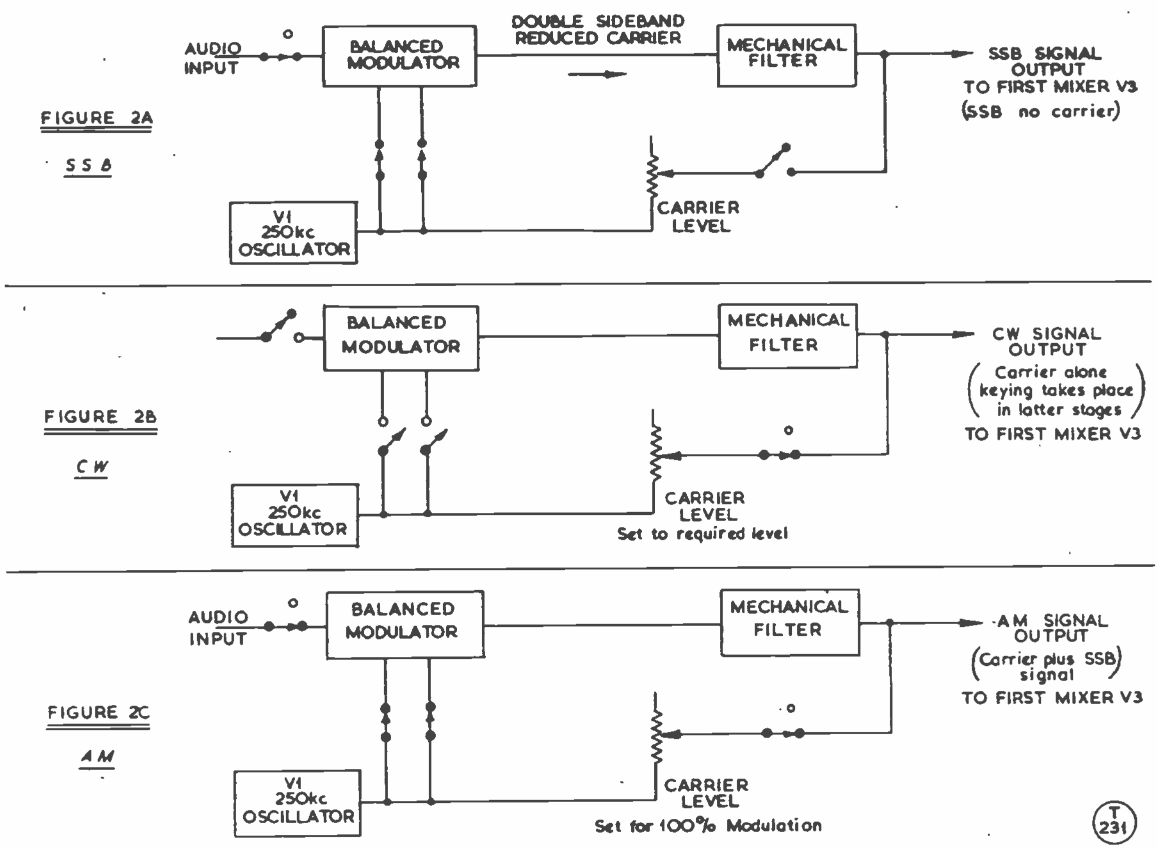


Fig. 2. Simplified block diagram showing method of generation used for SSB, CW and AM modes of transmission, selected by front-panel switching.

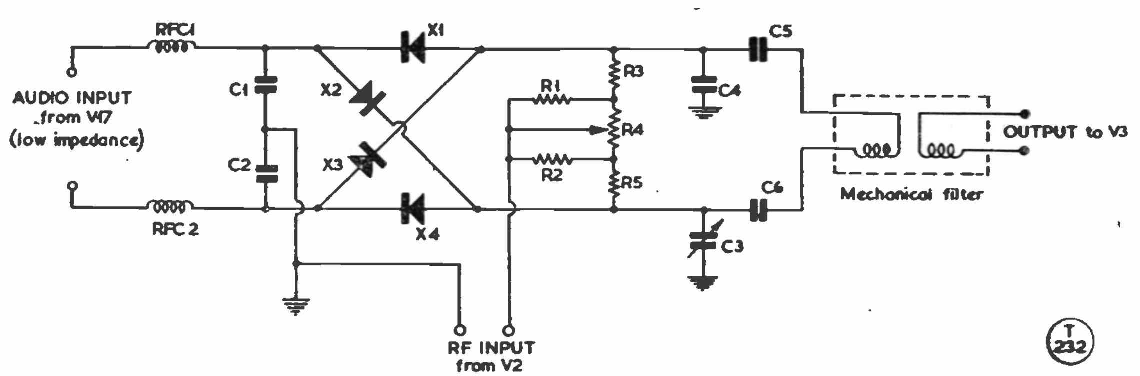


Fig. 3. Simplified circuit diagram of the balanced modulator and filter used in the Collins KWS-1 Transmitter. Values are given in the table.

In the KWS-1, a crystal-oscillator stage V1 provides a signal of either 251·5 kc (for upper sideband operation) or 248·5 kc (for lower sideband). This signal is coupled through a cathode-follower stage V2 to a crystal-diode ring-modulator. The audio from the speech-amplifier chain is also fed to the ring-modulator. The resulting double-sideband reduced carrier signal is passed to the filter which rejects the unwanted sideband and provides additional carrier attenuation. Fig. 2A and Fig. 3 show the development of the SSB signal and the circuit of the ring-modulator and filter.

Table of Values

Fig. 3. Simplified circuit of Balanced Modulator and Filter.

C1, C2	= .01 μF	R3, R5	= 680 ohms
C3	= 5-25 μμF trimmer (carrier balance control)	R4	= 100-ohm pot'meter (carrier balance control)
C4	= 62 μμF		
C5, C6	= 220 μμF		
RFC1, RFC2	= 2 mH RF choke	X1, X2, X3, X4	= Special crystal diode assembly
R1, R2	= 22 ohms		

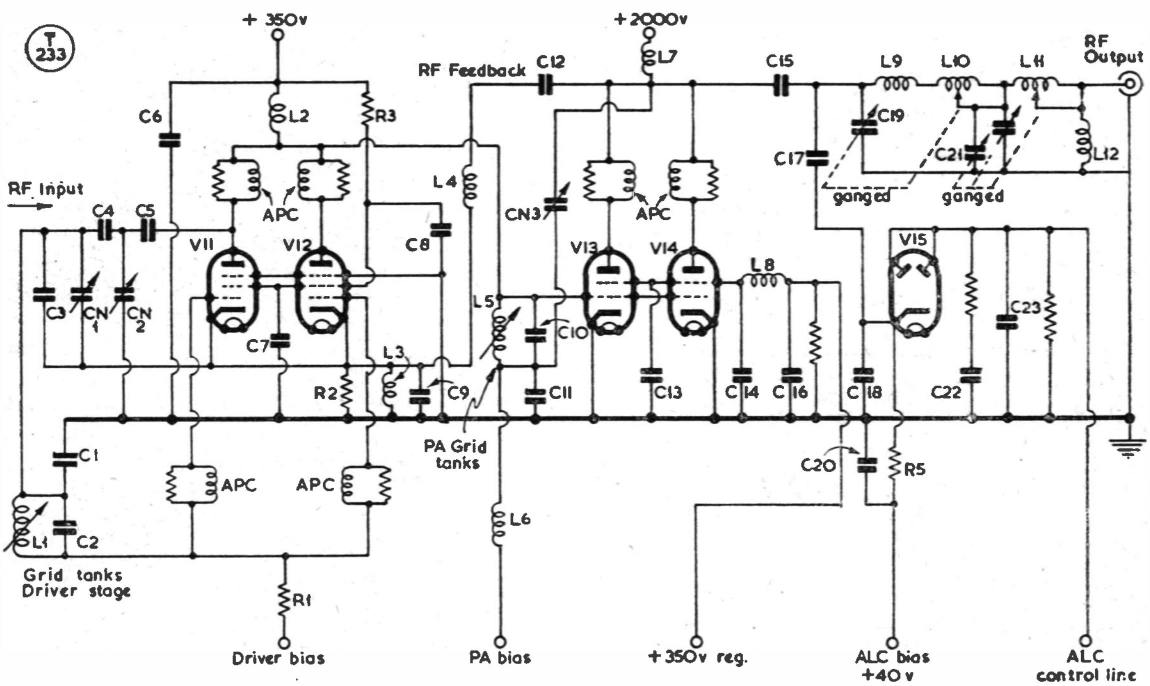


Fig. 4. This is a simplified circuit of the driver and PA stages of the KWS-1, showing the automatic load control (ALC) and RF feed-back loop arrangement. The PA runs a pair of 4-X250B's (V13, V14), large valves in the 500w. category, driven by two 6CL6's, (V11, V12), which are in the 6.3v. miniature classification. All values are shown in the table, and the neutralising circuitry is broken down in Figs. 5, 6 and 7.

The method used for generation of CW and AM signals is somewhat similar, except that the 250 kc carrier is re-inserted into the RF circuits. For CW the cathode side of the audio output stage is opened and the modulator and filter are by-passed (Fig. 2B). The first mixer stage V3 and the driver stage V9 and V10 are grid - blocked keyed through a wave shaping network which eliminates clicks and improves the keying characteristic.

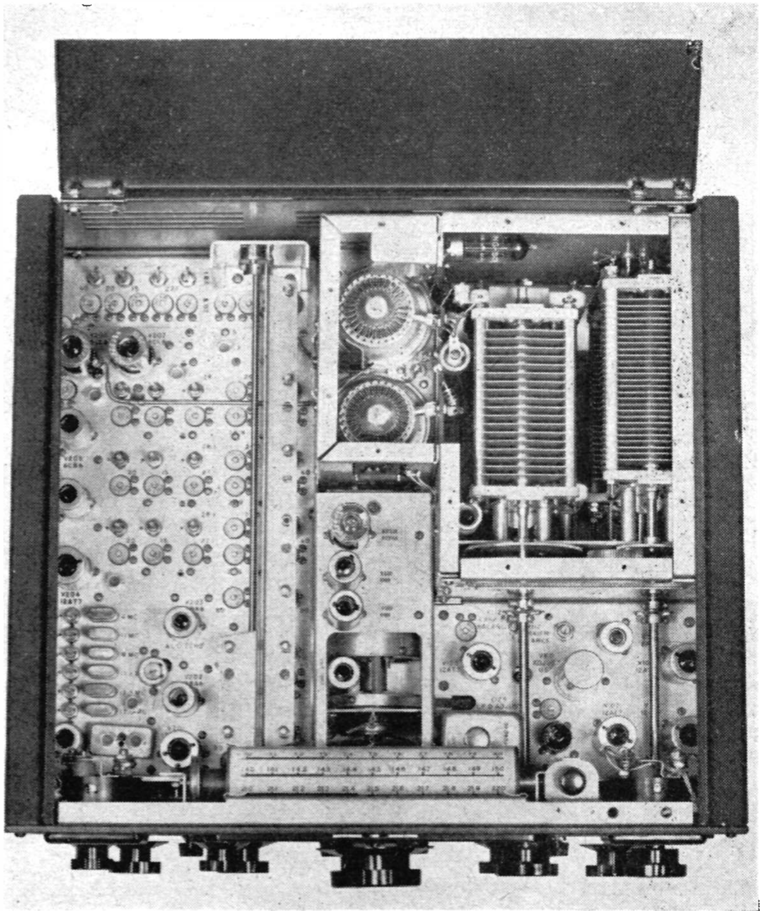
Amplitude Modulation facilities are provided by keeping the ring modulator and filter in circuit and re-inserting the carrier into the filter output circuit (Fig. 2C). The total output is carrier *plus* one sideband, which can be received in exactly the same manner as conventional AM.

The 250 kc output from the mechanical filter is frequency changed to the 3·5 mc band by the first mixer stage V3. The injection voltage is provided by the VFO operating in the range 2750-3750 kc.

The VFO circuit is of the Hartley type using the well-tried Collins permeability tuning system. The oscillator anode and screen supply is regulated by neon stabilisers and the heater feed is controlled by a series type regulator valve.

Since a mixer system is used throughout the exciter the change between upper and lower sidebands will cause the output frequency to be displaced by 3 kc unless the VFO frequency is moved in sympathy with the low-frequency oscillator. As the dial calibration must remain constant for both sidebands, Collins have used an arrangement similar to the pass-band tuning technique adopted in their 75A-4 receiver. The sideband selector switch is ganged to the VFO by a mechanical linkage which rotates the complete oscillator assembly, thus changing the VFO frequency by the correct amount to keep the output frequency constant. As the VFO unit is bodily moved, the dial calibration remains unaltered.

[over



Plan view of the Collins KWS-1 Transmitter with the covers off. The PA section is at upper right with the tops of the 4-250XB valves visible. The PA tank inductances are of the constantly variable type and are ganged with the tank tuning capacities (see Fig. 4) so that the band-to-band L/C ratio can be set up correctly. This pi-coupler arrangement is an original Collins development.

Table of Values

Fig. 4. Simplified circuit of Driver and PA stage, KWS-1.

APC	= Parasitic stoppers	R1	= 18,000 ohms
C1	= 100 μμF	R2	= 1,000 ohms
C2	= Driver grid tuning	R3	= 4,700 ohms
C3	= 33 μμF	R4	= 20,000 ohms
C4, C12	= 5 μμF	R5	= 47,000 ohms
C5	= 1.5 μμF	R6	= 3,300 ohms
C6, C7, C20, C23	= .01 μF	R7	= 470,000 ohms
C8	= .003 μF	L1	= Driver grid coil
C9, C11, C15, C16	= .001 μF	L2, L6, L12	= RF choke, 2.2 mH
C10	= 125 μμF	L3, L8	= RF choke, 0.5 mH
C13 C14	= .0037 μF	L4	= RF choke, 0.22 mH
C17	= 1 μμF	L5	= PA grid coil
C18	= 22 μμF	L7	= RF choke, 90 μH
C19	= 250 μμF anode tuning (ganged to L10)	L9, L10, L11	= PA pi-L tank coils, ganged to C19 and C21
C21	= 2 x 600 μμF loading (ganged to L11)		
C22	= 0.1 μF	V11, V12	= 6CL6
Cn1, Cn2, Cn3	= Neut. capacities (see Figs. 5, 6, 7)	V13, V14	= 4X250B
		V15	= 6X5

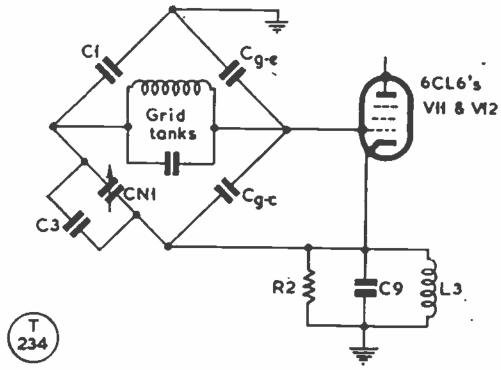


Fig. 5. The grid-to-cathode neutralisation bridge in the driver stage of the KWS-1 (simplified circuit). Cg-e is the valve grid-to-earth capacity, and Cg-c the grid-cathode capacity. The values are given with Fig. 4.

Low Level Amplifier Chain and Second Mixer

The 80-metre output from the First Mixer is amplified by two cascaded low-level buffer stages. These amplifiers are again controlled by an AGC circuit which the Collins people call " automatic load control " (ALC), and sufficient tuned-circuits are included in the chain to eliminate spurious mixer products. The ALC circuit can be described as operating in a similar manner to the AVC system in a receiver and reduces the gain of the amplifier chain under high excitation peaks and so prevents the PA from being overdriven.

A diode rectifier is coupled to the PA output tank by a capacity divider. The diode is held non-conducting by a positive bias voltage applied to the cathode. On high RF peaks (which overcome the standing bias) the diode will conduct and apply a control voltage to the low-level amplifier chain, thus instantaneously reducing the gain to a safe level. A special metering circuit is included to facilitate the setting of the ALC operating parameters.

For 80-metre operation the buffer stages feed

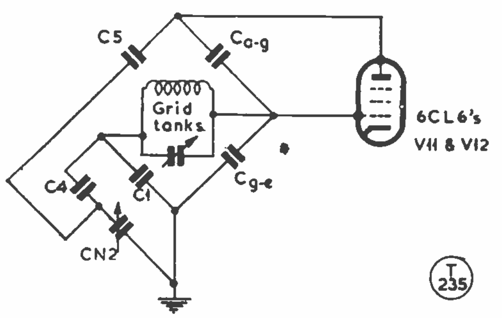


Fig. 6. Simplified diagram of the anode-to-grid neutralisation bridge in the KWS-1 driver stage. Ca-g is the valve anode-grid capacity, and Cg-e the grid-to-earth capacity. Values are as in Fig. 4.

directly to the high-level driver amplifiers. On the higher frequencies a further mixer and low-level amplifier chain are switched into circuit. The mixer is of the double-triode balanced type. Trap circuits are included to reduce any harmonics of the crystal-oscillator stage which provides the injection voltage to the mixer. As in the first low-level amplifier chain, sufficient tuned circuits are included to ensure the necessary selectivity for attenuating the unwanted mixer products.

The Driver and Final Amplifier

Two parallel connected 6CL6 pentodes (miniature 6AG7) drive the final amplifier, which runs two Eimac 4X250B tetrodes in parallel operated in Class-AB1 linear. A continuous tuning pi-L network is used in the anode circuit of the PA. Roller type rotary

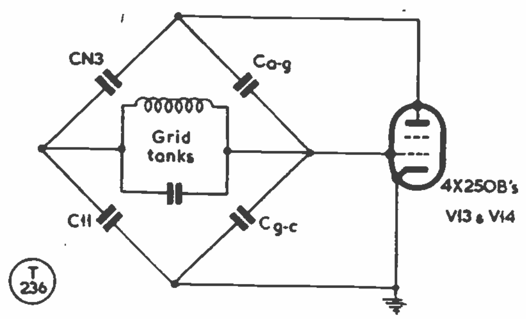


Fig. 7. Neutralising network, anode-to-grid, in the final RF stage of the KWS-1, using a pair of Eimac 4X250B's in parallel.

coils are ganged to the tuning and loading variable condensers and by very careful choice of L and C values and a suitable reduction gear drive, it has been possible to cover the full tuning range of the transmitter without band-switching. The combined pi-L section provides considerable attenuation of harmonics and in operation allows vernier tuning and loading adjustments without the interlocking of controls normally experienced with the simple pi-coupler circuit. It is of interest to add that, many years ago, Collins were first to use the pi-coupler in a commercial transmitter design—hence " Collins coupler."

In order to improve the linearity of the final amplifier, an RF feedback loop has been included between the anodes of the PA stage and the cathodes of the driver valves. Fig. 4 is a simplified circuit diagram of the driver, PA, ALC diode and the RF feedback loop. Approximately 12 dB of feedback is used, which provides a 10 dB reduction of unwanted inter-modulation products.

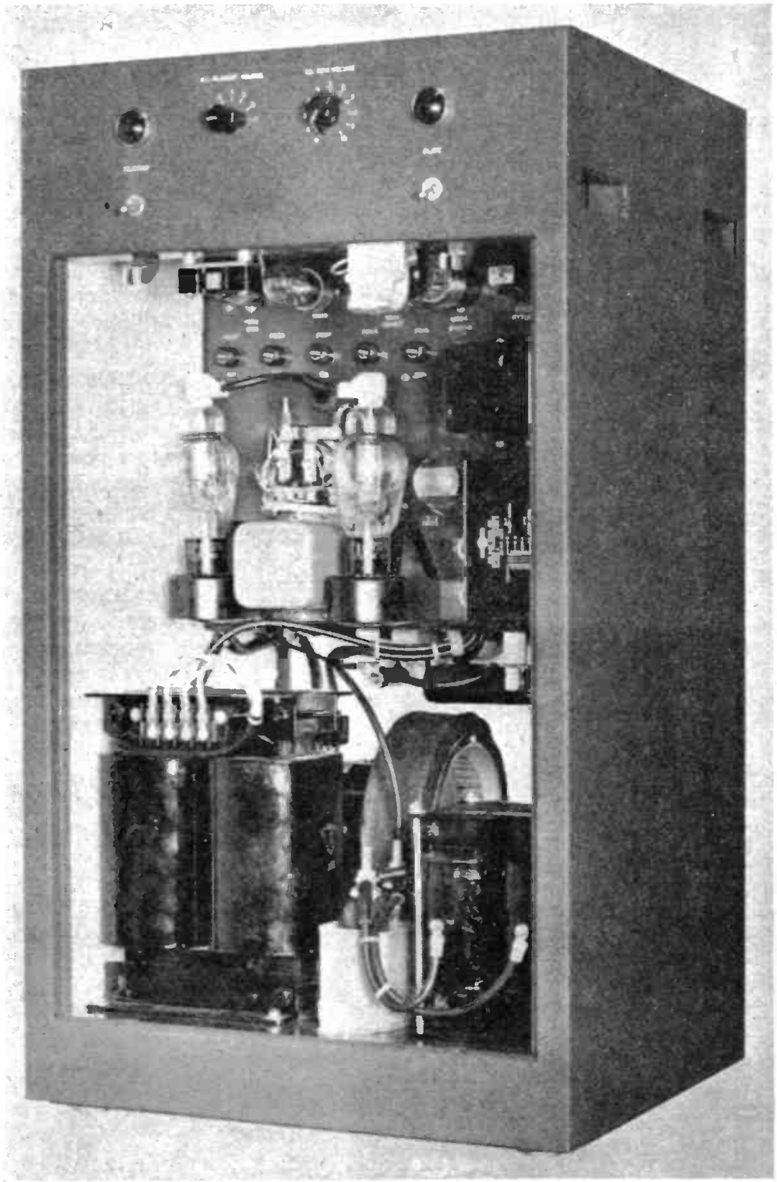
Very careful attenuation has been paid to the neutralisation requirements of the driver and PA stages and three separate bridge neutralising circuits are included. To clarify the complex make-up of the bridge arrangements Figs. 5, 6 and 7 show the breakdown of the capacity arms in the bridges.

Power Supplies and Control Circuits

The complete power supply cabinet is divided essentially into two sections; the low voltage supplies and the high voltage source. Both sections are conventional and are well fused to prevent damage by overload or component failure.

The low voltage section consists of four separate supplies: + 275 volts for the exciter, − 150 volts bias and blocking supply, + 350 volts regulated for the PA screens and 115 volts DC for the aerial and other external relays. A special screen protection circuit is included in the PA screen feed; this is a 2D21 thyratron which is held non-conducting by the PA bias supply. In the event of the bias supply failing or a short occurring in the PA valves, the thyratron fires and blows a protective fuse.

The high voltage section uses two 866A rectifier valves in a full-wave circuit; L and C values have been carefully selected to provide good regulation consistent with adequate smoothing. A thermal delay relay is connected in series with the primary circuit to prevent HT being applied to the rectifiers before the filaments have reached working temperature.



The power supply cabinet of the KWS-1, with the cover off. It is built as an entirely separate unit, considerably larger than the transmitter itself, the cable-forms supplied for inter-connection being of sucb a length that the two units can be installed separately if required.

Front Panel Layout and Controls

The front panel photograph shows the position of the various controls and meters. The VFO has the usual Collins double-scale; the top section, of the slide-rule type, is calibrated in 100 kc divisions and the lower circular scale can be read to better than 0·25 kc. A multi-range meter is located to the left of the tuning scale and this instrument can be switched to read PA filament and HT voltages, PA grid and screen current in addition to ALC level. A separate meter indicates PA anode current.

Of the remaining controls, some are conventional, but a few are definitely unusual. In the latter category are included the dial-drag, zero-set, VOX speech and ALC adjust. The dial-drag is a mechanical brake which holds the tuning control from moving when the side-band switch is operated. The slide-rule pointer can be accurately adjusted to the zero-point on the scale by means of the zero-set control. Although this control is included on the front-panel it is only used during the initial calibration adjustment and for very infrequent checks. The VOX speech control varies the gain of the voice operated circuit. A separate control mounted inside the cabinet is used to adjust the gain of the receiver mute circuit. The delay bias applied to the ALC rectifier is controlled by the ALC adjust knob.

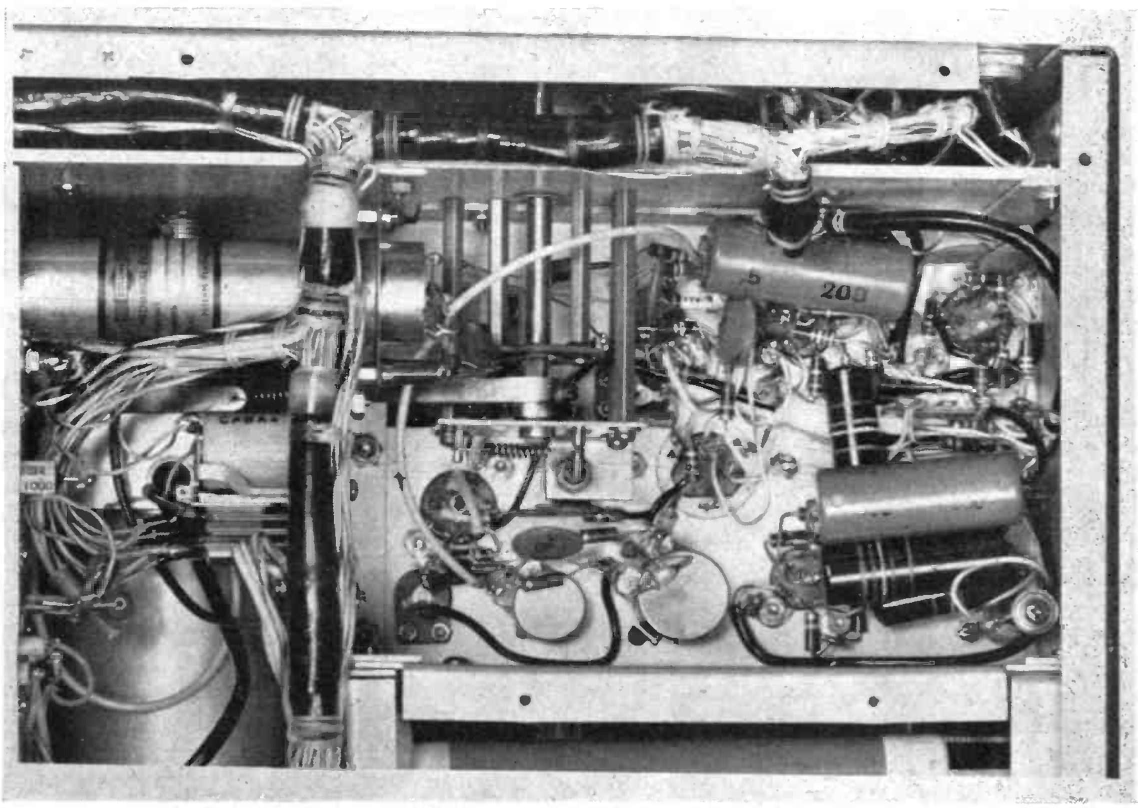
Netting facilities are included on the "Emission" switch and two calibrate positions allow talking-on-frequency, or provide a beat-note, depending on the position of the carrier level control.

The power-supply cabinet is relatively free of controls apart from filament and PA bias voltage adjustments and PA and HT switches.

Performance

Stability. This is outstanding; during a one-hour test run starting from cold, there was a total drift of but 320 c/s. Short term checks made when the transmitter was warm showed drifts too small to measure on a BC-221 frequency meter. It was, however, possible to make a series of separate tests on another KWS-1—which was itself checked against a Schomandl Frequency Standard and Decade Divider—and the ten-minute drift on the transmitter was found to be between 10 and 15 c/s depending on the band in use. As a mixer system is used the drift of the VFO is constant for all bands. The drift of the various crystals used for the injection to the second mixer does, however, vary from band to band and a maximum drift of 15 c/s was recorded on the 21 mc range.

SSB. On the reduced power model tested, the carrier suppression and unwanted sideband rejection were more than adequate, and checks made during on-the-air tests indicated that the suppression was better than 40 dB down. Not



In the KWS-1, the SSB mode can be selected simply by switching. This is an under-chassis view of the sideband generator section of the transmitter, with the mechanical filter at top left.

having access to a spectrum analyser, it was not possible to check the makers' claim of better than 50 dB suppression. The speech quality was excellent and the voice control circuits were positive in action, with no overhang or hesitation. Ample gain is available for low-level microphones and with the Acos Mic-22 crystal type used the gain control was barely open for full output. An alternative high-level input is also available, and this facility (although primarily intended for a phone-patch connection) is very useful for the input connection for an AF oscillator.

Amplitude Modulation. With the transmitter adjusted according to the instruction manual the speech quality appeared to be slightly " hard " and at first it was assumed that the amount of carrier insertion was not correct. Considerable juggling of the carrier-to-speech ratio did not materially improve the situation, and although all stations worked reported that the signal was clean and well modulated, several mentioned that the roughness was quite apparent. Checks made with other users of the KWS-1 have confirmed that they have had similar reports and have not been able to find the correct adjustments for high quality speech.

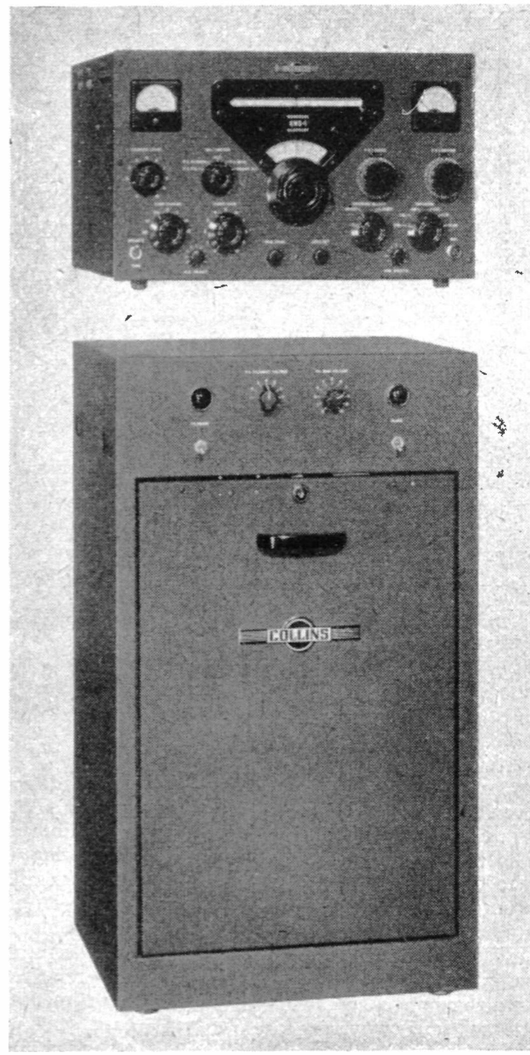
It should be mentioned that this trouble is not confined only to the KWS-1 transmitter, as in general all SSB equipment of the filter and phasing types exhibit similar degradation of the AM speech quality when full carrier is inserted.

The SSB-with-carrier type signal is fully compatible with normal AM and, apart from the slight distortion of the speech quality, it is difficult to tell the difference when listening on a normally adjusted receiver.

CW. It was only possible to make a short air test with the transmitter set in the CW position. Reports were excellent and these were later confirmed when a very careful check was made with the transmitter operating into a dummy load. As to be expected with the two-stage grid-blocked keying circuit, the signal was click-free and the keying characteristic firm and positive with no chirp or tail.

With the transmitter used in conjunction with the 75A-4 receiver it did not appear possible to be able to work full break-in and although the instruction manual was consulted no reference to this method of operation is included. On CW the receiver is fully muted in the " transmit " position and it is necessary to use a separate keying monitor.

The transmitter is a very fine example of modern electronics technique combined with first-class engineering design. It was designed by amateurs for amateur use and no effort has been spared to make the KWS-1 a really flexible unit which is a joy to operate.



The Collins KWS-1 assembly complete, the large cabinet being the power supply unit. The transmitter can either be mounted on the power cabinet, or separately. An interior view of the power supply is shown in another photograph.

The cost in the U.K. is approximately £940 and Collins (England), Ltd., have asked us to make it clear that under the present import restriction they are not able to accept orders unless payment can be made in dollars.

We should like to thank Collins (England), Ltd., for their co-operation in preparing this Report. We have also to thank many amateurs who co-operated during the " on-the-air " tests.

DX COMMENTARY

HB1CM/HE

CALLS HEARD, WORKED and QSL'd

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

It has been another lively month, with a bad patch during mid-April. But this patch seemed to apply only to certain times of day, so that although DX was far below standard in the mornings and afternoons, during the fruitful 1800-2100 period it was as plentiful as ever.

To sum up the bands as briefly as possible, one might say that One-Sixty has been dull, and activity low; Eighty has carried, as ever, the bulk of the local phone traffic and quite a little CW, mostly around Europe; Forty has yielded a few plums to those who persevere with it; Twenty has been the main DX band; Fifteen has been lively but not so good for "rare ones"; and Ten has been a paradise for phone enthusiasts who don't mind working the same countries over and over again.

The preceding paragraph does not do justice to all that has been going on, but at least it is not an unfair summary of the situation. At the time of writing the "dull patch" seems to be moving away, and DX of all kinds becoming more abundant.

The reaction to last month's method of presentation has been favourable, with hardly one dissident voice raised, and so we will continue to comment on the DX in general, without segregating the main DX bands. The vast majority of our correspondents seem to work Ten-Fifteen-Twenty—not in equal proportions, but using each band for part of the time, or for the kind of work that they feel like tackling at any particular moment.

High Scoring

The entrants for the 1957 WAZ Marathon have been climbing their ladder very fast, and we now have G5BZ and G3FKM at the top, both with 39 Zones and wondering where the Fortieth is to come from. (Perhaps the fabulous Tannu-Tuva expedition will settle the problem for them!).

It seems that 36 and 35 Zones are relatively easy targets, and after that the going gets rather hard. All the same, we shall be surprised if the top ten, by the end of the year, do not all chalk up 39. There *may* be a 40 or two, depending not so much on the efforts of the 'chasers as on the possible activity from Zone 23—which has been the tough one ever since this Zone business started.

Around the DX Bands

G2DC (Bulford) reports once more for *six* bands. *Eighty* was disappointing except for all W's less 6 and 7, but plus VE8OW; *Forty* yielded UF, UG, UH, UI and UAØ. *Twenty* still makes it worth while to switch on at any time and have a listen round. Far East and Oceania have been plentiful, and the month's log shows KR6's, BV1US, VQ6LQ, PZ1AP, UH8AB, UA1KAE, and all VK and ZL districts.

Fifteen was patchy, but G2DC found XE1A, running a full gallon and sounding like a local, with KH6AYG and VS6DN also putting in good signals. Interesting QSO's were made with W6VX on his portable and W2FPM in his car. *Ten* was best between 1000 and 1300 for good DX before hordes of W's descended on the band. VK's were two a penny, Middle East good, and VS1, VS6, VS9, VU, AP, 4S7, JA, UI8, UH8 and VP8 were worked thereon.

G2DC tells us that he has now retired from the Service and that his next move will not be overseas, but to a new QTH near Ringwood, Hants—selected with DX work in view! So, when the initial spade-work (literally!) is over we look forward to hearing a lot from the new G2DC.

G3DNR (Broadstairs) worked ZD3BFC on *Ten* phone, with W7, 8 and 9 on the key; *Fifteen* brought him VE8, ZC4, UB, UC, ZL and YI on CW for new ones, and VK, ZL and VP6 on phone—also new. All this lot with a vertical dipole. This reminds one to say that verticals are good for DX and always an answer if you have only a small garden space. A single 33ft. vertical wire can bring you the world on three bands, if not four—*see* the article in the January, 1957 issue of SHORT WAVE MAGAZINE.

G3ABG (Cannock) found ZP5KQ, OA4ED and MP4KAC for new ones on *Ten* phone, and also worked CT3AI, SV1AE, OQ5, EA8, VQ2, YV, CR7, ZD4 and many others, including over 500 W's in all States except Nevada and North Dakota. G3FYR/VS9 was a new one on *Ten* CW. *Twenty* CW gave him LA8FZ/P on Hopen Island, Svalbard—a nice one for the chasers. G3ABG was called by TI2WS/MM on Forty, but was in a local contest and could not reply. (Incidentally, G3ABG gives us advance notice that the Fifth Midlands "Topsfest," open to all amateurs and SWL's, will be held on Sunday, August 25 at The Swan, Lichfield.)

G3JZK (Cambridge) raised YN1AA, XE1PJ, VP9BO, YI3AA and 3W8AA on *Fifteen* CW, but missed VS4JT on phone. On *Ten* he collected PJ2AW, ZD2WAF and VS2DB on phone, missing HP1LB, CR9AL, JZØPC and sundry EA8's—also ET2RH on CW. G3JZK asks "Why can't we have some CW on Ten?" and no one seems to know the answer. He finds the band very selective in propagation at times, even to hearing only certain States on certain days. And, of course, when the U.S.A. band is practically dead, Central and South Americans are generally OK. On Twenty G3JZK just can't get out, but his exploits on Forty are mentioned elsewhere.

G2YS (Filey) reports only on gotaways — FL8AB, VP8BO, VP2LH and FG7XE, all on the same frequency on *Twenty*! G3HQX (Mitcham) is trying a "ZL Special" for *Ten*, and though it is only 18 feet up, it is working well; new ones were CN2, CR 6 and 7, EA8, VQ2, VS 1, 2 and 6, ZD 3, 4 and 6, ZL, ZS and 5A. New on *Twenty* were CT2, KP4 and PZ1.

GM3EOJ (Aberdeen) thought conditions badly down compared with last mouth, and raised nothing on *Ten* except W and VE. On *Twenty* he worked VK, ZL, JA and other Far East stations including VS2FN, also such countries as CR6 and 7, VQ2, 3 and 4; but the only new one was I5MAR.

DX Mobile

G5CP/M has been getting around with a new rig—a Geloso VFO, an 807 PA and a pair of 6L6's in the modulator. Using a quarter-wave whip on *Ten* and *Fifteen*, he has worked phone with all W districts, VE, VO, VQ2 and 5, CR9, 4S7, 4X4, PY, ZB1 and many Europeans. A loaded whip on Forty is also getting out well. Best contact to date was with W3CT/M, twelve miles east of Washington, D.C., G5CP/M being four miles south of Chesterfield. Mobile work of this quality is quite outstanding. A special certificate to mark this particular mobile-to-mobile contact has been produced and sent to W3CT. G5CP now wants only a VK or ZL for his WAC-Mobile!

G3BDQ (St. Leonards) had a good bag, mostly on *Twenty*, which included VP8BW and 8CI, KR6's, UL7, UI8, UH8, UO5, UAØ (Mongolia), UPOL4, ZA3AC (?), FL8AB, FD8AH, VS9AG, ZS2MI, 3W8AA, CT3, ET2 and KZ5. All these were CW, mostly between 1800 and 2000 GMT. On *Fifteen* he raised FB8ZZ and a UO5, also CW, while *Ten* phone brought in ZD6RM, CN8, 5A4, VQ4, SV and ZS.

The only new one for G3JSN (Kenton) was CT1BT on *Fifteen* phone, with the usual six watts; he found HS1B (*see* later about *him*) causing a furore on the band but didn't get him. Now G3JSN is inactive for exams, but will resume the chase in the autumn.

G3GZJ (London, S.E.23) says "the VK and ZL boys have to be heard to be believed on *Ten* some mornings," and also finds that the W QRM is not quite so bad in the afternoons, and that more South Americans are appearing. *Fifteen* has been open after midnight and has fetched in OA6M, FF8, VQ5, CO, CX, 5A, UP, TA, VP6, KL7 and VE8. *Ten* yielded VQ2, ZC4, CR9, CX and "the usual." (DX on *Forty* under separate heading).

G3BHW (Margate) has made 38 Zones and has found *Twenty* the best and most reliable band. It brought him 3W8AA, M1B, YI, VS9AG, UH8, UA9, UI8 and UAØ. *Ten* phone was responsible for two new ones—VP5DS (Turks Is.) and YN1HF, as well as HC1FS, CO8JK, CR4AP, VP9, HP1, OA and VS1. CW was

". . . . Judging by your signal you must be getting close now . . . ."

rewarded with PJ2ME. *Fifteen* phone accounted for FB8ZZ, ZC6UNJ and HS1B (all new), also VP4TO, VK9AT, 9HO and 9DB, 4S7, VP6 and KZ5. CW was lucky again, with VK9AJ (Cocos Keeling) and VQ6, JZØ, XE, YI, UF6, UJ8, UA9, VU and JA.

Old—but not Dead!

A correspondent from GM-land has been off the air for years but is now staging a come-back. He was afraid that his old set-up, consisting of CO-FD into push-pull PA with link coupling, will no longer be considered fit to release on the bands, since the mode now seems to be table-top transmitters, pi-coupled output and PA's in parallel. We have explained to him that it is the *quality* of the signal that counts; and one feels like adding that a good many of the best signals that one hears still come from "obsolete" rigs reposing in racks. If you watch the operating carefully you will note that some of them don't even use VFO's, but make intelligent use of three or four crystals in different parts of the band. TVI is, of course, a separate problem and does not apply to everyone—yet!

G3DO (Sutton Coldfield) managed to find two all-time new ones in 3W8AA (*Twenty* CW) and FU8AD (*Fifteen* phone). The latter had in his shack, at the time, FU8AC, YJ1DL and FK8AO! FW8AA has been chased without avail; he comes up on *Twenty* CW around 0800. Other good ones for G3DO were VK9HO, VK9AJ and UQ2AN on *Fifteen* phone, VP5DS on *Twenty* phone and YV5AB on *Ten* phone, together with HR1CB, TI2CHV, HC2KU, TG9MB and ZD6JL.

G3GGS (Preston) has been distracted from DX by a two-metre converter, but he collected two new ones on *Ten* phone—CR4AN and VP5DS. *Twenty* CW brought in FF8, CT2 and ZP, new for this year. He remarks that when the UA's first started working us again, QSL's flowed freely, but nowadays there seem to be none at all. G3GGS suggests that we should publish "power and aerial" *gen.* for all our regular correspondents and starts the ball rolling with "100 watts and 68 feet, north-south, off-centre fed. all bands."

G5BZ (Croydon) is always "busy with other things," but nevertheless has managed to hit that figure of 39 Zones. *Ten* gave him OA4BP, KG6, UAØSK, 3W8AA, VP5DS and the usual ZL, ZS and so on. *Fifteen* was even better with JA. KH6, VP8BS and 8CO (Graham Land), VP8BO (Shackleton), VK9AJ, 3W8AA, VS1 and 6, OD5LX and HC1LE. *Twenty* provided VKØAB, UAØKKB, JA's, UI8, 4S7, FG7, 3W8AA, CE, YV, FL8AB and many others. VP8AO asked G5BZ if he knew his uncle, who lives nearby, and the uncle turned out to be a customer of G5BZ's in the professional way!

First-Time Reporter

G3LKZ (Cleadon) writes his very first letter to the Commentary, and promises more. He has been on Twenty and Fifteen, mostly CW. *Twenty* gave up CE, ZC4, ZB1 and 2, KG1, JA, KL7, 3W8, OY and other new ones; *Fifteen* produced mostly W's, VE, VK, PY and VS6BE, who was using SSB. G3LKZ says he is quite new to the DX bands, so all the above was good stuff for him—and a good showing, too. So were the gotaways (wry smile!) who included FL8AB, YN1AA, FB8ZZ. VP8CC, KR6SC and UPOL6.

Far from his first report, but the first for some little time, comes from GM2DBX (Leven) who has unfortunately been on the sick list but is now on the way to recovery. We hope he will turn out as good as new, and look forward to more lists of DX from him. (Incidentally, that's a disadvantage of having one's rig at the business QTH . . . home on sick leave, and no radio!).

G3FPQ (Bordon) stuck to *Ten* phone and pulled out CR4AP, CR9AK, DU6IV, JZØPC, KG6, KR6, VK9BW, VP5BH, YA1AA and YS2AG. Just for a change he migrated to *Eighty* CW and raised VP6GT—very nice.

G2BLA (Morden), gives his "vital statistics" as 150 watts, all CW, 122-ft. end-fed. With this on *Ten* he raised PY, W's, UA3, FF8AJ, OD5LX, and 4X4BX.

FIVE BAND DX TABLE
(POST-WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries	Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	808	109	166	224	165	144	236	G6VC	322	30	43	134	62	53	142
W8KIA	704	68	148	265	113	110	265	GM3EDU	310	44	60	115	51	40	137
G5BZ	695	64	118	239	161	113	245	G3GZJ	260	18	52	72	76	42	111
G3FXB	667	71	126	201	159	110	222	G3IGW	245	42	61	75	50	17	104
G3FPQ	609	65	86	187	158	113	205	G3JWZ	243	48	60	65	38	32	95
G2DC	595	70	92	193	117	123	205	GM3EFS	243	26	46	98	42	29	113
G3DO	578	24	46	220	137	151	240	G3JLB	240	40	41	62	52	45	101
W1VG	562	25	117	192	122	106	200	G3IUW	222	31	38	67	59	27	103
K2BZT	511	66	71	203	104	67	208	ZB1HKO	212	18	32	74	57	31	90
W6AM	502	30	58	271	86	57	271	G3JZK	194	15	44	38	69	28	100
G2YS	445	65	84	145	97	54	163	G3HQX	165	9	37	46	36	37	79
G3WL	414	38	73	136	94	73	163	G3DNR	160	10	21	69	31	29	84
G3ABG	411	45	83	159	67	57	171	G2BLA	139	17	38	39	37	8	64
GM2DBX (Phone)	411	34	31	158	97	91	172	GW3DNF	124	19	29	48	24	4	52
G3BHW	349	15	32	137	91	74	168	G8TJ	109	12	30	39	19	9	50
W6AM (Phone)	340	13	32	235	39	21	235	G3KKM	80	16	29	24	10	1	41
JA1CR	334	15	49	170	67	33	173	G3JSN	75	16	17	22	13	7	33
G2HPF	333	33	54	151	56	39	161	G3IDG	74	11	14	12	12	25	38

Fifteen gave him LZ, W's and VQ2, and *Twenty* CE3RE. On *Eighty* he collected SP3HD.

GM3EST (Motherwell) managed to raise this HS1B on *Fifteen* phone, also VK3AZY, who runs 12 watts and arrives at S9 plus; he missed out on TI9CR, and the following day heard from TI2RMA that the '9CR boys had broken down and had to return to Costa Rica after only two days instead of the intended fortnight! Recent nice ones have included ZK1BS, VR2BZ, LU3ZS, VK9's, 3W8, VP8CC, VP2 and OHØ.

GW3DNF (Chirk) has had gremlins in the rig, but raised YO for a new one on *Forty* and *Twenty;* CN8, UP and 5A on *Fifteen*, and UA3 and PY on *Ten*.

G6VC (Northfleet) stuck to *Ten* CW and chalked up VS9, 3W8, KG6, 5A, ZC4 and LA3YF/Y who gave his QTH as "Alta Arctic."

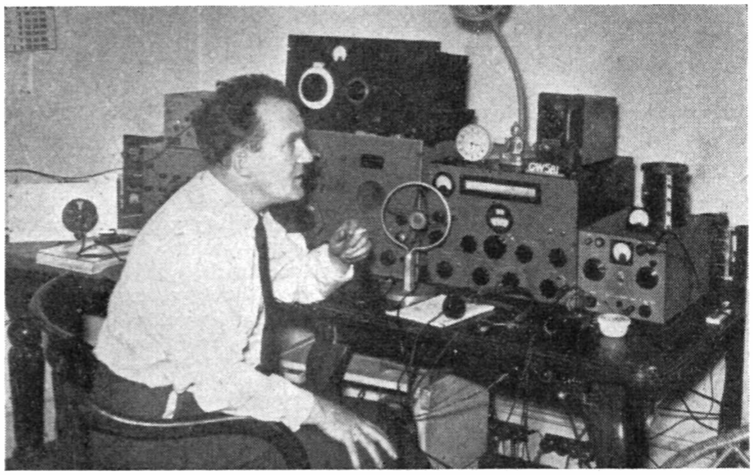
G3HCU (Chiddingfold) operated, as ever, on *Ten* and *Fifteen* phone only. New on *Ten* were YV5BX and KH6CM; on *Fifteen*, JZØ, HS1B, VP5EM, HP, VP7, TI, VP5DS and CR5SP.

Forty Metres

This small space is specially reserved for the undaunted few who continue resolutely to gather in the DX on Forty, and consistently send in their news of this very controversial band. G3BST (Bletchley) is a specialist on 7 mc, and he has collected 9S4DF, LU6DJX, 5A5TZ, ZC4JX, 4X4 and some W's; he had hoped to pick out some more during the WAE Contest, but a bad cold intervened. Russian jamming has not been so troublesome, he says.

G3JZK raised UQ2BA, ZA1AA (?), F9UC/FC, UA9RA and plenty of W, PY and VE; he missed YV5FL, VP6AG and CEØAC, all CW. All of this was between 2300 and 0200 GMT.

G2BLA worked PY, lots of Europeans including Trieste and YO, and W3BVN, who was using 750 watts to a 4-element fixed beam (589 both ways!). G3LNR started on the band some weeks back, with 10 watts, and raised a bunch of Europeans, but UM8KAA, CN8EW, PY, LU and W's got away.



Licensed "AA" in 1931 as 2ANN, the call became G5BI in 1932, and since 1937 has been GW5BI in Cardiff. Activity is on all bands 1.8 to 144 mc, the main transmitter being an 813 modulated by a pair of TZ40's. The receivers are a BC-1147A and a CR-100 with RF-24 HF band converter. The aerial array includes separate dipoles for each band 3.5, 14, 21 and 28 mc, that for 80 metres also being used as a long-wire on 7 mc and Top Band.

G3GZJ worked ZC4, 5A, EA8, PY, W, VE, TF, UQ, IS and Trieste, scoring near misses on an SU and OD5CA.

Top Band Topics

Correspondence on the Top Band is thinning out a lot, and there are so few changes in the Counties Worked Table that we are not showing it this month. G3JSN heard but missed EI8J and YU3EU (first YU heard on the band); he raised four new counties, though.

GM3KLW (East Lothian) undertakes to put this "rare county" on the map from May onwards. He has no experience of 160 metres, but is putting up a 132-ft. wire and building a rig, and intends to QSL all comers.

G3EJF and 3JZP (Tottington) have once more had to remove their long wire from the local pasture and are back on their 66-footer. They both raised GM3KHH/P in Banff for a new one.

G3LNR worked five new counties and a new country (GD), and also heard SP1KBK (589 at 2315 on March 18) and a bunch of OK's.

G2CZU (Bath) is another who worked GM3KHH/P, who apparently made 59 contacts and caught a whale of a cold! G2CZU has heard and called YU, but no joy.

On the DX side, W1BB and ZB1HKO made it at last, on February 27. It seems to have been touch and go, but a QSO *was* made, and another "first" chalked up to W1BB.

Not wishing to rest on his many laurels, Stew collected yet *another* "first" by working TG9AD. This one would make quite a story on its own merits, because, owing to wind damage, the operators at *both* ends of this QSO were on their roofs in pyjamas and slippers, chasing gremlins very early on the same morning! W1BB heard W6KIP on February 23, but the scheduled test on February 24 was a complete washout, with WWV sending "W2" and not even the commercial "markers" audible.

SWL Corner

P. Day (Sheffield) sends a very useful log in which the high-spots are VS4JT, VK9DB and other Far East stations on *Fifteen* phone, with UJ8AF on CW; much good DX on *Twenty*, a lot of which, he says, is now using SSB (including ZD4BF, W4LIB/FQ8 and some KC4's). On March 23 at 0700 GMT he heard "hundreds" of W6's on *Twenty* phone at over S9, together with VK, ZL and HC1FGX.

[over

E. N. Cheadle (Mill Hill) bagged ZD8SC, VP5DS and ZP5ET on *Ten*. He finds this band falling off, though it is best in the late afternoon. Best on *Twenty* were HI8BE and W4OQA/VS4; notable on SSB were BV1US, HB1FU/HE, OA4CK, KG1FR and HZ1AB. E.N.C. has passed the exam. and hopes to have a call soon, so we shall hear more of him.

H. Lawson (Hull) heard VEØND telling an HB that his was the only VEØ call, issued to the Canadian Navy and the property of the carrier *Magnificent*, on which he is serving; the ship was off the coast of Portugal at the time. This seems to tie up with what we have heard about this mysterious VEØ, who certainly appears genuine.

V. Kelly (Betws-y-Coed) reports terrific signals from HS1B (*Fifteen* phone with pile-up). He was heard as late as 2140 GMT, and his QTH is given as Box 1038, Bangkok.

W A Z MARATHON, 1957

All Bands

Station	Zones	Countries
G5BZ	39	128
G3FKM	39	109
G3BHW	38	110
G3HLY	36	109
G3BDQ	36	106
G3HCU	36	98
G2DC	35	102
G3FXB	35	78
G3DO	33	106
GM3EOJ	33	93
G2HPF	32	65
G3GGS	31	83
G3JKF	28	55
G3HQX	25	61
G3DNR	24	52
GM3BCL	22	37
ZL3CP	22	34
GM2DBX (Phone)	21	52
G3JWZ	19	48
GM3EFS	19	33
G2BLA	18	44
ZB1BF	18	39
G5FA	17	45
G8TF	16	40
G3INR	10	10
G3KMA	5	16

News from Overseas

VQ6AB (Hargeisa) tells us that he has been receiving cards for 21 mc, on which band he has never operated, and that VQ6LQ has also been getting them for the period when he was in the U.K. So some clever pirate has been fastening on VQ6 for his somewhat pointless activities. VQ6AB will not be on again until July or August, and then only on 7 and 14 mc.

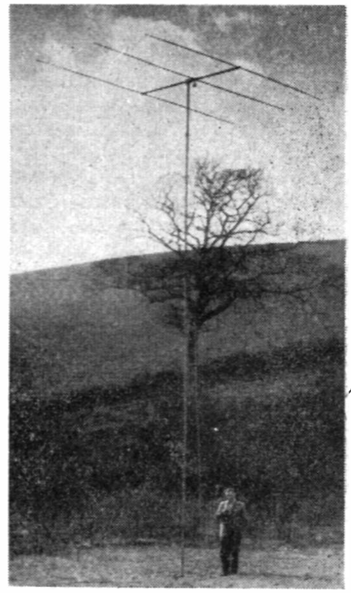
ZS2AT (East London) is puzzled by the fact that many DX stations seem incapable of hearing anything but W's. (The obvious explanation is that W's are most numerous and have, on the average, the best signals!) But he rightly adds that if the DX stations would use the QLM or QML procedure, they would be able to spread replies out a little, to their own advantage as well as everyone else's.

4S7GE (Trincomalee) is now G3JTG, and says that his return to U.K. has ended all activity from Northern Ceylon. Anyone requiring a card should drop him a note c/o 6 Manor Close, Southwick, Sussex.

GM2CAS writes from Turkey, and tells us that any operation from out there is quite illegal. TA3AA in Ankara was apparently closed down because of stupidity on the part of one of the operators, and TA3US is now the only station that is ever on at all. GM2CAS would like to know any details of TA1FA, reported a little while back as having been worked by G8TJ.

WØFWW (Lincoln, Neb.) wants reports on his Twenty CW, with a new rig running 800 watts and a rotary. Times 1200-1400 GMT. Please look out for him, and SWL's send QSL's direct to Lew Cook, 2111 K Street.

GW3KWY is one of the club members who operate VS1GL, and says that they find us a pleasant link with home; he and G3KXN are interested in going SSB, and that will be their next job after their multi-band 150-watt transmitter is complete. VS1GL is active most evenings, and operates at week-ends from 1030 till 2330 GMT. DX out there is "quite reasonable," but the bands are only open about half as long as they are at home. Good ones recently worked include ZK2AB (14040), DU1CP (14022), VQ6LQ (14050) and also VR2's and KG6's.



Against the Westmorland sky, the 10-metre beam at G6VQ, Kendal, makes a fine picture—it works the DX, too.

VQ4AA arrived home recently, on leave until September; he confirms the news that VQ4RF has packed up all his gear and gone in for Hi-Fi. Apparently conditions are now much too good for Frank, and he looks forward to resuming DX work when they deteriorate again!! VQ4RF likes his DX the hard way! VQ4DN and 4GW, both of Nakuru, have taken his place on the DX bands. Duncan Fletcher, VQ4GDF, is mourned as a Silent Key, having died in a London hospital only a few days after flying home for a medical check-up. VQ4VL has become VE7VL and will be working CW only for the next six months. He has offered a reward of six dollars, to buy American equipment, to the first VQ4 station to work him.

VK3CX (Canterbury) has run his score up to 229, with 206 confirmed, and now has a Geloso VFO driving parallel 6146's, all bands, with a long wire. He tells us that CEØAC is active again.

that FW8AB is alleged to be on, and that ZC3AA was worked recently. ZL5AA is active on Twenty CW. VK3CX is busily hunting ZD3, ZD8, ZD9 and EL, all of which have been heard by locals when he wasn't on to work them.

The HS Situation

We are reliably informed—by a reader of "DX Commentary" who was actually in Bangkok barely three weeks before this is being written—that unless HS1B was licensed after the departure of our informant (which is most unlikely) he is probably spurious. The facts are that there are now only two licensed HS stations—HS1A, who is a Siamese national, and HS1MQ, who is LU8BF, at their embassy, and interested only in working the Argentine; in fact, HS1MQ made it quite clear that he did not want to be bothered with calls from U.K. stations!

In Bangkok a month or so ago, nothing was known, officially or unofficially, of HS1B. Of course, it could be that he is a "genuine under cover" station, in which case it will be interesting to see if anything comes out of Box 1038, Bangkok, the QSL address given by this HS1B. But if he is heard or worked on any band at a time when Far East signals are not normally coming through on that band, it will be proof enough that he is neither legal nor genuine.

DX Strays

TI9CR (Cocos Is.) caused quite a stir in early April. He seemed to be operating all bands, phone and CW, with TI2LA and TI2MCH as operators. TI9CR/MM was also heard during the "to and from" period. Thanks to G6UT and many others for notes and QSP's on this subject. (We found him roaring in on about 14070 kc one morning around 0900, before we had even thought of looking seriously for him.)

VP8AO (Shackleton Base) runs 300 watts to a rhombic aimed at the U.K.. and has been running skeds with G3ISV, among others, at 2000 GMT or thereabouts.

W2SAW (Webster, N.Y.) collects his FBA and shows a list of 38 countries worked on four bands to make sure of it. One of them is TI9, represented by TI9MHB on all bands from Fifteen to Eighty . . .

ZL3CP joins our 1957 Marathon, having raised 22Z and 34C on Twenty despite being temporarily rock-bound. He is trying out a folded ground-plane, made of 300-ohm ribbon, and thinks it works quite well. (Wet weather ditches it, though.)

GW5TJ (Merthyr Tydfil) has worked G5RV as VP5RV, VP6RV and VP7RV, and passes on the 'RV 73 to all G's. He will soon be on from Trinidad as a VP4, and we are also warned to look out for G5RV/PJ2. (QSL's and letters to VP6RV, Box 3443, Caracas, Venezuela.) GW5TJ remarks that G5RV will have quite a tale to tell on his return, and adds that he himself has had a wonderful holiday trip all over W-land, with the usual proverbial hospitality from everybody—an amateur's dream come true.

G2NS confirms that HB portables in Liechtenstein use the suffix /FL and should not be confused with the FL8 prefix.

Operating Notes

One of the sad things about Amateur Radio is that the primitive few can make it so difficult for the civilised majority. A few examples, heard on the bands this month, will illustrate:

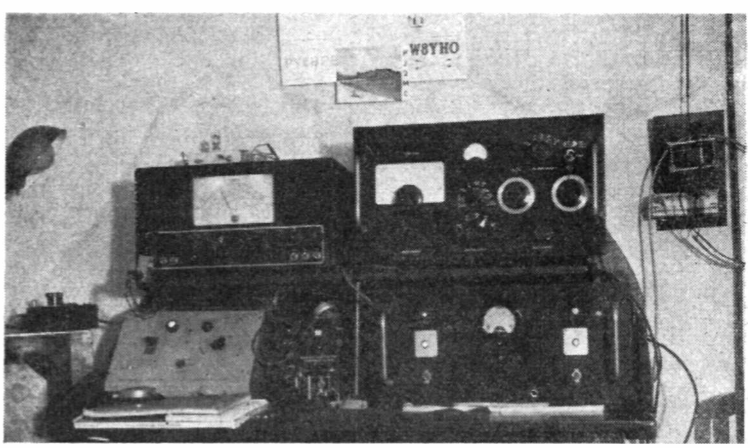
VK7UW was having a normal QSO with someone and simply sent "K" at the end of an over; whereat two very loud and raucous chirpers started up, bang on his frequency, one calling "VK7UJ" (an OK) and the other "VK7UAM" (a YU). All the time the station he was working was 10 kc away, continuing the QSO, and we feel that VK7UW didn't even notice these sad manifestations.

On the very same day we heard an EA working a UA1; both had notes that you might call "T5 chirpy" if you were feeling generous—but each passed a T9 report to the other one.

The next day TI9CR showed up, and two Europeans of the usual T5 variety called him without fail—every time he was sending. It so happened that when he was listening to the other end of his QSO, they were always silent. In other words, they simply couldn't hear him, but having heard his call-sign used by another calling station they simply had to stay on the frequency and generally foul the nest. (Incidentally, one of them was calling "TI9RC," all the time.)

Shortest QSO

Last month we asked "When is a QSO a QSO?" G3COI (Wolverhampton) gives a clear answer. He was calling VP8BO, along with a



G3DPW at South Croydon, Surrey runs an Eddystone S.640 with a 14-21-28 mc 12AT7 pre-selector, the transmitter being a parallel 807 arrangement, modulated by 807's in Class-AB2. Wide-band couplers, as described in the June 1953 issue of "Short Wave Magazine," are used very successfully in the transmitter, which covers the five bands 3.5 to 28 mc. Main interest is in 21 mc DX, using a ground-plane aerial, as outside space is limited to a 67-ft. wire. A Top Band transmitter is also available for keeping in touch with the local net. DX is worked as opportunity offers, but all contacts made are of equal interest at G3DPW.

few hundred others, of whom one of the loudest was FA9VN. As G3COI finished his second call, the FA made one "dit," to which G3COI made a similar "dit." "In that brief exchange went years of fellow-feeling and frustration, and it has more claim to be called a QSO than a hundred of the so-called rubber-stamp efforts . . . I have spent a total of six man-hours trying to snag VP8BO, and it is becoming an obsession." But at least G3COI and FA9VN can claim the shortest QSO on record, for we honestly don't see how a shorter one could be achieved.

GM3EST rightly waxes hot under the collar about the "new technique" of breaking in on a QSO. Pet aversions include (*a*) Bursting in on a DX station before he has signed; (*b*) Ignoring a DX station's specific call to someone else, so that those who (rightly) leave him alone are infuriated to hear him come back to someone who hogged the call while they were behaving themselves; (*c*) Pinching of a DX station, from those who would really like him, by some high-scorer who has already worked the country, possibly many times.

GM3EST truly says that much of what passes as "hot DX technique" is nothing but ordinary bad manners. The thicker the chap's skin, the more he can get away with, although of course the DX station always holds the whip hand, and if he operated intelligently he could put a stop to all these practices. Meanwhile, GM3EST is not the only one who says he would willingly go back to the "bad" conditions of five years ago, when you could take some time off the air secure in the knowledge that your DX rival wasn't raking in new ones while you were not on!

DX Shorts

FW8AA will be on at 0800 GMT "when conditions are right" . . . C3MH works with 10 watts, around 14110 kc; says he is the only Chinese amateur on the air . . . **Ghana** counts as a new country, as from March 4 . . . 9S4 becomes DL8, but we don't know about its status . . . A DXpedition to ZA-land is promised for August —eight days of operation, all bands, good equipment. We still don't know whether there has *ever* been a genuine ZA, despite cards purporting to come from Albania.

W4DQA/KS4 is now said to be active from Swan Island . . . ZD9AF is definitely a pirate . . . ZC5RF is on 14150 kc phone . . . FB8BX/NB is on Nossi Bè Island; not a country, but counts for DUF . . . VU5AB was on recently, supposedly from Nicobar Island; he worked W6's on 14028 CW . . . Station signing HS1WR is on CW, around 14100 kc (1600 GMT) . . . ZC5AL and ZC5DA are both active on CW . . . ZD4CB (Ghana) is on 14050 kc phone (0700).

HB9MX and HB9UE will be on from Liechtenstein this summer, phone and CW, Ten-Fifteen-Twenty . . . G3FYW/VS9 has now joined VS9AG on Twenty and Ten CW.

VK/ZL Contest

This year's VK/ZL Contest will run more or less as usual except for a change in the scoring system. Overseas stations will now claim 5 points per contact, plus a bonus of 50 points for the first contact with each VK or ZL call area or each band. Serial numbers may begin anywhere between 001 and 100.

Phone Section: 1000 GMT, October 5 to 1000 GMT, October 6.

CW Section: 1000 GMT, October 12 to 1000 GMT, October 13.

Only CW-CW and Phone-Phone contacts count; one operator only (if there are two, they must enter separate logs); all amateur bands, with one contact per station per band.

Entries to Federal Contest Committee, W.I.A., Box 1234 K, G.P.O., Adelaide, and postmarked not later than October 31. Logs should maintain continuity of serial numbers and not be divided into bands. Columns must show Date, Band, Time (GMT), Station Worked, Serial Sent, Serial Received, Points Claim, Bonus Points, and an extra blank column.

And so we come to the end of another full month of DX. Please keep up the good work and let us have all your reports by the next deadline, **first post on Friday, May 17.** (Overseas readers note that the following one is *June 14.*) Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And until next time, Good Hunting, 73 and —BCNU.

PANDA LONDON OFFICE

We are informed that the full range of Panda equipment can now be viewed at their new London showroom and office at Autavia House, Redcliffe Gardens, Kensington, S.W.10 (*FLAxman 0906*), where G3LND is in charge. We understand also that demonstrations can be given, and that supplies of all Panda apparatus are available from stock.

R.E.C.M.F.'s NEW CHAIRMAN

For many years a member of the council of the Radio and Electronic Component Manufacturers' Federation, and a familiar figure at radio trade shows and exhibitions, Mr. Richard Arbib has been elected chairman of the R.E.C.M.F. for the ensuing year, in succession to Mr. C. M. Benham (G4TZ). During the past 20 years Mr. Arbib has been largely responsible for the development of the world-wide business of Multicore Solders, of which he is chairman and managing director.

NEW SUNSPOT THEORY

According to the TIMES of March 6, the French radio-astronomic observatory at Nancay (Sologne) claims that researches made there show that sunspots which cause magnetic storms do not occur on the surface of the sun itself, but in the solar surround, a vast gaseous mass of which the sun is the central element. The important point made by M. Danjon, director of the observatory, is that magnetic storm intensity bears no relation to the size of sunspots observed. Getting down to our level, so to speak, this means that "bad" and "good" conditions can develop without reference to the sunspot count—the interesting thing is that this is just what does happen.

AUDIO MIXER AND CONTROL UNIT

THE "MULE" AND ITS USES

B. WARDMAN (G5GQ)

HERE is a little general purpose unit, made from the odds and ends lying idle in the average junk-box, which can make audio equipment (including modulating gear, radio, TV, and tape recorders) far more flexible and useful. Since it can be described as a "Mixer Unit, volume LEvel indicator," it could be called the "Mule," because it will also do a variety of otherwise tedious jobs! Instead of having to make up special connector cables for each audio purpose, and insert different matching transformers, all one does is flick over the requisite switch.

What It Can Do

For instance, it connects the low impedance output of a tape recorder to external low impedance speakers. Of course, one could do it by just plugging in and out as required (provided music and not live speech is being recorded). However, with the mike on, nine times out of ten the operator forgets to pull out the external speaker plug, with the result that a horrible feed-back howl occurs. So a switch from "Reproduce" to "Record" is better. And there is a further point: external speakers do not mean special additional speakers, but include the hi-fi speakers used in the domestic radio and TV equipment. All such speakers can be paralleled on a low impedance external line. (After all, why have those speakers idle just because their particular audio side is not in use just at the moment?)

In other words, by means of a simple low impedance bell line run around the skirting board, a double operation is possible, in that a programme either on radio or TV can be recorded instantly without any juggling with connectors. Even if the recorder is some distance away (maybe in the shack at the end of the garden), this cheap low-impedance line presents no difficulties.

There is one slight complication: the input of most recorders is designed for high impedance feed. So a step-up transformer has to be inserted. Immediately this opens up fresh possibilities, since, with *two* impedance circuits, they can be used for two inputs, one low and the other high impedance. A "fader" (centre-tapped potentiometer) is inserted so that the modulator or recorder can fade-out on the low-impedance output, *e.g.* radio over to the high impedance input, such as from a microphone pre-amplifier. This facility can be used for dubbing in such things as announcements when recording, or fading out the speech on the transmitter to play back a recording.

Having gone so far with the design, it is useful to incorporate a simple bass and/or top cut. For example, most amateurs regard the microphone as a close-talk device, having their lips but inches away. If, instead, the microphone is used at, say, six to eight feet (especially in a normal type of room), then all sorts of echo and absorption effects come into play, and the speech can appear to descend as much as two octaves. Switching over to bass cut will work wonders.

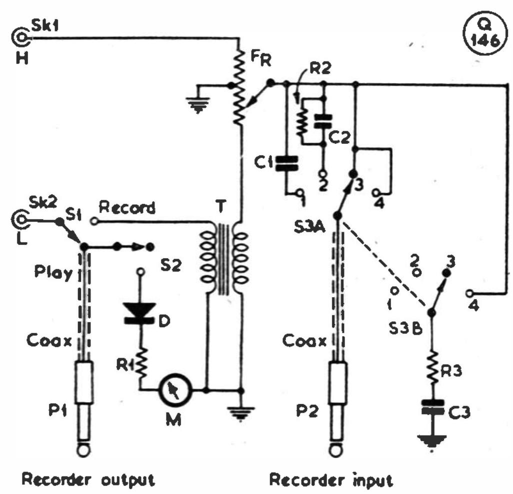
For modulation purposes, these "cuts" can help working DX, because a large proportion of fading at DX is "selective," *i.e.* over part of the transmission only. Thus it may be that either the top or the bass is being cut up by fading, and removing that part of the speech for the moment can improve readability enormously.

On radio, the hi-fi FM transmissions are given a 75 micro-second pre-emphasis at the transmitting end to make them, simply speaking, fill out the carrier space more efficiently. The receiver should have a similar de-emphasis unit to restore the balance. This

Table of Values

Audio Control Unit — The "Mule"

C1	= .001 µF. 350v. wkng.	D	= Westinghouse KG1
C2, C3	= .0003 µF 350v. wkng.	M	= Level indicating meter (*see text*)
R1	= 100 to 2,000 ohms (*see text*)		
R2, R3	= .025 megohm, ¼-w.	Sk1	
S1	= Single-pole toggle.	Sk2	= Coax sockets, high and low impedance inputs
S2	= Meter on-off toggle		
S3A, S3B	= Two-pole 4-position tone selection	Fr	= Fader, 1 megohm centre tapped potentiometer
T	= Pentode to low-impedance speaker xformer	P1, P2	= Standard phone plugs



Sockets Sk1, Sk2 take inputs at either high or low impedance, from any usual audio source. Plug up as shown for Recorder use; then with S1 at "record" any audio signal fed to Sk1 (high impedance) or Sk2 (low impedance) can be recorded, being fed into the recorder input via the fader Fr, the tone selector switch S3 and plug P2. With S1 at "play," the Sk2 line is disconnected from the recorder input side and transferred to the output, giving play-back into external speakers that may be connected across the Sk2 line. S2 brings in the volume level meter (see text). The tone correction given by the S3 switching is: Pos.1, .001 µF bass cut; pos. 2,75 micro-sec. pre-emphasis; pos.3, no correction; pos.4, 75 micro-sec. de-emphasis.

can be put into the unit.

Some recorders have a magic-eye volume level indicator, whilst others have nothing. In any event, a meter to give comparative readings is always useful, and so one is incorporated in the design; it can be used on any low-impedance line where there is between ½ and 1 watt of audio. In this unit, the volume level indicating meter is switched in or out at will, and can either read the input to the recorder head or the output which the instrument is pushing back into the line — watch that, and there will be no more yelling that " it's turned up too loud " from the receiving end of the line.

Construction

The complete circuit incorporating these ideas is shown in the diagram. It is built in a standard type of chassis, 8 x 6 inches, by 2½ to 3 inches deep; the depth depends upon the size of the transformer available.

The actual switches used for S1 and S2 can be the toggle, bakelite ex-Service sort having four poles, the two at the top or the two at the bottom being connected together as the toggle is moved. The selector switch S3 for tone correction, having four positions, is of the standard rotary type.

The transformer is a standard pentode output/speaker component, with the pentode side used as secondary.

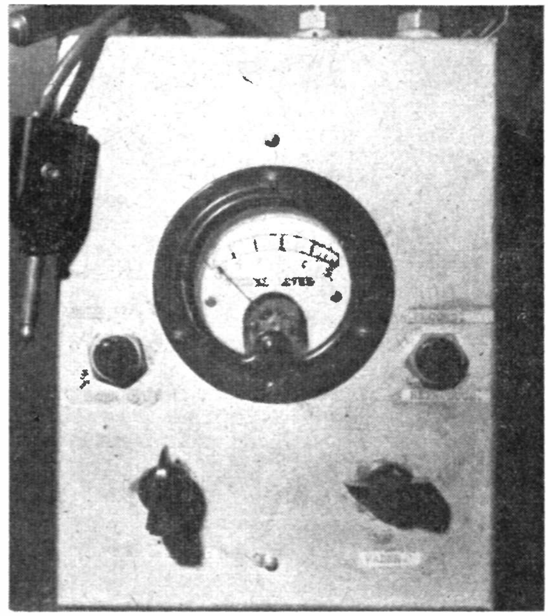
Volume Level Meter

This can be contrived from any milliameter having a full-scale deflection of between 1 and 2.5 mA. In the writer's case, a burned-out thermo-ammeter was used, because this consists of a thermo-couple, the DC current of which is read by the incorporated milliameter. When the thermo-couple blows, the DC milliameter provides a spare movement usually just right for jobs like this.

There are few junk-cupboards which don't contain one of these blown units, so this is the way to reclaim one. (The same process can be followed to modify any sort of standard m/c meter, incidentally.) Take the meter out of its case. This usually fits on the base (circumference) by three or four tiny screws tapped into it; sometimes these are covered up by wax. Take them out, and, grasping the meter by its terminals, the front case can be slipped off, showing the " works " underneath.

Next, remove the dial plate, usually held by two screws. Be careful after taking out the first one, because the plate has a habit of swinging round unexpectedly (pivoting on the remaining screw) and then knocking the needle off its bearing.

The connections can now be seen. If it is an RF type, the thermo-couple can be recognised, looking like a sweated joint on a power cable. Using a 1000 ohms per volt ohmeter, start tracing the continuity from the terminals to the movement. From one terminal, it will be found possible to get a reading of zero almost right up to the movement; indeed, as the " other " side of the movement coil is touched, the needle will move across as it starts to measure the current being passed by the ohmeter. This



The model of the "Mule," as constructed by G5GQ and described in his article. The meter is an 0-2 mA movement scaled arbitarily in terms of volume-level for accurate adjustment of the gain controls in recording and play-back.

" other side " point has to be connected to the second terminal; it is only a few moments' job to trace that side and find the best position on the wiring to connect it. Once that is done, a continuity reading will be obtained right across the meter terminals, and it will start reading, possibly half scale if it is a 2 mA full-scale deflection type. Sometimes, these dis-used thermo-ammeters have series or shunt resistances in them, which reduce the scale reading; they look like small coils of cotton-covered wire. Try shorting them out (in case they are in series) or removing one end (in case they are shunt connected).

Preparation of New Scale

Whatever movement is used, a new scale has to be made. First trace the scale from the old dial on to a piece of paper, *also tracing through the mounting holes.* Estimate, as accurately as possible, the position where the needle spindle is situated.

Next, put pinpricks through the tracing to mark the upper and lower extremities of the scale, the two mounting holes, and the needle spindle position. Since first attempts at making the final scale are rarely successful, this pinpricking helps to keep the master tracing in good condition.

Now place the tracing over a piece of white card, good quality postcard being excellent. Pinprick through the seven holes on to the postcard. All that is necessary is to mark in the upper and lower arcs, using a pair of compasses, or something circular of convenient size. The pinpricks mark the edges perfectly. Use a BB pencil; it's easier and just as good-looking as Indian ink. The vertical divisions of the scale are made by using a ruler from the point marking the needle spindle.

The lettering can either be done by hand or, more easily, by typewriter. Using this latter method, it is necessary to provide indications so that the card can be put in the right position in the machine. This is very simple. From the needle spindle draw very fine lines to the divisions; these provide the "verticals" for the typing. Then, at the required level, draw an arc across them to provide the horizontal indication. It is then dead easy to type in the numbers and get perfect curvature on the scale.

Drill the two mounting holes, place on top of the old dial, and bolt back. Don't glue it, for often the glue reacts with the old metal plate and discolours through after a short time. If a thick, glazed piece of card is used, the old dial can be removed completely so that the card alone forms the scale.

Rectifier

To rectify the audio, a Westinghouse Type KG.1 rectifier is used. This is very inexpensive and is capable of handling the requirement. The small germanium detectors are rather too small for this purpose, and it is a nuisance to have to keep on replacing them.

Adjustment

The volume level indicator has to be adjusted to suit individual requirements. One obvious way is to have it so that a sustained note fully modulates the tape when the meter is about three-quarters across the scale; this leaves scope for overload indication, and the remainder of the scale could be marked in red, shading with a crayon.

For this purpose, R1 is inserted, and it may be almost anything between 100 ohms and 2,000 ohms, depending on the equipment and the set-up. Possibly a pre-set potentiometer could be used and adjusted to requirements.

The very simple arrangement described here is not particularly elegant, but, after trying out all sorts of arrangements, it was still found to be by far the easiest in operation. In practice, even though the writer's tape recorder has its own "magic-eye" indicator, it is easier to record on meter indication because it is just that fraction slower on transients, so that its "over-modulation" kick is more obvious. And, of course, it can be used on many other jobs.

G9BF CALLING AGAIN!

NEW IDEAS—NEW TECHNIQUES—NEW DX RESULTS—NEW WAYS OF MAKING TROUBLE

Those readers who may feel that this stuff is a shocking waste of valuable space are absolutely right.—Editor.

TERRIFIC response squib, p.31 March, forced Editor accept important new contribution from me G9BF. All old pals like MO1FFI (ex-RAF type with permanently bloodshot eyes), XX1TIX (ex-Army smoke-signal champ) and ZQ14BF/MM (ex-RN speed signaller flags) wrote in, also cards from lotsa other old pals invented by me G9BF to impress Editor. (But still nothing from SUSIE.—*Editor.*)

Nett result am able give you advance inside *gen* on super-hot new all-813 broad-bander Tx with guaranteed rock-crusher note. Am only technical writer in print able guarantee rock-crusher signal guaranteed clear any band and all TV viewers off air. Es mark this: Under proper local radiating conditions my signal also guaranteed crack screens every TV receiver within half-mile thus guaranteeing permanent QRT moaning TV viewers. No other writer able offer better guarantees.

How It Is Done: Years experiment have convinced me G9BF only sensible line-up for modern high-power DX station is SEO 813 with 813 buffer-doubler into push-pull 813 driver into two pairs 813 in parallel push-pull—of course modulated to taste and as required by more 813's. But for guaranteed rock-crusher signal (and to keep GPO baffled) essential stick to CW for DX operation. Phone only annoys neighbours and starts local gossip making it easy for GPO. (If neighbours really troublesome this new Tx designed by me G9BF will modulate their electric cokers with rude personal remarks, no trouble at all.) Advise all beginners go in big for real success at start by adopting technical principles and operating methods propounded by me G9BF. All others merely coloured imitations.

First 813 in SEO burns paraffin only for economy of course. Circuit is well known "hard-boiled Hartley" with excitation tap well up coil to guarantee huge output squiggers. *This most important.* Second 813 buffer-doubler operates as Class-A locked oscillator driven off SEO tank flywheel. Locking circuit extremely ingenious and provisional patent held by me G9BF. (Patent number self-assigned of course thus dispensing all irksome formalities.) As stated locking circuit extremely ingenious: Length copper tube has insulated wire inserted, then formed into coil using outer tube for SEO tank and inner wire for buffer grid tuned circuit. Gimlet-eyed intelligent reader will now say "But wot abaht using coax fer inner es outer?". Answer is Yes for QRP but No for QRO as SEO power should melt coax insulation if circuit working properly.

Buffer Amp. Slight feed-back applied buffer 813 to guarantee adequate self-oscillation as full power essential this stage. Circuit then locked up tight using small spanner. All other similar systems, like Goyder-lock, use key here but this no good for G9BF real QRO job.

Buffer 813 pumps bags urge into push-pull 813 driver, used generate actual rock-crusher note. Input-output coupling circuits same patented system already described. This driver stage being push-pull (hence self-rectifying) takes HT direct from 2000v. AC xformer thus producing high power drive signal nicely modulated with distinctive 100-cycle tone.

Output Amp. PA design also most cunning and likewise subject provisional patent with secret self-allocated number. Four 813's arranged push-pull parallel have each pair self-oscillating on frequencies separated by width of band used. Lock up from 100-cycle modulated broad-band driver excited by squigger-producing SEO *guarantees* PA output will cover *whole* band, not just few kc with lots other competing signals. If design carefully followed PA cannot do otherwise.

This where real cleverness me G9BF comes in. Any intelligent reader paying attention will immediately grasp fact *No VFO Procedure* required with this Tx. Since signal covers whole band all QRM automatically eliminated and no necessity fiddling VFO to zero-beat, switching off PA while waiting for DX station's AR, old-fashioned nonsense always being advocated by . . . (never mind. *Editor*). On G9BF's Tx just smack on HT to call anyone you hear. He can't miss.

All readers will agree this represents outstanding contribution to art and practice working DX. Modern method invented by me G9BF makes DX easy, certain and QRM-free. It is secret my recent successes in DX sphere. Am only op. in world able call CQ on round about 40 metres and get reply from Russian ship in Suez Canal. Have also worked BC station in Liberia ("Voice of Free Independent Saudi-Banana") and have big correspondence with many Mittel-EU's also using SEO rigs and wanting advice from me G9BF. Advise all beginners play close attention my writings for real DX success.

Next Time: How to Run Tx and Radiate Signal.

(There will be no next time if we can help it. Editor.)

"THE VHF HANDBOOK"

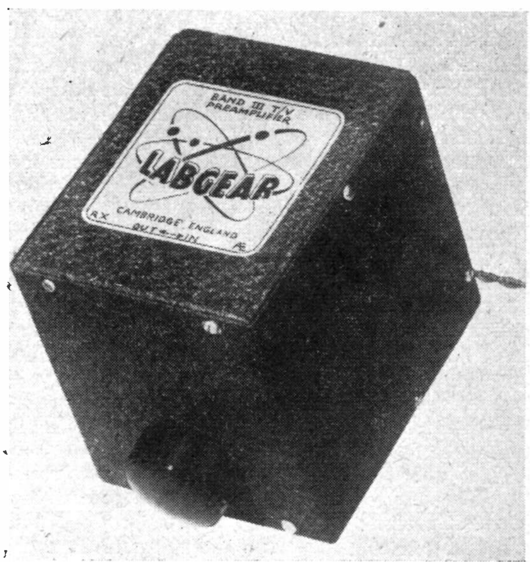
This is a new publication which covers the design and construction of receivers, transmitters and aerial systems for the four international amateur VHF bands 50, 144, 220 and 430 mc. (We in the U.K. and Europe are, of course, interested only in 144 and 430 mc, since 70 mc is not specifically dealt with in this handbook.) The treatment is straightforward and practical and, though this is an American book, is applicable to the requirements of the British Amateur and in line with VHF thinking in this country. A wide range of equipment is described, and there is a useful short chapter on VHF test apparatus, including noise generators and a VHF standing wave indicator. The chapters on propagation are also good. The book is of the kind that can be described as invaluable to the experienced VHF operator as a source of reference, while being plain enough to set the "HF type" amateur who has not yet investigated VHF on the right course. Of 210 pages, divided into 12 chapters, *The VHF Handbook* is fully illustrated in line and half-tone. It costs 24s. post free, and can be obtained (from stock) from the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CONSULT THE INDEX

For every volume of SHORT WAVE MAGAZINE, completing in February each year, we have prepared a comprehensive Index, given free as a loose supplement with the first issue of the next volume, March every year. Many of the enquiries we get prove beyond doubt that the Index has not been consulted! If you cannot find what you want in the Index, it has not been published in SHORT WAVE MAGAZINE! Of course, this does not help us much with the reader who will demand a full editorial *précis* of the article in which he is interested before he hazards his half-crown! At the other end of the scale is the reader who will ask for photostat copies (at the 10s. 6d. *a page* we have to charge) of articles which have been out of print for years. We do our best to please them all. But do look at the Index before writing in to ask if we have *ever* published *anything* on the RF-27, the TA-12B or a good VFO. If you can quote the copy you want from the Index, obviously it saves time and correspondence.

AR88 INSTRUCTION MANUALS

We are glad to be able to announce that new instruction books on the RCA AR88 and AR88LF receivers are now available. Of the most comprehensive nature, they include full maintenance, installation and performance data. They are obtainable direct only from: RCA Great Britain Ltd., Lincoln Way, Windmill Road, Sunbury-on-Thames, Middlesex, at 27s. 6d. each, post free. An essential buy for every owner of one of these receivers.



The new Band III TV Pre-amplifier unit, offered by Labgear. It is a high-gain broad-band low-noise amplifier, with self-contained power, and so arranged that on-off switching is automatic with the main receiver. The unit is readily adjustable for Channels 8, 9 or 10.

VHF BANDS

A. J. DEVON

Conditions and Activity—
EI2W/G6NB Make "First" on Four Metres—
Notes, Comments and Reports—

GENERALLY speaking, the month has been only fair in terms of conditions, which has had the usual effect as regards apparent activity. The London area stations make a good showing on Monday evenings, but most of the working has been semi-local, with contacts at 100-mile distances the exception rather than the rule.

However, at any time this rule can be broken—such are the vagaries of VHF. Those who had done their stuff for the week on Monday April 1st missed the very nice NE/SW opening which developed on the evening of Thursday 4th, when GC3EBK was a loud and steady signal for several hours, workable as far north as Yorkshire. For him, it was a very busy time, for from about 8.00 p.m. onwards he worked nearly all the G stations on the band—not that there were a great many of them, but there were enough to keep Bernard hard at it all the time he was coming through. Signals were somewhat subject to QSB, but R5/S9—plus was the usual report both ways. And, what is to your A.J.D. a sure sign of good conditions, G5MR was RST-579 at about 10.15 p.m. To those who might not appreciate the significance of this, G5MR at Hythe in Kent, right on the South Coast, is almost completely screened in all northerly directions, and in the ordinary way has the greatest difficulty in working even London stations; hence, when he is about S7 in the South Midlands, it can be assumed that a GDX situation has developed.

GDX on Four Metres

We are very glad to be able to report that two of our best known VHF workers, who for years have been steadily breaking new ground, scored another notable "First" in the late evening of April 18—it was at 2335 that EI2W and G6NB made it on four metres, under what were very peculiar propagation conditions on that band. At EI2W, Bill's signal, which was very strong in bursts, sounded as if it might be arriving by auroral reflection; when Henry turned his beam north, the noise level came up in great waves, with "patches of silence," during which G6NB was a clear and steady S8. The distance Brill-Dublin is 255 miles.

Had it not been that these effects were apparently most pronounced on a northerly beam heading, one would have said that it looks like having been a sporadic-E manifestation. In any event, we can expect 4-metre propagation by spor-E, because 70 mc is in that part of the spectrum which is likely to give EDX by this sort of disturbance. The best period for sporadic-E is during the summer months. (In writing about this, one feels more than ever the need for European co-operation on 70 mc—anyone reading this who ever worked Italians on five metres by sporadic-E will no doubt be thinking the same.)

Incidentally, EI2W reports that he also heard another G signal, almost on G6NB's frequency, and likewise arriving in bursts, who sounded as if he might have been G3EHY—but it was not a positive identification. However, it probably will be soon, as arising from the comment in this space last month, we understand that EI2W/G3EHY propose to start a regular schedule on four metres.

On the general topic of four metres, and the results to be expected on that band, Louis of G3EHY (Banwell) writes that, so far as he is concerned, the path London-Somerset seems always to be open; he has worked G2DD and G3CLW at a variety of times from early morning to late evening, and they have always had solid contacts, on CW if not on phone; these tests have suggested that the best time is just before sunset, when signals are nearly always very strong.

In the opinion of G3EHY—and he may well be right—it is far too early yet to draw any conclusions as to the relative merits of two and four metres. Having been regularly active on 70 mc almost since the band was opened, Louis says that it is most interesting to note how signals come up as the operators really keen on four metres get round to improving their gear and putting up proper beams.

An interesting contact recently for G3EHY, in a new direction, was with G3FUW (Hinckley, Leics.), who is

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1956

Starting Figure, 14

From Home QTH only

Worked	Station
47	G3GPT
43	G5MA
41	G3KEQ
40	G3GHO
37	G3DKF
36	G3LHA
35	G5ML
33	G2CIW, G3IOO, G3JWQ
32	G2DVD
30	GC3EBK
26	G3KHA
25	G3CKQ, G3KUH
23	G3KEF, G3KPT
21	G3DLU
19	G3FIH
18	G5MR
17	G2AHY
15	G3IER, G3KQF

This Annual Counties Worked Table opened on September 1st, 1956, and will run till August 31st, 1957. All operators who work 14 or more Counties on Two Metres in the year are eligible for entry in the Table. The first claim should show a list of counties with stations, which can be added to thereafter as more counties are worked.

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
75	G5YV
70	G6NB, G6XM
68	G3BW
66	EI2W (286), G3IUD (302)
65	G3CCH
64	G3GHO, G5BD (435)
62	G3BLP (630)
60	G2FJR (427), G2OI (402), G3DMU
59	G3EHY, G4SA
58	G3IOO, G8OU
57	G8SB
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G5BM, GW5MQ
54	G5MA
53	G2AJ (519), G3FAN, G4CI
52	G2NH, G6RH, G6XX, GW2ADZ
50	G3ABA, G3GSE (518)
49	G3HAZ (358)
48	G3FIH, G5ML, G6TA (487)
47	G3HBW, G5WP
46	G4HT (476), G5BY, G6YU (205)
45	G2DVD (362), G2XC, G3BJQ, G3KEQ, G5JU
44	G2CIW (208)*, G3BK, G8DA
43	G2AHP (500), G3BA, G3COJ, G3HWJ, G4RO, G5DF
42	G2HOP, G3BNC, G3DLU*, G6CI (220), GM3EGW (146)
41	G2FQP, G3DO, G3WS (255)
40	G2DDD, G3CGQ, G3IER, G3JWQ (256), G8KL
39	G2CZS (275), G2IQ, G3DKF, G3DVK (208), G3GBO (434), G3VM, G8IL (325)
38	G2FCL (234), G3APY, G3CKQ, G3HTY, G5MR (336), G8VN (190)
37	G2FNW, G2FZU (180), G3DLU, GC3EBK (260)
36	G2DCI (155), G3CXD, G3IIT, G3KHA (195), G3LHA (150), G6CB (312), G8IP
35	G3FZL, G3FYY (235), G3HCU (224)
34	G3AEP, G3BKQ (116), G8IC
33	G3HHY (125)
32	G3HIL, G8QY, G8VR, GC2FZC
31	G3HXO, G3KPT (108), G5RP
30	G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GM3DIQ, GW8UH
29	G3AGS, G3AKU, G3FIJ (194)
28	G3ITF, G3KUH, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160) G6GR, GI3GQB, GW3GWA
26	G2BRR, G3CFR (125), G3SM (211), G3YH, G4LX, G4MR (189)
25	G2AHY (139), G3JMA, G3JXN (220), G5SK, G6PJ
24	G3DLU*, G3FD, G3FXG, G3FXR, G3GSO (112), G3JHM
23	G3CWW (260), G3HSD, G4JJ/A G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWJ, G6XY
20	G3EYV, G3IOE
19	G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE, GM3DIQ*
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

one of the few Midlands stations using four metres.

QRO on Two Metres

PAØFB writes that he is now running an Eimac 4X250B as PA, in a coaxial tank circuit; for very little drive, it runs easily at 150 watts input on two metres, fully modulated, and gives him a much better signal than with the old 40w. outfit—as, indeed, one might expect ! PAØFB says that though the 4X250B costs the Dutch equivalent of about £19, he considers it cheap at the price, having regard to the high efficiency of the valve in terms of RF output and driving power.

For those who may be interested, PAØFB is often on in the early morning, among the G's he has worked at that time being G3EMU (Canterbury), just across the water, so to speak.

Another item of news in a long and interesting letter from PAØFB is that both PAØGER and PAØWAR are building for 23 centimetres; they acknowledge, in this connection, the generous help they have been getting from G3HBW, over a long period.

Some Station Reports

G3DLU is in that part of Sheffield which is administered by the Derbyshire C.C., so should count as a Derbyshire station; this is one of those geographical twists that we are always bumping into in the county-counting business ! Of more importance and much greater interest is the fact that G3DLU has now got his new YU1AD converter down to an NF of 3.7 dB; wisely, he has decided to tie up on that and the period of gestation—if we may use such a term in this space in that sort of context !—now being over, G3DLU is back on the active list again. For 15 evenings of activity during the period, he shows some 46 stations heard or worked, with G3LOK (Cowes, I.o.W.) as best DX.

G3KUH (Rotherham) has put away the old 4-ele flat-top and now runs a 5/5 slot assembly, with which he is very pleased; the two-metre receiver has also had some attention, and his calls h/w list for the period shows the worth of these improvements. On the evening of April 4, G3KUH experienced what was evidently "a touch of Aurora," in that for a short time G3JZN (Manchester) was rough and almost unreadable on a northerly beam heading. After midnight on April 4-5, GI3GXP and G3FAN were heard with strong normal signals, but could not be raised on either CW or phone.

G3GHO (Roade, Northants.) keeps regularly active, and though mainly QRX, can usually be heard in the early evening working somebody; he also remarks that though all signals were well above average on the evening of April 4, activity was pretty disappointing.

G3DKF (Coventry), our latest VHFCC member, has now worked nearly 300 stations on two metres—

and looks forward to making it a few more when he goes /A from St. Mawgan, Cornwall, during the holiday periods this year. G3DKF intends to keep active from the home QTH, but remarks that this is also the time of year when "you have to show some dirt on the spade"; in spite of these outdoor calls, he keeps moving in the Tables, as does G2AHY (Crowthorne, Berks), now at 139S worked.

G2CIW (Cambridge), who is only 50 ft. a.s.l., has become accustomed to hearing others giving out S9-plus to stations he cannot even find; however, PE1PL was worked on two metres on April 3, and G5LL, for Lincs., on 70 centimetres on April 8. G3GSO (Derby) had everything in bits and u/s when the March openings occurred—how often this happens!—but since then has put up a 4/4 slot job which has improved things considerably. At any rate, he worked 8 new stations, most of them never heard before, in three weeks; G3GSO reports the following as being active on two metres in the Derby area: G2CRL, G3EKX, G3KQF and G3OZ.

It happens that the next letter on the pile is from G3KQF, putting in his first claim for Annual Counties; he runs 15w., with a 6-ele Yagi, "too near a very large elm tree, which doesn't help things much." An old friend—he started with us as an SWL, a long time ago—who reports this month is G3IOE (Newcastle), who has been off the two-metre air for over a year, having been involved with the R.A.F. in DL2. He got the gear going after some trouble with the PA, and G5BD in Mablethorpe was worked. G3IOE hopes to be regularly active again in about three months' time. SWL Stokes (Ruislip) puts in a calls heard list, his total of stations logged this month being rather less than for the previous period.

The Tabular Matter

All claims made for the current period have been taken in—and we would like to see many more calls h/w lists. This is where our SWL's could make a very useful contribution. It would, for instance, be most helpful if some SWL in Scotland could put in a regular list of GM calls heard; we would also be very glad to hear from SWL's in Northern Ireland, North and South Wales, the West Country, East Anglia and the Lancs/Yorks. area. It cannot be that there are no VHF listeners in these parts; it must be that they think we get all the information we need from the transmitting fraternity, and that their reports would be of no interest. This is not so. A feature like *VHF Bands* is built up on "information received," so that the more of it we get, the better.

As regards calls h/w lists, we would particularly ask that they be set out exactly as printed, *i.e.* with callsigns in proper order, and written clearly. Nearly every list your A.J.D. sees has to be marked in one way or another—either because the calls are not in strict alphabetical and numerical order, or because (in hand-written lists) there is no clear distinction between such characters as V and U, O and D, I and 1, S and 5, Y and V, or 2 and Z! Hundreds of callsigns are printed in every issue of SHORT WAVE MAGAZINE—enormous trouble has to be taken to get them all exactly right.

This and That

Talking of getting things right reminds your A.J.D. to make some observations on a point of procedure which has been causing some bother recently—gabbled callsigns. Now, when you are having a natter with a chap who has said that you are "S9-plus," or with someone with whom you are so regularly in QSO that a callsign exchange is almost superfluous, remember that nine times out of ten there is somebody else listening with whom your signal may be weak, or fading, and who is having great difficulty in reading you.

TWO METRES
COUNTRIES WORKED
Starting Figure, 8

16	ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, 9S4)
15	G3GHO, G4MW, G5YV, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM)
14	G2FJR, G2HDZ, G3IOO, G5BD, G8OU
13	G2XV, G3BLP, G3CCH, G3DMU, G3GPT, G5DS, G6XM, G6XX
12	G2HIF, G3WW, G5MA, G6LI, G6RH
11	EI2W, G2AJ, G3ABA, G3DVK, G3HAZ, G4RO, G4SA, G5UD
10	G2FQP, G2HOP, G3BK, G3BNC, G3EHY, G3FAN, G3GHI, G3GSE, G3WS, G5MR, G8IC, GM3EGW, GW5MQ, PAØFB
9	G2AHP, G2CZS, G2DVD, G3FIJ, G3IUD, G5ML, GC3EBK
8	G2CIW, G2DDD, G2XC, G3AEP, G3DKF, G3GBO, G3HCU, G3HWJ, G3JWQ, G3VM, G5BM, G5BY, G8SB, GC2FZC

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 strict alphabetical and numerical order).

PAØFB, The Hague.
WORKED: DJ1XX, 3NR/P, DL3VJ, ØMR, F9LD, G2JF, 3ANB, 3EMU, 3IJB, 3KFX, 4DC, 4IB, 5KG, 5KW, 6NB, ON4AB, 4HN, 4ZH, 4ZK. (*March* 11 *to April* 8).

SWL Stokes, Ruislip, Middx.
HEARD: G2AHP, 2AIH, 2ANT, 2BDP, 2BZ, 2DVD, 2FMJ, 2FVD, 2HDJ, 2HDY, 2UJ, 2YB, 3BFP/A, 3BFP/P, 3BII, 3CNF, 3CZY, 3EYV, 3FCQ, 3FQS, 3FUH, 3GDR, 3GHI, 3GTH, 3HBW, 3IUL, 3JQN, 3KEQ, 3KEQ/P, 3KQC, 3LOA, 5DS, 5KW, 5MA, 5NF, 5UM, 5WW, 5YH, 6AG, 6JP, 6LL, 6NB, 6OX, 6RH, 8RW, 8SC. 8SK, 8UG/A. (*March* 18 *to April* 14).

G3KUH, Rotherham, Yorks.
WORKED: G2BM, 2CVD/P, 2DCI, 2FMO, 2FO, 2HQ, 3AZU, 3DKF, 3DLU, 3DVK, 3EHK/M, 3ELG, 3FAN, 3FUR, 3GFD, 3GHO, 3GJV, 3GSO, 3HA, 3HBW, 3HEB, 3IUD, 3IWJ, 3JZN, 3KFD, 3LHA, 3PY, 4GZ, 5BD, 5DS, 5KW, 6BX, 6XM, GC3EBK.
HEARD: G2CIW, 2XV, 2YB, 3AGS, 3ALC, 3BA, 3CO, 3FTN, 3GHI, 3HXS, 3JXN, 4DC, 5KG, 5MA, 6AG, 6RH, 6XX, 8VZ, GI3GXP. (*March* 23 *to April* 15).

G2AHY, Crowthorne, Berks.
WORKED: G2ANT, 2CPX, 2FMJ, 2YB, 3BFP, 3BVW, 3DKF, 3DQC, 3EMG, 3GHO, 3IIT, 3JR, 3KHA, 3LHA, 3LOA, 3LOK, 5DF, 5NF, 5TP, 5WW, 6AG, 8VZ.
HEARD: G2AHP, 2ANS, 2AUB, 2CIW, 2DDD, 2HCG, 2TZ, 3DLU, 3DOR, 3EVV, 3FEX, 3FNW, 3FQS, 3GHI, 3GVR, 3HBW, 3HSR, 3IUL, 3JWQ, 3JZN, 3KAG, 3KEQ, 4BC, 5MA, 5KW, 5US, 5YV, 6JK, 6NB, 6NN, GC3EBK. (*Month ending April* 15).

G3DLU, Sheffield.
WORKED: G2ANS, 2AUD, 2BM, 2CIW, 2CRL, 2DCI, 2FNW 2HQ, 2JF, 3ALC, 3BA, 3BU, 3CGQ, 3EKX, 3FFV, 3FUR, 3GFD, 3GHO, 3GSO, 3GJV, 3HBW, 3JWQ, 3JXN, 3JZG, 3KEF, 3KQF, 3KUH, 3LHA, 3LOK, 4DC, 4MK, 5KG, 5MA, 6AG, 6XX.
HEARD: G2CVD/P (Nr. Birmingham), 2FMJ, 2JF, 3DKF, 3IIT, 3JWQ/P (Derby) 3KEQ, 5BD, 5YV, 6NB, 6XM. (*March* 22 *to April* 15).

FOUR METRES

G3EHY, Banwell, Som.
WORKED: G2ABD, 2DD, 3CLW, 3FUW, 3HHY, 3JFS, 5DS, 6NB, GW2ACW, 4CG, 8SU.
HEARD: G3AMF. (*Month ending April* 16).

He may not be specially interested in what you are talking about, but he does want to know who you are—so sign over carefully and distinctly. A gabbled callsign is *always* an irritation and an annoyance, quite apart from the fact that it is contrary to the terms of the licence not to sign over properly.

Some operators are a model in this respect; they give their callsign and location clearly, and (what is often just as important) mention their beam heading as well. Somebody 100 miles away then has all the information he needs—and is probably willing to stand by until you have finished in order to give you a call.

In the old days on VHF, there were some enlightened operators who not only signed carefully when on phone, but also had an MCW device which enabled them to key their callsigns without actually going over to CW; this may not be necessary with a well-modulated phone signal, but a clear statement, at the beginning and end of each transmission, giving callsign, location and beam heading at the time, undoubtedly is.

There is not much CW on the two-metre band these days, more's the pity. But some pretty slovenly procedure has been heard recently from certain operators who do use the key! Under GDX conditions, about the worst thing to do is to call 40 CQ's in a row and then sign, rather untidily, twice. On the HF DX bands, a good operator will call "three times three"—no more. On VHF, "five times three" is a good rule. This gives the listening station time to sort out the callsign (if QSB conditions prevail) and estimate what the path is like if contemplating a reply.

Contest Comment

A number of those who have written in this time have commented rather sharply on the decision—see p.96, April *VHF Bands*—not to stage any sort of SHORT WAVE MAGAZINE VHF contest this year. We are very glad to have their views (and implied support for a contest) and to know that we may have been mistaken in our own assessment of the interest in contests.

However, while respecting the wishes and opinions of those who have been good enough to express them, from where your A.J.D. sits it still looks as if the *majority* of VHF operators could not care less about contests as such, even if they are interested enough to come on for the activity that a staged contest usually produces.

In fact, it is easy to see that most VHF operators have the same interests, fundamentally, as those who like working DX on the HF bands—the only difference is in the meaning of the term DX on VHF! If, as we may reasonably expect this season, there is a spell of sustained good conditions on VHF, with EDX and GDX steadily workable over a period of several days, then it is a certain bet that most VHF operators will be on for every minute of the time that they can manage, irrespective of whether or not there happens to be a contest running!

On the other hand, if a contest is staged, and conditions turn out to be no better than average, then the interest will be lukewarm, the support unrepresentative and the main criticism of the rules will be that the contest was allowed to go on too long!

These are some of the reasons why we feel that the best long-term result is obtained by cutting out the staged contest altogether and relying upon the incidence of conditions to generate a high level of worth-while activity.

The VHF Century Club

Periodically, we have to "re-find the data" on VHFCC for the information and guidance of those who are new to VHF and this column. The Club was founded some nine years ago, the idea being that those who could show cards for not less than 100 different stations worked "on the VHF bands from 50 mc up" were entitled to some concrete form of recognition. It was this thought that produced the VHF Century Club, with its distinctive and much-prized Certificate—only 210 have been issued since the VHFCC was first instituted.

The requirement is QSL cards proving two-way contact with 100 different stations on the VHF bands, any band counting from 50 mc upwards—we once had six metres, as well as five metres—which should be sent in, with a check list, for the attention of A.J.D. The Certificate is issued, and the cards returned, within a short time of the claim being made.

At present, the main difficulty with VHFCC is getting the cards in! It is now fairly easy to work 100 different stations on two metres alone, but quite another thing to prove it in terms of cards actually received.

In Conclusion

Dead-line for the next issue is **Wednesday May 22,** for appearance on June 7. Send all your VHF news, views, ideas, opinions, suggestions and criticisms to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And then it's Whitsun—or how time flies!

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
29	G2XV
26	GW2ADZ
23	G3BKQ, G6NB
20	G3HBW
19	G3KEQ
18	G3IOO
16	G6NF
15	G4RO, G5YV
14	G2HDZ
13	G2CIW
10	G2OI, G3IRW
9	G5DS
7	G2DDD, G2HDY
6	G3FAN, G3JHM, G3JMA, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G5ML
4	G3JGY

On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue

LICENCE FIGURES

According to the latest return, there are now nearly 15 million licences in issue, of which more than 6,800,000 are for TV reception. Nearly 305,000 licences have been issued for car radio receivers (which must be paid for separately).

AN INTRODUCTION TO AMATEUR RADIO

STRICTLY FOR THE BEGINNER

PART III

The first two parts of this article appeared in our March and April issues, and covered the callsign system, use of the different amateur bands, the Q-code, the QSL procedure, and the competitive side of Amateur Radio. This instalment, the last of this particular series, discusses DX contests, how to listen for DX, some points on the art of working it, the place for telephony and telegraphy operation on the amateur bands, operating procedure, and nets and parties. In forthcoming issues, we shall be covering other aspects of Amateur Radio activity from the beginner's point of view.—Editor.

Most of the Certificates and Awards already mentioned may be gained in the course of one's ordinary radio operating. Casual contacts are just as likely to count for a future award as any other kind of contacts. But, naturally, the intensely competitive side of the hobby (for those interested in the sporting aspect) demands some organised contests, and these now exist in plenty.

Usually held at week-ends, there are several world-wide Contests which stir up a tremendous amount of activity on all bands. The annual *ARRL DX Contest* is probably the oldest-established event of this kind, and occupies no fewer than four complete week-end periods of 48 hours each. Two of these are devoted to CW and two to telephony. In this contest the amateurs of the USA endeavour to work as many foreign countries as they can, on all bands; while the stations outside the USA score their points according to the number of U.S. and Canadian "districts" they contact. The second half of this year's telephony Contest took place over March 9-10, and the CW week-end was March 23-24.

The *CQ* DX Contest, traditionally held in the autumn (the ARRL event being in the spring) leaves everyone free to work as many other countries as possible.

Other large-scale affairs are run by other national societies (not forgetting the Russians, who confine their activities to the countries within the Soviet Union and the satellites, and seem to sponsor some sort of contest almost every week-end!)

Other events in the competitive world are "Top-Band" (160-metre) Contests, Field Days, Club Contests (the "MCC," or *Magazine* Club Contest, organised by SHORT WAVE MAGAZINE, is a popular and interesting example) and all manner of semi-private feuds run by local societies and clubs.

In most of these affairs there is scope for the receiving enthusiast as well as the transmitter; and even if he does not formally enter for a contest, the much-increased activity which results from the bigger events rewards him handsomely for a week-end's listening.

Listening and Concentration

New converts to short-wave listening are apt to think that they have only got to turn the dial of their receiver until they hear a signal, loud and clear, to become experts in the art of DX-chasing. Alas! a disillusioning awaits them. The "loud and clear" signal is nearly always a European. The most interesting signals are usually the weakest ones, and the really rare DX is not only weak but usually half-buried under local jamming.

To hear American amateurs "loud and clear" it is desirable to have a receiver covering 10 metres—they *can* be heard on other bands, of course, but Ten is exceptionally good just now.

But never neglect anything because it is weak and apparently unreadable. By concentration it may be possible to winkle it out from the QRM, and then it may be just the signal you have been looking for. You may even be the only one to hear it, but in that case it is safe to assume that it must have been very weak and very badly jammed.

Needless to say, a selective receiver, rather than a noisy one, is a prized possession. Such aids as converters and pre-selectors are extensively used, and the receiving aerial itself is of great importance. Never be deluded into thinking that "a piece of wire" is good enough for reception; the better the aerial, the better the results. Most transmitting amateurs use their transmitting aerials for reception, and this is usually why some of our less expert SWL's often hear a transmitter (even in their own neighbourhood) working someone that they cannot even detect. The aerial is *everything*.

If you are interested in several bands, a long wire is probably the most useful. If you specialise in one band, a dipole (folded or otherwise) is excellent. The vertical ground-plane is another type that has become popular, and it has the peculiar advantage of reducing the strength of semi-local signals (up to 1000 miles or so), thus making the real DX easier to find. But a detailed description of aerial types is outside the scope of a general article of this nature.

Telephony or Telegraphy

These two separate types of communication are both used extensively, for a variety of reasons. A CW signal will be audible, and readable by a good operator, when it would be quite impossible to make telephone intelligible. Thus CW is the ideal medium for low-power work, for high-power work when conditions are bad, and for long-distance work on bands where it is not usually feasible to use phone. Only when the transmitter and the receiver are both capable of producing a good strong CW signal is it practicable to communicate on phone.

Telephony means extra complications at the transmitting end, and extra concentration or skill at the receiving end—unless one is just interested in listening to the phones that roll in without any trouble.

Some telephony enthusiasts look upon CW as a primitive and outmoded means of communication, just as some CW experts are unduly prejudiced against telephony and regard themselves as the true progressives! In fact, of course, there is scope for both systems; the faithful band of CW users have developed an extremely friendly means of communication out of mere dots and dashes, and the telephony stalwarts have practically invented their own language!

One fact should not be overlooked — that, by virtue of natural laws, it is inescapable that CW occupies less room on the bands than telephony does; likewise that phone causes more interference to CW than *vice versa.*

The bands are not *officially* divided (except in the USA and a few other countries) for phone and CW, but there is an official understanding, or "band plan," among most operators. The present band plan was shown on p.41, March. The result is that, in theory, the CW is confined roughly to the lowest 100-kc stretch of each band, telephony occupying the rest.

Listeners who are not familiar with the Morse code will, of course, be somewhat restricted in the DX they can hear, especially when conditions are bad. CW stations continue to come in from many countries whence it would really be an achievement to hear phone; and some rare countries, represented, perhaps, by only one amateur station, may not even have a phone transmission on the air at all.

Modern Procedure

Amateur procedure, in general, has changed a lot since the pre-war days. It has had to—by virtue of the enormous increase in amateur activity, and therefore in interference. In the old days, when none of the bands was really populated to bursting point, G3XYZ would transmit, probably using crystal control, on any convenient frequency within the band; if he called CQ, he would listen round the *whole* of the band for a reply. If he called another station, he would still transmit on whichever crystal frequency he happened to be favouring on that particular day.

Nowadays, however, it is the custom (or, rather more emphatically, one might say the rule) to call stations *on*, or *near*, their own frequency. Crystals are no longer the last word; it is everyone's ambition to make and use a VFO (variable frequency oscillator) that *sounds* just as good as a crystal but leaves one free to settle on *any* spot in the band.

So if G3XYZ calls CQ today, he will expect to hear replies within a hairs-breadth of the spot on the dial where his own transmission comes in, on his own receiver; and he will probably not bother to tune more than 5 or 10 kc on either side of that spot. Likewise, if he hears a desirable DX station calling CQ, he will hurriedly adjust his own VFO to that frequency and reply on the other station's own spot.

This has its advantages—it confines the QRM caused by one rare station and all his callers to a few degrees on the dial. But that can also be a disadvantage, and often the unfortunate G3XYZ, switching over hopefully to his receiver to see if the DX is replying to him, can hear nothing but dozens of other stations still calling the DX man — with longer calls than he himself put out. And when the DX man returns to one of the crowd who called him, he, in turn, may not be able to hear the station of his choice because of the calls of all the others on the same frequency.

From the listener's point of view, this VFO procedure can be quite helpful, since, if he hears a strong station calling or working one that intrigues him, he has only to stay around the same frequency and he will probably hear the other end of the contact as well. The most successful short-wave listeners are those possessed of plenty of patience—to such an extent that if they merely hear a rare station being *called*, they will probably be content to stay near the spot for an hour or two on the off-chance of hearing the DX man finally emerge on a clear channel.

Nets and Parties

Quite separate from the DX-chasing fraternity are the many stations who are content to work regularly or, at least, very frequently, with the same locals or semi-locals. These operators form themselves, for convenience, into "nets"—several stations working on one spot-frequency and taking it in turn to transmit. This is an excellent procedure if someone is in control of things and brings the various stations on in the correct order. Sometimes, however, the net gets very much out of control, and seven or eight stations will all be in a considerable muddle as to whose turn it really is. But it makes entertaining listening of a very lazy variety, for all that the listener has to do is to sit back and let his receiver and loud-speaker do the rest.

Summary

It would indeed be difficult to describe the peculiar world of Amateur Radio in the course of a few paragraphs. If, however, the reader has had the patience to follow this article through its tortuous paths, a short summary will probably be perfectly understood and, possibly, may even prove enlightening.

The average amateur, in these post-war days, is primarily a *communicator.* It is his joy to play with (or in more serious instances, shall we say to *work on*) his own complicated electrical and electronic apparatus in order that he can use it for communicating with all parts of the world.

To do this, he has to understand the behaviour of certain natural forces (sunspots, ionized layers, and so on); he also has to know which frequency band to use, at which season of the year, and at what time of day.

He must know how to design and erect an aerial system which puts his signals out in the most efficient manner on each of these bands. His receiving department must be as efficient as his transmitting gear; his operating must be constantly kept up to date with modern practice.

He may be heard talking in a leisurely manner, on telephony, with local stations; or he may be heard fighting his way through interference to get his Morse signals to some remote part of the globe. He may be operating fiercely for hours on end in a contest of some sort, or just "lazing around" on a band in the hope of hearing, and working, some interesting new place.

But all the time he is very much the *amateur,* pursuing his hobby for the best of all reasons—that he likes doing it. He can be observed in his habits by anyone keen enough to set up the simplest of gear, whether it be a home-built two-valve receiver or a ready-bought superhet. Many home broadcast receivers have been used with great success to listen to amateur telephony on the 40- and 20-metre bands, although they are useless for CW unless modified for that purpose. But it is safe to say that *anyone* with the inclination to investigate this fascinating branch of radio can do so—with varying degrees of success! Start with the home set, build a two-valver, modify an ex-Government communications job, buy a real amateur-band superhet and finish up as a hopeful applicant for a transmitting licence . . . that is the usual sequence. And we can promise you that there is never a dull moment.

SPRING CALL BOOK

The latest issue of the *Radio Amateur Call Book* is dated Spring 1957 and, as usual, is obtainable direct only from us from stock (while it lasts). The G-section of this issue runs to some 28 pages, and includes all addresses published in our "New QTH" feature up to and including the January 1957 issue of SHORT WAVE MAGAZINE. Needless to say, it also includes (in the full edition) the callsign, name and address of every other known radio amateur in the world as well! These days, the quarterly issue of the *Call Book,* the only directory to the radio amateurs of the whole world, is a very large compilation, running to something like 600 pages, with some general DX data and operating information included. For the convenience of U.K. and European buyers, each quarterly edition of the *Call Book* is published in two parts: The Full Edition, including all known callsign/addresses; and the Abridged Edition, which covers the whole world less only the American listings. Post free prices for this latest *Call Book* are 37s. 6d. for the Full Edition and 17s. 9d. for the Abridged, of the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR INTENDING CONTRIBUTORS

We are always glad to see, for possible paid publication in SHORT WAVE MAGAZINE, articles of Amateur Radio interest from authors known and unknown. It is not intended here to specify what is required in the way of technical material—that should, in any event, be fairly obvious from a study of the *Magazine* itself—but to draw the attention of potential contributors to the Notes on the Preparation of Articles on p.432 of our October 1955 issue. By following the principles laid down there, not only will it be easier to produce the article, but it will be presented in the way most acceptable to us for a paid contribution.

THE OTHER MAN'S STATION

Offerings for this feature should include a good, clear photograph and full notes on the equipment, station record, experience and operating interests of the owner of the station. The story is written by us from these notes, and payment is made for all contributions used. We are just as interested in the modest beginner with QRP as in the more elaborate layouts.

AMERICAN I.R.E. EXHIBITION

NEW YORK, MARCH 18-21, 1957

Reported For SHORT WAVE MAGAZINE

HELD in the new Coliseum building in the heart of uptown Manhattan, the 1957 Institute of Radio Engineers' Exhibition must have been the world's largest radio and electronics show. There were over 850 exhibitors filling all four floors of the new building, and although no official figures have been published, the attendance estimates vary from 40,000 to 50,000 *per day.* For the convenience of visitors, the organisers divided the exhibits so that the ground-floor was restricted to complete equipments, the first-floor to components and electronic instruments, the second-floor to general instrumentation, and the top-floor showed production tools, materials and services.

The British Consulate-General in New York, in conjunction with the Board of Trade and the electronics industry, arranged a special exhibit of British-made equipment and components, which were shown in a separate section located on the first floor. Amongst the exhibitors in the Great Britain room were such well-known names as Mullard, G.E.C., Standard Telephones and Cables, Creed, Solartron, Sullivan and Belling-Lee. Other British exhibitors located in other parts of the building included Muirhead, Garrard and Stratton (Eddystone).

Amateur Interest

Most of the leading U.S. manufacturers of amateur equipment were showing new items, and some of the stands were more reminiscent of the amateur exhibitions held in London than a professional display! For instance, several of the component manufacturers were using amateur-built equipment to demonstrate potential applications for valves and components.

Pride of place on the National stand was the NC-300 receiver. Five new National receivers were also on display, as well as the production version of the "atomic-clock" type master frequency standard. Hammarlund, too, had a receiver display with the new HQ-100 and HQ-150 types, as well as the latest versions of the HQ-140 and Super-Pro series. Hallicrafters were showing ten separate equipments for amateur use, including the new SX-101 receiver, HT-32 exciter and HT-33 table-top kW linear amplifier.

In addition to the HT-33, at least four other table-top kW amplifiers were on show: the Eldico SSB-1000, the Collins KWS-1 and two home-constructed units on the Eimac and Jennings stands. The latter amplifier was a multi-band pre-set tuned equipment using a water-cooled valve and a large number of vacuum condensers — quite a thing!

The Collins display included a 40 kW SSB linear amplifier now being produced for the U.S.A.F. The KWM-1 mobile SSB transceiver was also on display in addition to the current KWS-1 and 75A-4 models. Eldico were demonstrating their new electronic bug-key, which has additional circuitry built in to provide receiver muting and monitoring facilities. Several SSB receiving adaptors were on show, including the Technical Material Corporation GSB-1 and the Crosby Laboratories mechanical filter model. A phasing type adaptor intended as an accessory to the RME-4300 receiver was displayed on the Electro-Voice stand. T.M.C. were also showing the GPR-90 receiver and GPT-1 transmitter, as well as a new SSB exciter/transmitter designed to allow independent sideband operation for commercial multi-channel telephony.

Both Knight and Heath were listing new kits, but these were mostly in the hi-fi and test gear fields. Many companies displayed beam aerials, towers, rotators and poles. Most of these exhibits were specifically directed to commercial applications; however, Telerex included a very comprehensive display of amateur beams on their stand.

In addition to the exhibition, a convention and technical lecture programme was arranged by the Institute of Radio Engineers, and 55 different sessions were held in the Coliseum and Waldorf-Astoria Hotel. Subjects ranged from communications to colour television and from computors and data-processing to aerials and propagation.

In accordance with current practice in the States, all persons were required to wear badges supplied by the exhibition organisers. These badges showed name and address and the name of the company represented. It was surprising to see how many call-signs had been added to the basic information, and during the busy periods every third or fourth person seemed to be amateur. As to be expected, a large number of informal get-togethers were arranged in the convention hotels after the show closed each evening. The New York SSB group held their annual dinner and social evening during the exhibition, which was attended by nearly 300 active sidebanders from throughout the U.S.A. *R.L.G.*

RADIO WORKBENCH AND ITS EQUIPMENT

SOME IDEAS AND PRACTICAL SUGGESTIONS

THE purpose of this article is to discuss and enlarge upon points which are common problems for everyone who is getting under way—whether for the first time, or that " last " time which somehow never is the last.

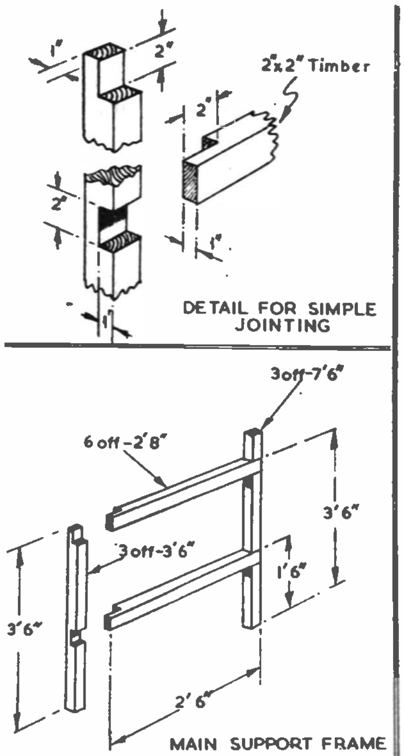
Now, it is obviously not possible to suggest a standard station design—because every case is an individual one. Some amateurs are lucky enough to have an outside building, complete with fitted workshop, to which they can retire in peace when the mood takes them; many work in a spare room in the house; others use part of the garage; some have the equipment built into the roof-space, or a cupboard, or under the stairs. But generally speaking, most amateurs have at least part of a room which they can call their own, and in which they can construct and instal their apparatus.

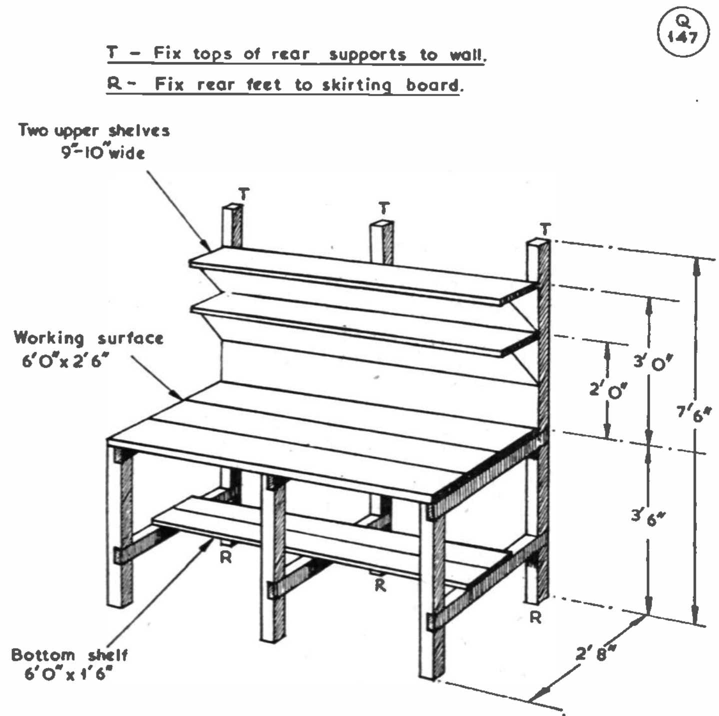
The first requirement is a workbench of some kind. This can either be built up, or an old kitchen table can be converted for the purpose. Unfortunately, such articles of household equipment fetch remarkably high prices in the second-hand market nowadays, and it is by no means as easy to get them as it used to be before the war, when a pound was a fair sum for a full-sized deal table with drawers. A substitute for a table is a converted bureau or an unwanted writing-desk; usually, however, these are too small to serve as workbenches, but can be admirably adapted for mounting the completed apparatus.

Constructing a Bench

A bench, is, however, almost essential, so that in most cases it will be necessary to make one. This can be done quite easily by anyone with but slight ability in the use of tools. The sketches accompanying this article show a simple but practical design, the leading dimensions—height, length and width—of which can be varied to suit the space available. For maximum dimensions, 6ft. long by 2½ft. wide is ample; there should always be lower and upper shelves (two are shown in the drawing) and the height of the working surface should be chosen in accordance with whether it is desired to sit or stand at the bench. The height given in the sketch is convenient for standing while working; one usually wants to move about and reach round when busy on a job, so that it is generally better to choose the standing height for the working surface.

The main members are of 2in. by 2in. timber, with the working surface, back board and shelves of ½in. planking. With three supporting frames, there is no fear of any sagging of the working surface, particularly if the supports are moved in a little at each end. The bench can be constructed in sections, and since it must be absolutely rigid, it should be fixed to the wall and floor at the points shown. The length of the main uprights should be such as to





bring their ends above the top shelf; while the bottoms of these uprights can be notched out to fit over the skirting board, to which they can be screwed; the tops must be secured to a batten which in turn is held to the wall by some fixing such as Rawlplugs.

If the constructor's ability as a carpenter is equal to it, a good, deep drawer can also be provided under the working surface. Such a drawer is extremely useful for keeping all the necessary odds and ends, such as small tools, spools of wire, boxes of screws, and so on.

Obtaining the Timber

While the sketches give all necessary information for building the bench, there is a point to mention in connection with getting the wood for it. Every effort should be made to obtain well seasoned timber to prevent distortion of the job with ageing. In every locality there is a merchant who can supply sawn timber and his advice should be sought.

Having cut the pieces to the different sizes, the 2in. x 2in. lengths should be carefully notched in the manner shown and the main support frames fitted together. They should be fixed in their correct positions before the planking is cut on, making sure that they are in square both horizontally and vertically. All fixing should be done with screws, *not* nails, in order to ensure a rigid job—use 1½in. wood screws for the main support frames and 1in. screws for the planking.

When the structure is complete, the bench can be finished by having the working surface covered with hardboard from the local builder's merchant; the exposed parts can be given a coat of grey paint.

The wood for the bench illustrated amounts to 70ft. of ½in. plank and 50ft. of 2in. by 2in.

Providing Power

The next thing is to wire the bench for power. From a main supply point which incorporates an on-off switch, leads should be run to subsidiary points for plugging in the soldering iron, a table lamp, and HT/LT power units. One cannot have too many power points—and they should be of two types: Batten lamp-holder and two- or three-pin 5 amp. Secondary switching should be provided at some of these points, so that when testing apparatus, it can be switched off quickly if anything begins to smell hot. By the same token, a 5 amp. fuse should be fitted in both mains leads between the inlet point and the station main switch. Take care to sort out N, L, E.

Earthing

This is most important if accidents are to be avoided and the gear itself is to be stable. A heavy gauge insulated lead should be clipped to the nearest cold water pipe—it will not be possible to solder it—and a bare wire lead (a length of 7/22's aerial wire will do admirably) run along the first upper shelf of the bench; this will enable earth connections for apparatus to be quickly and easily made by means of clips or screw connectors. All HT negative connections and any chassis carrying power packs should be permanently bonded to the main earth line. If the power inlet is three-point, as it should be in a house wired in accordance with the latest regulations, the fat pin on the plug is the earth connection. It should be left untouched, since with an AC supply all the radio apparatus in the station will be fed through transformers, and thus will have no direct connection with the mains. In other words, the station earth should be kept for everything on the station side of the power transformers.

Choosing Tools

While the tools actually needed depend upon the scope of the work which it is proposed to carry out, it is at the same time a good thing to have as many useful tools as can be obtained. In these days, small tools are easy to get and it should be possible to find without difficulty a soldering iron, three sizes of screwdriver (one with a long shaft), two or three pairs of pliers in different sizes and shapes, a steel rule, a hacksaw, a brace or breast-drill and set of drills in sizes from 1/16th in. to 5/8ths in., files in three sizes, a centre punch, light hammer, and calipers. Not all of these are essential, but they will always be found worth having.

Additional items which may or may not be within the budget are a small electric pistol-grip drill taking drills up to ⅜in. or ¼in. (a priceless asset), a table vice, a wood rasp, a metal reamer tapering from ¼in. to 1¼in., a pair of metal shears, a steel square, an adjustable radius cutter, and a large pair of spring-loaded pincers.

If much of the constructional work is to be in metal, other requirements are a set of chassis punches, and taps and dies.

While one cannot go wrong in having plenty of tools, it is a fact that much useful work can be done with only a soldering iron, screwdriver, pair of pliers and a penknife. But when it comes to making and drilling chassis, whether in metal or wood, and undertaking the more complicated jobs which progress in constructional work will demand, a rather more ambitious range of equipment is necessary.

As to where and how to obtain tools, a visit to the local ironmonger for his advice will be useful even if it does not produce everything that is required.

Workshop Material

One of the items most needed in wireless is wire. This should be purchased in ½lb. reels in the lighter gauges from 24 to 14 SWG, and the most useful insulation finish is not DCC or DSC, but enamelled. A pound or two of hard-drawn bare copper wire in gauges from 14 to 10 SWG will serve to make up self-supporting air-spaced transmitting coils. Then there will be the need for a stock of a dozen or so yards of lighting flex and, for connecting up, single wire insulated with rubber or plastic compound. Wires in all these sizes and categories can often be obtained from good ironmongery stores, if not from the local radio dealer.

A good assortment of BA brass screws, nuts and washers is also necessary. These should be in sizes from 8 to 2 BA, and in lengths from 1¼in. to ¼in., either round head, cheese head, or countersunk. A few dozen of each will suffice for stock—remember to provide plenty of washers, at the rate of 2 dozen of washers to one dozen of screws. In regard to wood screws, two or three dozen in 1in. to ½in. lengths, size 7 or 8, and again either countersunk or round head, will be useful. Try the ironmonger again for all this material.

The next requirement is metal and bakelite sheet and strip, and light gauge enamelled steel for chassis and panels. The right gauge for aluminium sheet is about 14's, and for steel, 18's or lighter. If the metal is too thick, it is very difficult to work. On the other hand, if too thin, it will not support heavy pieces of equipment without buckling. Aluminium in the sheet is often obtainable from the local garage. It is preferable to steel for constructional purposes in that being softer, it is easier to work. Bakelite sheet is quite easy to get from the "surplus" stores, and the best thickness is ⅛in. In the strip, it is extremely useful for small panels, for carrying a row of terminals, mounting components which need to be insulated from the metal chassis, and a hundred and one other similar purposes.

Another useful acquisition in the line of material is a quantity of insulated sleeving in various lengths, bores and colours. It also is easy to obtain from "surplus" sources.

There are many other items of equipment and material which will suggest themselves as being either useful or necessary as time goes on. An occasional tour round the ironmongers and household stores will often produce something worth having in the way of tools, small fittings and metal sections of various dimensions.

A good rule in starting a workshop, or re-stocking an existing one, is not to buy too much of anything at first. The material one really needs is usually in good local supply, so that it is a waste of money and space to overstock, as there is always the possibility of finding that one has too much of one item.

THE AUDIO FAIR

This year's Audio Fair, at the Waldorf Hotel, London, during April 12-15, was very well attended and fully supported by the many firms now taking an interest in the high-fidelity amplifier, speaker and tape recorder field. Much of the interest lay, and most of the business was done, not round the rather small stands, but in the demonstration rooms "upstairs." From the point of view of musical reproduction, the G.E.C. had an outstanding exhibit in their new Periphonic Speaker System; this was driven by an amplifier similar to the well-known 912-Plus design for home construction. Other good demonstrations of high quality reproducing equipment were put on by Pilot Radio and Decca. Taking it all in all, this exhibition was an astonishing demonstration of the standards now attainable in musical reproduction, using equipment generally available to the hi-fi enthusiast for operation in his own home.

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.

DL2BC, Cpl. Akehurst, J. *(ex-DL2VM),* c/o 21 Indep. Inf. Bde. Sig. Sqdn., Osnabrucke, B.A.O.R. 10.

G2FCA, A. E. Burnard, 26 Northolme Gardens, Edgware, Middlesex.

G3JFH, T. A. Russell, 201 Gloucester Road, Cheltenham, Glos.

GI3JUR, E. M. Byrne, 5 Strandmore, Portrush, Co. Antrim.

G3LED, H. Riding, 11 Bank Crest, Baildon, Shipley, Yorkshire.

G3LLS, H. Stockley, 6 The Priory, Alcester, Warks.

G3LMJ, C. Clancey, 1 Court Farm Road, Mottingham, London, S.E.9.

G3LOL, F/Sgt. K. S. Livermore, 32 Chestnut Avenue, R.A.F. Station, Topcliffe, Thirsk, Yorkshire.

G3LOT, E. M. Dyson *(ex-4S7EM),* 15 Brockhall Road, Flore, Northampton, Northants.

G3LPJ, K. Gray, 60 Braithwell Street, Denaby Main, Doncaster, Yorkshire.

GM3LPJ/A, 2759154 L.A.C. Gray, K., c/o Post Office, R.A.F. Station, Kinloss, Forres, Morayshire.

G3LPN, J. P. Hunt, 9 Station Road, Lapworth, Solihull. Warks.

G3LPO, A. B. Burgess, 57 Newenham Crescent. Knotty Ash. Liverpool, 14.

G3LPQ, H. W. Wooding, 147 Westfield Grove, Yeovil, Somerset.

GW3LPR, J. W. Rastrick, 34 Graigwen, Penygraig, Llanelly. Carms.

G3LPS, E. Pickering, 167 Shear Brow, Blackburn, Lancs.

G3LPT, G. Woods, Two Acres, School Lane, Halesworth, Suffolk.

G3LPU, E. W. Burrell, 11 Milton Road, Tottenham, London, N.15.

G3LPY, R. A. Nye, 20 Bramley Road, Southgate, London, N.14. *(Tel.: BARnet 3238).*

G3LQB, K. M. Bishop, 1 Northwick Walk, Ombersley Road, Worcester, Worcs.

GW3LQE, A. M. Ernest *(ex-ZC4AA),* Robinwood, Bridgeman Road, Penarth, Glam.

G3LQK, Huddersfield South Methodist Radio Club, Salem Methodist Church, Berry Brow, Huddersfield, Yorkshire. *(QSL to:* Rev. A. W. Shepherd, 11 Station Lane, Berry Brow, Huddersfield, Yorkshire. *Tel.: Honley 286).*

G3LQO, E. L. Harris, 22 Baliol Road, Hitchin, Herts.

G4PJ, W. L. Honeywill, 8b Fore Street, Salcombe, South Devon.

CHANGE OF ADDRESS

G2CDB, R. A. Pittock, 15, Sandringham Drive, Bramcote Hills, Notts.

G2DPK, Col. E. H. Rodwell, Woodlands, Holbrook, Ipswich, Suffolk. *(Tel.: Holbrook 246).*

G3BCI, V. F. Cotton, 45 Branksome Hill Road, Bournemouth West, Hants.

G3BCP, L. S. Dixon, 181 Mead Way, Bromley, Kent.

G3BED, A. F. W. Bennion, 4 Stanhope Heath, Stanwell, nr. Staines, Middlesex.

GM3BQA, J. S. McCaig, 19 Edinburgh Road, Cockenzie, East Lothian.

GM3CIG, J. E. Priddy, 39 Hillfield Crescent, Inverkeithing, Fife.

G3CQE, W. Brennan, 11 Hammond Way, Salhouse Road, Rackheath, Norwich, Norfolk.

G3DKS, W/Cdr. C. K. Street, R.A.F., 139 Brownlow Road, New Southgate, London, N.11. *(Tel.: BOWes Park 9728).*

G3ELF, F. W. Malpass, 19 Lower Dorrington Terrace, London Road, Stroud, Glos.

G3FRG, R. B. Forge, 14 Poulters Lane, Worthing, Sussex.

G3FRV, R. G. B. Vaughan, Cervante, Arundel Drive East, Saltdean, Brighton, Sussex.

GM3GZC, C. H. Fraser, Ambleside, Salen Road, Tobermory, Isle of Mull.

G3HGR, P. Knight, 21a South Norwood Hill, London, S.E.25.

G3HLW, D. A. Pilley, 8 Tamlin Street, Sandford, Wareham, Dorset.

GI3HNM, C. E. Davies, 109 Seaview Drive, Belfast.

G3IQE, J. E. Fuller, 9 Laws Terrace, Aldershot, Hants.

G3IQR, A. W. E. Barber, 93 Royal Crescent, South Ruislip, Middlesex. *(Tel.: Ruislip 9123).*

G3JAY, A. C. Richards, 174 Overwoods Road, Gorsey Bank Estate, Wilnecote, nr. Tamworth, Staffs.

G3JGO, B. Priestley, Stoke House, Roxwell Road, Writtle, nr. Chelmsford, Essex.

GM3JOA, H. E. Stanway, 30 Durham Avenue, Portobello, Midlothian.

G3JZK, G. T. Sassoon, 55 Eltisley Avenue, Cambridge, Cambs.

G3KCT, D. W. Blythe, c/o Sgts.' Mess, R.A.F. Station, Cosford, Wolverhampton, Staffs.

GM3KLW, J. Fraser, 11 Alexander Street, Tranent, East Lothian.

G3KWK, R. W. Nolan, 9 Raleigh Road, Padstow, Cornwall. *(QSL to:* 200 Victoria Avenue, Manchester, 9, Lancs.).

G3LCJ, R. J. E. Mills, 28 Chapman Street, Loughborough, Leics.

G4GN, Lt.-Cdr. W. Fletcher Cooper, M.I.E.E., R.N.V.R., The Naight House, Minsterworth, Gloucester.

G5YK, F/Lt. B. M. Morrissey, 9 O.M.Q., Martins Lane, Bawtry, Yorkshire.

GI8LF, E. O. Byrne, 5 Strandmore, Portrush, Co. Antrim.

G8NI, S. R. Long, 29 Salcombe Road, Basford, Nottingham. *(Station at Astra Cinema, Newton, Nottingham).*

CORRECTION

G3JVY, D. D. Devan, 62 Queen's Park Rise, Brighton, Sussex.

The Other Man's Station — G3JEQ

THE station of G3JEQ at Merrydawns, Meadowside, Great Bookham, Surrey, is owned and operated by W. R. Steverson, who was first bitten by the bug when on war-time service with the R.A.F. Licensed in 1954, G3JEQ is not in any sense a "professional amateur"— that is to say, his radio interest is purely a hobby.

Accommodated in a "home-constructed room" 15 ft. by 12 ft., complete with opening window, contrived in the roof-space — which G3JEQ has "found ideal for experimental work and operating without hindrance"— the station is very well equipped for all-band working. Receivers are an AR88, a CR-100 and an R.1155A, much modified, which also covers Top Band. On the transmitting side, the rack-assembly at the left accommodates a home-built band-switching 1.8-28 mc transmitter, completely TVI-proofed. From the 6SJ7 ECO/VFO, the buffer-doublers are 6L6's with wide-band couplers, the PA being an 807 run at a maximum input of 75w., with the power variable from less than 10w. to full input by control of screen voltage. Output is taken at 80 ohms *via* a low-pass filter to a switched aerial tuning unit (top panel in rack), consisting of separate tank assemblies for each band; these circuits are, in effect, pre-tuned, making for quick and easy band changing.

The modulator is to the design in the February 1948 issue of SHORT WAVE MAGAZINE ("Inexpensive 100-watt Modulator"), consisting of a pair of 807's in Class-B zero bias, the early stages running 6J7-6J5-6L6.

For TVI control, the harmonic traps in the transmitter are adjusted by a harmonic indicator, with a TV vision unit built round a VCR-97 as a visual monitor. Other bench equipment includes a combined heterodyne frequency meter and 100 kc crystal oscillator, and a GDO. Equipped also for two metres, G3JEQ runs an 832 in the PA at 15w., with a 12AT7 converter feeding out at 10 mc IF, the beam being a 4-element Yagi.

On the communication bands, full CW break-in is available by means of a keying relay and separate aerial; the main change-over can also be single-switch through relays. After much experiment, G3JEQ has settled for 260 ft. and 132 ft. end-fed wires as aerials for the HF bands. The operating record stands at more than 110 countries worked on all bands, 15C having been confirmed on 160 metres, for which our WABC is held.

G3JEQ concludes his notes for this description of his station by remarking that "All QSO's are welcome, be they phone, CW (5 or 35 w.p.m.), bug or left-foot keying, break-in, DX, rubber-stamp or rag-chew. All are catered for and enjoyed, as the aim is to get the most out of every side of Amateur Radio." A very proper sentiment. And G3JEQ also acknowledges, gracefully and gratefully, the support he gets from his XYL, "whose forbearance and encouragement make Amateur Radio worth while."

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Deadline for June Issue : MAY 17)

LAST month's comments on the reason for existence of these Club notes has brought forth quite a few kind comments, mostly from the smaller and newer Clubs which are still in search of members. To them it is obvious that they are doing themselves a service by sending in regular notes of their meetings and activities, chiefly by bringing them to the notice of non-members in the district.

There are even a few cases in which small but widely-dispersed Clubs find these notes the best medium for informing their own members of future events! Not all Clubs find it possible to circularise the membership every month; and it is not unheard-of for members to forget the date of the following meeting.

We should just like to repeat our suggestion that secretaries should watch the calendar and inform us of meetings taking place *after* the publication of the issue in which their notes will appear; previous meetings are past history and not of great interest unless they happened to be unusually important.

Remember, too, that we are always interested to see *good* photographs of Club interest for reproduction in this feature; payment is made for those used, by way of a small donation to the funds of the Club concerned. Prints should be clear and sharp, with details on a separate sheet, and *please* be *very* careful to quote all callsigns accurately; names need only be given in the case of SWL members, or non-holders of callsigns.

And so to this month's reports:

Tees-Side meet fortnightly in Settlement House, 132 Newport Road, Middlesbrough, at 8 p.m. Visits are also being organised to places of local interest, and preparations for NFD are in hand. The membership of the Club is 99 per cent. licensed, G3FMZ being a recent addition, having just moved to Middlesbrough.

The *Radio Amateur Invalid and Bedfast Club* continues its good work and publishes "Radial" monthly, with a technical supplement. A club net has been started on Forty—full details of this and other matters from the Hon. Sec. (*see* panel).

The **Ashington & District Radio Club** was recently formed in that area of Northumberland, and although present membership is rather small, it is hoped that it will grow steadily. Meetings are held fortnightly in the Blue Room of the Grand Hotel, Ashington. May 7 and 21 at 7.30 p.m. are the next two dates. See panel for secretary's name and address.

Bradford meet on May 14 and 28, and at the first of these there will be a discussion of Field Day arrangements. Both meetings 7.30 p.m. at Cambridge House, 66 Little Horton Lane.

The *British Amateur Television Club* foregather on May 9 to hear from Mr. J. Royle (G2WJ/T) about a "Test Card C" Monoscope Unit. 7.30 p.m. at 10 Baddow Place Avenue, Great Baddow, Essex.

Cray Valley held their April meeting on the 23rd, when they were given a demonstration of Stereophonic Sound, arranged by the G.E.C. On May 28 G3HRO will lead a discussion on SSB, with demonstrations. 8 p.m., Station Hotel, Sidcup.

Crystal Palace will be together on May 7 for their normal "first Tuesday" meeting, and on May 18 there will be a talk on Relays. Both meetings 7.30 p.m. at Windemere House, Westow Street, London, S.E.19.

The programme at **Derby** includes an Open Evening on May 8, a Mullard Film Strip on Indicating Instruments on May 15 and a visit to a place of local interest on May 22 (to be announced later).

Harrow have a Junk Sale on May 10, a Practical Night on May 17, and an informal discussion on Useful Ancillary Equipment on May 24.

Midland (M.A.R.S.) are meeting on May 21 for a Lecture-Demonstration on the Eddystone "888" by G5JU, and on June 18 for a Film and Talk on the Manufacture of Cathode Ray Tubes by Messrs. Mullard. Both meetings will be at the Midland Institute, Paradise Street, Birmingham.

[over

All Clubs and local groups are invited to use this space for publicity and the reporting of their activities. Reports should be addressed to : "Club Secretary," "Short Wave Magazine," 55 Victoria Street, London, S.W.1, and posted to arrive on or before the date given every month at the head of the article. Reports received late cannot usually be taken into this feature.

The future programme at **Norwich** includes the building of the Club Tx, slow Morse instruction and practice, an R.A.E. Course, and talks on Electronic Computers.

Slade will be posing "The 64,000 Question" at their meeting on May 10; on May 24 they return to mundane matters with a talk on the Supply of Electric Power to Moving Machinery. On June 7 they are to hold the election of a general secretary, followed by a talk on Mapping the Galaxy by Radio Astronomy.

Bury will be hearing about Direction Finding from G3HZM on May 14, and June 11 is booked for a Junk Sale. On July 9 they are holding a "Noggin and Natter Night," and they also make the preliminary announcement of their Hamfest on September 14.

Cambridge recently held their A.G.M., at which the officers were all re-elected. The meeting was followed by a talk about IGY by Dr. B. H. Briggs, of the Cavendish Laboratory, who is the Club's president. The next meeting, on May 31, will be a Junk Sale and will be held at the Jolly Waterman, Chesterton Road, at 7.30 p.m.

Clifton meet on May 10 and 24 for Constructional Evenings, on May 12 for a D-F Contest and on May 31 for a Quiz. Their recent Transmitting/Receiving Contest was won by G3KZN and Mr. D. Veasey. All meetings at 7.30 in the Clubroom, 225 New Cross Road, London, S.E.14.

Hartlepools had a very successful evening on April 1, when several visitors were present. SWL's were introduced to "the voices" by a roll-call at which each licensed operator announced his name, call and QTH, and many new friendships were made in this way. Discussion of future activities followed, also refreshments and the "usual swindle." It is hoped to arrange a similar gathering for the near future, to which YL's and XYL's will be invited.

Liverpool forward their news sheet, "5 & 9," from which we gather that they will meet on May 7, 14, 21 and 28, the first three being "Open Nights" and the fourth a D-F Contest from the Clubroom. They want more members, and also more volunteers to give them a talk on any suitable subject. The former VS1GP is now G3LGP in Southport.

Medway meet on alternate Mondays at a new location—The Viscount Hardinge Hotel, High Street, Gillingham. Members recently heard a talk on the AvoMeter, illustrated by slides; the next meeting takes place on May 6. In August there will be an International World Scout Jamboree, for Scouts of the R.C. denomination, at Rochester. Medway will be manning a special station for the whole period, August 12-23, and will be active on four bands. A great deal of help will be required from non-members, and it will be appreciated if any volunteers will contact G2CBA, G3BRJ or G3LCC.

North Kent recently had a talk from G3ANK about his experiences in Aden as VS9AS, where he achieved a considerable success with only a B.2 and a "mediocre aerial." Radio Astronomy (G3JJC) and Magnetic Recording (G3MZ) were other subjects recently covered, while future meetings will comprise a Junk Sale on May 9, discussion of NFD details on May 23 and an NFD Inquest on June 13. On June 27 G8KW will be giving a talk on Geloso Equipment and Mobile Operation. All meetings at 8 p.m. in the Congregational Hall, Chapel Road, Bexleyheath.

South Manchester get together on May 17 to hear about Amateur Uses of an Oscilloscope; on May 31 a Walking D-F Contest takes the place of a lecture. The Club is closed on June 14 and on June 28 G6DN will talk on the Design and Construction of a Mobile Tx.

The **Enfield Group** forwards its news sheet, "The Lea Valley Reflector," from which we learn that they meet on the third Sunday, 3 p.m., at the George Spicer School, Southbury Road Enfield. The "Reflector" contains much social and technical news, with diagrams of an Electronic Aerial Switch, a Two-Metre Converter and a Two-Metre Tx.

Liverpool University has recently formed a Radio Society, activities including Morse classes, lectures and the building of an audio amplifier. Interest has also been shown in instrumentation and radio control. Over forty members have been enrolled in six weeks; membership is open to present and past members of the University—apply to Hon. Sec. for details. *See* panel.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

ASHINGTON: T. G. Musgrove, Millbank Farm, Bedlington, Northumberland.
BRADFORD: F. J. Davies, 39 Pullan Avenue, Bradford 2.
BRITISH AMATEUR TELEVISION CLUB: D. W. E. Wheele, G3AKJ, 56 Burlington Gardens, Chadwell Heath, Romford.
BURY: L. Robinson, 56 Avondale Avenue, Bury.
CAMBRIDGE: F. A. E. Porter, 38 Montague Road, Cambridge.
CLIFTON: C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
HARTLEPOOLS: J. Thompson, G3KQU, 27 Chester Road, West Hartlepool.
LIVERPOOL: W. D. Wardle, G3EWZ, 16 Mendip Road, Liverpool, 15.
LIVERPOOL UNIVERSITY: T. W. Mather, 2 Bedford Street North, Liverpool, 7.
MEDWAY: H. G. Cheeseman, G3KNO, 265 Cliffe Road, Strood, Rochester.
MIDLAND: C. J. Haycock, G3JDJ, 360 Portland Road, Birmingham, 17.
NORTH KENT: D. W. Wooderson, G3HKX, 39 Woolwich Road, Bexleyheath.
NORWICH: H. Staff, G4KO, 59 Charles Avenue, Thorpe, Norwich.
RADIO AMATEUR INVALID AND BEDFAST CLUB: W. Harris, 25 Playford Lane, Rushmere, Ipswich.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham, 23.
SOUTH MANCHESTER: M. Barnsley, G3HZM, 11 Cemetery Road, Denton, Lancs.
SPEN VALLEY: F. Pearson, 24 Fenton Road, Lockwood, Huddersfield.
TEES SIDE: B. B. Wilson, 18 Holdenby Drive, Park End, Middlesbrough.
WEST CORNWALL: (Falmouth Branch) J. Brown, G3LPB, Waterworks, Penryn.

Spen Valley recently debated the question "Should we have a Novice Licence?" Quite a few interesting points emerged, one being that the Morse test is no longer needed! On May 15 the subject is "Businessman's Radio" (G3HHV), and on June 5 there will be a visit to Slazenger's, at Horbury. *See* panel for new Secretary's QTH.

The Falmouth Branch of the **West Cornwall** Radio Club will in future meet at the YMCA, Bar Road, Falmouth, on the first Wednesday of each month; the next after this appearance will be June 5. All visitors (and any new members) will be welcomed. The usual meeting procedure is a talk, followed by a rag-chew. As Falmouth is a holiday centre, they should see some visitors.

R.E.C.M.F. EXHIBITION

In the space of a paragraph, it is hardly possible to do justice to an undertaking like the 1957 Exhibition of the Radio and Electronic Component Manufacturers' Federation, held during April 8-11 at Grosvenor House and Park Lane House, London. Suffice it to say that there were more than 160 exhibitors, with a large spill-over accommodated in Park Lane House, and that once again there was a great deal to see and to discuss. The Exhibition was as crowded as ever and it is reported that a very satisfactory volume of business was done. In the last ten years, radionics component production has increased six-fold, the 1956 output being valued at more than £80m.

PUBLICATIONS DEPARTMENT

Every issue of SHORT WAVE MAGAZINE carries a page advertisement of radio books and periodicals we are able to supply, either from stock or by subscription. In fact, we can obtain for you any technical book or periodical, on radio or any other scientific subject. Through our Publications Department, you can pay in sterling for any foreign publication. Ask for our quotation.

HOLIDAYS—AND HOLIDAY PHOTOGRAPHS

With the holiday season approaching, we take the opportunity to remind readers that we are always interested in short descriptions of Amateur Radio encounters abroad, accompanied if possible by clear, sharp photographs; these should be of strictly Amateur Radio interest, *e.g.*, photographs of amateur stations and personalities, as distinct from, say, the Leaning Tower or the Doge's Palace, with "a friend in foreground." All such material that we are able to use is paid for at good rates.

TTX DX ON TOP BAND

We were very interested to hear from G3KOX/TTX (Southampton) that both he and G3CSZ/TTX (Birkenhead) have been able to work DL2ZO on Top Band, using transistor transmitters. We understand that contact was first established using the main 160-metre transmitter, at both stations.

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.

SITUATIONS VACANT

JUNIOR WIRELESS TELEGRAPHY OPERATORS required by Falkland Islands Dependencies Administration for service in South Georgia for one tour of three years in the first instance. Salary according to age and experience in scale £420, rising to £520 a year. Free board and lodging ; free passages ; liberal leave on full salary. Candidates, preferably single, and must be able to transmit and receive Morse at 25 w.p.m.; they should be familiar with HF and MF transmitters ; P.M.G. Certificate an advantage. Selected candidates to leave U.K., August, 1957. — Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience, and quote M2C/41977/SQ.

THE UNIVERSITY OF MANCHESTER: There are vacancies for four Controllers in connection with the Radio Telescope at Jodrell Bank. Duties will include the operation and maintenance of the telescope control mechanism and recording apparatus, for which some experience of electronics is necessary. Applicants must be prepared to work on a shift basis.—Applications should be sent to the Secretary, Jodrell Bank Experimental Station, Lower Withington, Macclesfield, Cheshire.

TRADE

CONVERTERS, switched, 14, 21, 27 and 28 mc, £3 5s. 0d.; s.a.e. details of complete range. Suitable P/Packs, £3 ; high-pass filters, over 40 dB attenuation, with coax fittings, in neat red case, 19/6 ; 72-ohm stranded coax, 7½d. yard ; new tubular wire-end electrolytics, 8 μF, 2/3 ; 16 μF, 3/- ; 32 μF, 4/- (all 450v.) ; 25 μF, 25v., 1/6 ; 50 μF, 50v., 1/9. Post extra.—G3FXB, 86 Cross Road, Southwick, Sussex. *(Southwick 3382).*

WANTED: Wireless Set 62, Air Ministry Sets TR-1934, 1935, 1936, 1950 and MR-80, R1132B, PSU 234A ; also S+DX 3CHDX and 1+1 Terminals.—R. Gillfillian & Co., Ltd., 7 High Street, Worthing, Sussex. *(Tel.: Worthing 30181).*

TWELVE ONLY, Rx Type R3547, incorporating 22 valves, relays, electric motor, etc.; IF chassis, Type 153. New, in original case, £3 10s. 0d. each, carriage paid U.K. Sixty only: Control Units, Type 214 ; very useful components ; in metal case, 11in. x 8½in. x 4½in. Gift at 7/6 each (carriage paid U.K.).—G3AZO, 11 Brunswick Road, Cattedown, Plymouth.

G3CGD QSL's.—Fixed and mobile samples on request. Printing enquiries welcome.—30, St. Luke's Road, Cheltenham.

TELEVISION INTERFERENCE. — Receiver Filters: High-pass E.5037, 30/- ; Low-pass E.5031, 30/-; Composite Band I/III, 49/6. Transmitter Filter E.5034, 80 dB, .1 kW, £6. — Labgear (Cambridge) Ltd., Willow Place, Cambridge.

QSL's and Logs by Minerva. The best there are.—Samples from Minerva Press, 2 New Road, Brentwood, Essex.

SMALL ADVERTISEMENTS, READERS—*continued*

AR88D RANGE SWITCH, new, with screens, 50/-; 45 mc harmonic indicator in case, with power pack and 50 microamp meter and 6 valves, partly built, 75/-; field strength meter with set of 5 Eddystone plug-in coils and 50 microamp meter in case, for Amateur bands, 45/-; field strength meter for 45 mc, xtal type with 50 microamp meter, in case, 30/-. Morse Key, P.O. type, with brass and glass cover, 25/-; 829B with base, 30/-; Eddystone Tx Condenser, Type 137, 12/-; Coax relay, 12/24v. Type 78A, 15/-. Meters (thermocouple) for RF: 14 of 0-350 mA, 2in., projecting, 3/9 each; 4 of 0-1 amp., 2in., projecting, 4/- each; 8 of 0-1 amp., 2½in., projecting, 4/6 each. Meters, m/c 50 mA: 2in., flush, 4/-; 2 of 0-250 microamp, 2½in., projecting, 8/6 each; 0-300 mA, 2½in., flush, 7/6; 0-30 mA, 2½in., flush, 7/-; AC volts 0-20, 2½in., flush, 7/6; 0-300v., 2½in., flush, 12/6. Books: *Short Wave Magazine,* Volumes 7 to 14, 10/- per volume; *R.S.G.B. Bulletin,* Volumes 28-29-31, 7/6 volume; *Short Wave Listener,* Volumes 3 to 6, 6/- volume; *Radio Construction,* Volumes 2-6, 7/6 per volume.—Sephton, 16 Bloemfontein Avenue, Shepherds Bush, London, W.12.

FOR SALE: Old Barn Cottage, Chiddingfold, Surrey. The "Q5-R9" QTH of G3HCU! One of the finest spots in the country for Amateur Radio. Delightful rural district.—Write, or phone *Chiddingfold 111,* or *Str. 4289.*

FOR SALE: HRO Senior in good condition, C/W power pack, 8 coils (4BS, 4GC), complete set of new boxed valves, speaker; worth £20 or more. For quick sale accept £15. C/W manual.—G3HUM, 25 Cheriton High Street, Folkestone. *(Tel: Folkestone 75248).*

SHACK-CLEARING: 10/6—Collins mod. Trans.; audio output. 7/6—Eddystone PA Formers 5-pin bases; 600v. 4 μF; 1000v. 4 μF; 500 μμF Twin-Gang. 3/-—600v. 2 μF; 1200v. .01 μF. £14—160/80m. Phone/CW/Transmitter. £10—2m. Phone Transmitter; Eddystone 400B receiver. £9—160/80m. Battery Transceiver. 75/-—2m. Converter; 1355 receiver. Add carriage. WANTED: Type 247 Power/Pack.—G3ATL, Hugglescote, Leicester.

EDDYSTONE 680X for sale, £80; excellent condition; just had complete check-up by Webb's; seller requires Eddystone "888."—Apply Box No. 1863, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: B2 Minor Tx/Rx, complete; two xtals for 3.5 mc; ready to go on air; ; output 5 watts; £10.—Write G3JJU, 93 Hills Road, Cambridge.

FOR SALE: Collins 75A-3 Receiver; used only to test on delivery; with matching speaker; for immediate sale at £90 10s. 0d.—M. A. Powers, 15 Wavedene Avenue, Lea Thorpe, Egham, Surrey.

SALE: Woden UM2, £3; set new AR88LF 735 kc IFT's, including xtal, £4 (o.n.o.). — G3HXS, 6 Bromley, Long Marston, Tring, Herts.

LG300 TRANSMITTER, mint condition, £42. Labgear 1 kW low-pass filter, new, £4 10s.; high-pass, £1. Complete power unit, relayed, rack-mounted, 866's (P/P 807), AB2 modulator, UM3, £15. —Harrison, G3CDC, 5 Upton Drive, Sherwood Notts.

SMALL ADVERTISEMENTS, READERS—*continued*

R208, good condition, 10-60 mc, speaker, AC mains or 6 volts, with instructions, £7.—John Whitington, 45 London Street, Worthing, Sussex.

HALLICRAFTERS S.27D VHF Communications Receiver, 28 to 143 mc; switched AM/FM; S-meter, ANL; 15 valves; push-pull output; £15, plus carriage.—Parsons, 90 Maesycoed Road, Cardiff, Glam.

COMPLETE STATION, 120-watt AM/FM; TVI-proof, fully-screened 10-metre transmitter; all stages metered; 100-watt modulator; own power supplies. Bendix mast (2 spare legs), 3-element beam, large-type pitch-prop motor, Selsyn unit, coax relay. Remote control VFO; 2-stage audio pre-amp. Beam, relay supply Eddystone 640, S-meter, speaker; D.104 mike; spares, etc. First £70.—G3YB, M. Smith, 61 Orchard Road West, Manchester, 22. *(Wythenshawe 4832).*

MIDGET "SPY" Tx, Type 51/1, 3-12 mc, 4-watt; easily fits pocket; built-in P/Pack, key, RF indicator with aerial, Govt. manual, etc. Midget "Spy" Rx, Type 53/1, mains or battery, only 14 oz., P/Pack; deaf aid type xtal earpieces; aerial and manual; £10 the lot. BC453 Type Top Band Rx with 24v. fil; 250v. HT P/Pack, 12in. speaker; all in case; good performances; £5. Automatic Record Changer, magnetic PU, £3. Voightlander Bessa 66, 3.5, with GEC light-meter, leather case, £15. 1448 Rx, less coils, £3. Premier VCR-97 TV, £5. 12in. Goodman's Hi-Fi speaker, £4. Goodman's Audiom 70, cone resonance, 35 c/s, 20-watt, new, accept £10. German VHF Rx, 12 valves, 22-62 mc, xtal calibrator, variable selectivity, 4-band turret, £3. Eddystone "All World Two" Rx, with coils in box, 9-170 metres, instructions, £2. 19 Set P/Pack, 15/-. Large multi-tapped output speaker transformer, £1 10s. 0d. VCR-97, 10/-; 3-inch, also 10/-; new 813, £1. 80-metre Tx in Eddystone cabinet, TVI built-in P/P modulator, relays, 15 watts Phone, 25w. CW, grid-plate-aerial meters, professionally-built circuit, £10. WANTED: Ekco Portable TV.—Box No. 1864, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Five American Midget Relays, spot 10,000 ohm coils (write full specification), with five 12AU7's, etc., £4 (o.n.o.).—Box No. 1865, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: BC-1147 Bendix Communication Rx, 1.5-30 mc; 13 valves; two RF, Mix-Osc. (stabilised); three IF; in very good condition; £23 (or near offer). Also Eddystone 504, 10-valve Receiver, 500 kc-30 mc, in five bands, two RF stages; Xtal filter, BFO, S-meter, professionally re-built with miniatures throughout; £35 (or near offers).—Simpson, 149 Broomhall Crescent, Corstorphine, Edinburgh, 12.

SALE: QRP Wilcox-Gay Tx (Described Oct., 1952 *Bulletin*) including p/pack ATU, £3 10s. 0d.; Oscillator, Type 145 and p/pack, £4; Wavemeter, 1.7-2.0 mc, 100 kc xtal, old design but very sound precision instrument, p/pack and calibration curves, £3; 160/80 metre FM/CW 10w Tx, with p/pack and ATU, neat, compact, £5; CC 144 mc Converter, IF 24-26 mc, 40s.; 144 mc 4-ele. Yagi, 10s.; o.n.o. for any item; prefer purchaser collects.—44 Hazell Road, Farnham, Surrey *(Phone: 4511).*

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Minimitter Tx, purchased October last; only had 30 hours on air; immaculate appearance. Also low-pass filter; aerial relay unit; G.E.C. m/c mike. £70 (plus carriage).—David, 142 Western Avenue, Sandfields, Port Talbot, Glam.

HAMMARLUND Super-Pro, Model BC779B, with power supply, in tip-top condition; covers Top Band (160 metres); market value £38, sell for £25 (o.n.o.).—Halls, 54 Victoria Avenue, Redfield, Bristol.

EXCHANGE: Eddystone 840 Receiver, little use, excellent condition; radio course; odd aerial items — for motor-cycle. — 20 Cromwell Road, Dorchester, Dorset.

WANTED: Mobile Tx/Rx, 6- or 12-volt., complete and ready for air, covering 21/28 mc. State price and description.—GM3HLQ, Hallbyres, Strathaven, Lanarks.

EDDYSTONE 750, modified S-meter, £36 (o.n.o.); demonstrate/deliver reasonable distance.—GM3EST, 76 Jerviston Road, Motherwell, Scotland.

TRANSMITTER, 10-60 megacycles, W.S.36. 120 watts, high-level modulation, etc., £19.—Write: 2 Allnutts Road, Epping, Essex.

SPRING Cleaning: Books, valves, crystals, Woden transformers and chokes, meters, condensers, Labgear VFO, B2 Tx/Rx, etc.—S.a.e. for list to: G3ATH, MQ27, Tattershall, Lincs.

FOR SALE: Eddystone 750, good condition, £37 10s. 0d.—Andrews, Merryweather, The Green, Wingham, Canterbury. *(Tel.: Wingham 320).*

BC453B, £3; TCS6 Tx, £10; TCS6 Rx, £10; BC348-0, £12; 28 mc Tx, TT15, output, TVI-proofed, £6; 3.5 mc VFO, 5763's, £3; G2IQ 2m. converter, £2 10s.; Tx, QQVO6-40 output, £6 10s.; VHF mobile Tx and Rx, 118-174 mc, 12v. input, £15; CR100/5 receiver, FB condition, £15. Valves: QQVO6-40's, 50/-; 829's, £1; TT15's, 15/-; 5763's, 15/-. Handbook SCR522, £1.—Box No. 1866, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SHORT WAVE MAGAZINES, pre-war and post-war; *Practical Wireless, Wireless World*, 1947 onwards; mostly complete volumes; best offer secures. New 813; other components; s.a.e. details. —G2AOZ, 18 Gipsy Lane, Nuneaton *(Tel. 4619)*, Warks.

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*Extract from a letter from GM3KJB, Bellevue Crescent, Ayr — an unsolicited testimonial.

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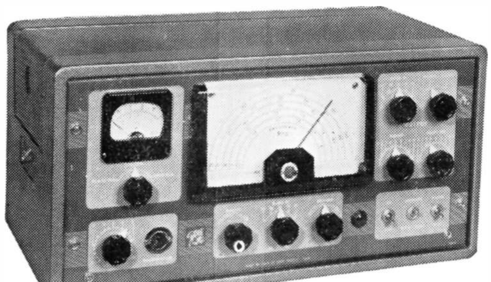

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Printed by The Courier Printing Co. Ltd., Tunbridge Wells, for the Proprietors and Publishers, The Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following: Continental Publishers & Distributors, Ltd., William Dawson & Son, Ltd.; AUSTRALIA AND NEW ZEALAND—Gordon & Gotch, Ltd.; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *May, 1957.*