The SHORT WAVE Magazine

2/6

VOL. XVII JUNE, 1959 NUMBER 4

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The SHORT WAVE Magazine

EDITORIAL

Progress *All through the years, Amateur Radio has shown a steady process of development — from the loop-modulation and directly-keyed SEO transmitters of the early days, down to the modes and methods of the present time.*

During this long period, it has always been pretty clear " what was coming next." From telephony by absorption loop we went to grid control, then to choke modulation (still used in BC transmitters) and after that to high-level amplitude modulation as it is known today. The telegraphy transmitter has changed from the old keyed-oscillator-with-aerial-tapped-on (quite capable of giving a T9 note in the hands of those who knew what they were doing) to the elaborate CW systems now in use, which can give break-in working with all stages of a high-power transmitter cut dead when the key is up.

It would seem difficult to see in what way we can advance. But phone men would be quick to point out the advantages of SSB, and CW operators the attractions of RTTY — sending and receiving by teleprinter.

There can, in fact, be little doubt as to the direction in which we are now heading. Within a minimum period of, let us guess, five years, the great majority of phone stations will be on Single-Sideband, radiating far more effective power than the AM stations of the present day. The only factor which can prolong the life of high-level amplitude modulation is its simplicity as compared with SSB. But nothing succeeds like success, and so we shall see it the rule rather than the exception for telephony stations to be on Sideband.

While the keyed carrier — or, in other words, CW telegraphy — is at present the easiest and the most accurate and reliable method of communicating over any distance, it has some disadvantages — manual keying and the writing out of the received message — which are to a certain extent overcome by the radio-teletype system of " sending and receiving on a typewriter."

Though SSB is already well with us, the development of radio teleprinter communication (RTTY) is likely to be a much slower process for amateurs, because for one thing the need for it is not so pressing, and for another expensive apparatus is required. What it comes to is that while SSB gives marked advantages for DX phone working, straight CW is still (in the purely Amateur Radio context) a very reliable and economical method of communication compared with any known telephony system — if the requirement is simply efficient communication.

It can be said, then, that while all the real DX is still being worked on CW (and so it will be for a very long time to come), telephony communication in the DX sense has been given a considerable fillip by the advent of SSB.

Austin Forbes G6FO.

Top Band in Two Hours

RAPID CONVERSION OF COMMAND TRANSMITTER CCT-52232

The particular type of Command set discussed here makes a very nice 160-metre CW transmitter, and the modifications involved also have the merit of being quick and easy.—Editor.

THE popular Command Transmitter (SCR-274N or ARC-5) has at times been available in various versions, the best-known being the BC-457, 458 and 459, covering respectively 4·0-5·3 mc, 5·3-7·0 mc and 7·0-9·1 mc. Until recently, however, the type covering 2·1-3·0 mc has been fairly hard to come by.

These units have now appeared on the market in the form of the Navy version, CCT-52232, and they are suitable for a quick and very simple modification into Top Band transmitters.

The conversion is in two parts: First, the QSY to the 1·8 mc band; second, the adaptation from 28 volts DC to 12 volts AC for the LT supply. (The HT is in any case supplied externally and involves no alteration of the transmitter.)

The "QSY" operation consists merely of unlocking two variable condensers used for padding and re-setting them at a larger capacity. The modification of the heater wiring is almost equally simple. The only other desirable alterations are the removal of a large "mangle" type loading coil, so that the transmitter can feed an orthodox ATU, and the provision of a co-ax socket for this purpose. (If mobile work is intended, even this job is not necessary, and the loading coil may be left exactly as it is.)

The Circuitry

The VFO (V54) is a 1626 in an electron-coupled circuit, the anode being earthed from the RF point of view. The oscillatory circuit across grid, cathode and earth, is inductively coupled straight to the grids of V55 and V56, the parallel 1625's in the PA. The heaters of the latter two valves are wired in series, and the heater of the 1626 is in series with that of a 1629, which is a "magic-eye" type of resonance indicator used in conjunction with a 2·5 mc crystal for checking the calibration on the original 2·1-3·0 mc range.

Since 28-volt operation is apt to be inconvenient from every point of view, it was considered essential to modify the transmitter to work on either 12 or 6 volts; eventually 12 volts was decided upon, as the existing valves

Table of Values

Fig. 1. VFO section reference

C58A, C58C	= .05 μF	R72	= 51,000 ohms
C59	= 180 μμF	R74	= 15,000 ohms
C60, C63	= 220 μμF	T53A, 53B, 53C	= Single unit comprising VFO coils
C68	= 3 μμF trimmer	V	= 1626
R68	= 20 ohms		

(Note: Circuit element numbering is as in original.)

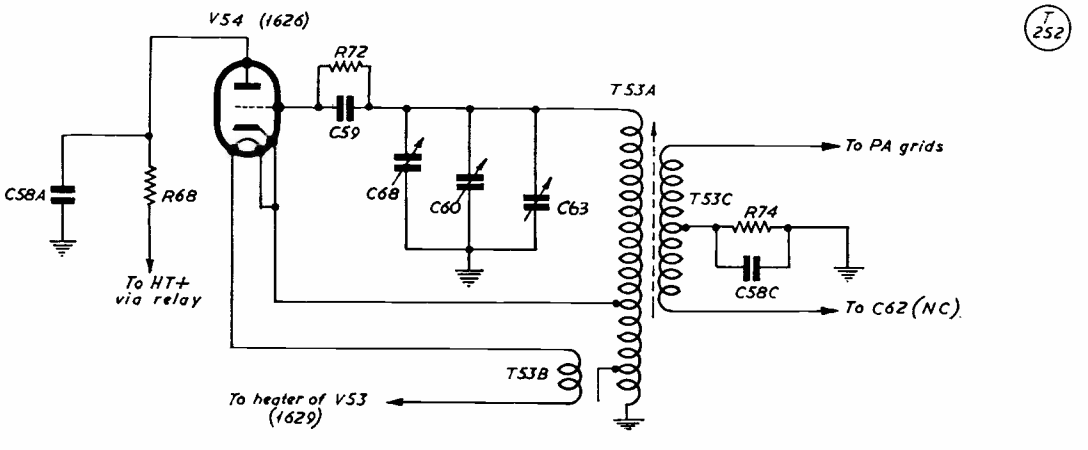


Fig. 1. Part of the VFO section of the Command transmitter type CCT-52232 (similar to the BC-457/459 series) covering 2.1-3.0 mc. This version has an electron-coupled oscillator of the grounded-anode type as VFO; nothing need be altered in this part of the circuit for the Top Band modification, except only that the padder C60 is increased in capacity — see text.

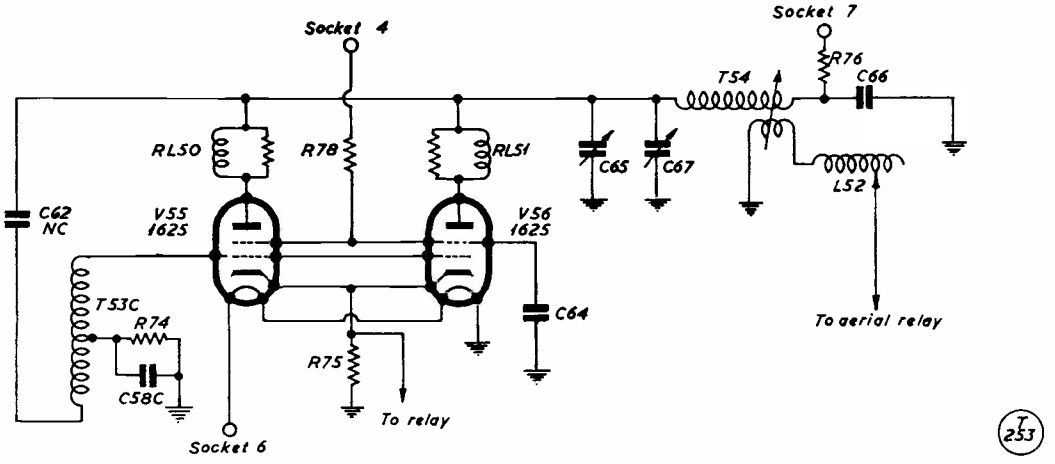


Fig. 2. The PA side of the CCT-52232 Command transmitter, running a pair of 1625's (12v. 807's). For the Top Band modification, the only alterations needed are the removal of one 1625 and the shorting of its heater connections; the removal of L52; and an increase in capacity on C67. The work involved in getting the CCT-52232 Command Tx on to 160 metres can actually be done in about an hour.

can be used. First, then, one of the 1625's is removed and put in the " spares " box (no one wants two of them in parallel for 10-watt operation!) and its heater tags shorted with a small piece of wire. It doesn't matter which one is removed—the heater of the other one will now operate if 12 volts are applied.

Dealing similarly with the VFO, the heater tags of the 1629 (pins 2 and 7) are likewise shorted across, which will leave the 1626 VFO ready to operate with 12 volts applied.

Next, remove the metal cover from the VFO assembly, disclosing the transformer (coils T53A, 53B and 53C) and the padding condenser C60 (the tuning condenser C63 is under the chassis, ganged with C65, an exactly similar condenser which tunes the PA). Remove the locking screw from C60 (it is held in position by a tag which is simply screwed to the body of the condenser by a self-tapping screw). C60 can now be adjusted to a suitable capacity before replacing the metal cover, and then left alone.

A similar operation is next carried out on C67, the PA padding condenser (the centre one of the three underneath the chassis), so that it, too, can be set to an increased capacity, the final adjustment made, and then left untouched for ever more (if all goes well!).

The on-off relay, mounted under the chassis and near the base of one of the 1625's, breaks the oscillator anode circuit and the PA cathode circuit. It is *not* suitable for keying, and the easiest way of dealing with it is simply to jam it in the closed position with a small piece of cardboard under the armature. (It can, of course, be removed, and the two pairs of leads from its contacts permanently soldered together. Alternatively, again, the oscillator cathode lead may be removed from the relay and taken to a keying jack which can be mounted on the front panel, for that proves to be the best method of keying the converted Tx.)

Table of Values

Fig. 2. PA section affected by modification

C58C	= .05 μF	R78	= 51 ohms
C62	= Fixed neut. cond.	T54	= Tank coil with link
C64	= .002 μF	L52	= Ae. loading coil
C65, C67	= 220 μμF	RL50,	
C66	= .01 μF	RL51	= APC
R74	= 15,000 ohms	V	= 1625
R75	= 51,000 ohms		
R76	= 20 ohms		

(Note: Circuit element numbering is as in original.)

Final operations take place immediately behind the front panel, with the removal of the " mangle " (L52), which makes an admirable Top-Band coil for use in the station ATU. The lead which connects one end of it to the variably-coupled link coil inside T54 is simply removed and connected, instead, to a co-ax socket mounted at the top left-hand corner of the front panel. The aerial relay may also be removed.

Further Details

The following quick notes may be of interest: First, nothing need be done about the wiring of the 1629 circuit except the removal of the valve and the shorting across of its heater

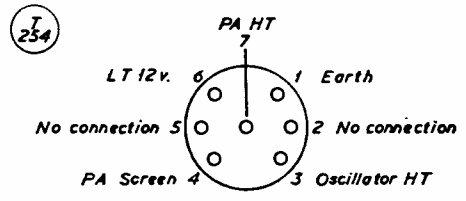


Fig. 3. The power socket for the CCT-52232 Command transmitter, viewed from the rear. No external connections are made to pins 2, 5, but internally pin 2 is connected to the centre-tap of the PA grid coil, and pin 5 to the two relays (which are either removed or made inoperative).

terminals. Secondly, nothing need be done about the 2·5 mc crystal except to remove it from its socket. Thirdly, it may be thought that the fixed neutralising condenser for the 1625's will be useless, now that one of them has been removed. Probably this is correct, but it appears to be quite unnecessary to disconnect it and there is not a trace of instability about the operation of the PA.

Fig. 3 shows the connections to the power socket at the rear of the transmitter. Any convenient power pack may be used, provided that it is possible to feed about 300 volts to Pin 7 (PA HT); about 200 volts to Pin 4 (PA Screen); and about 150 volts to Pin 3 (VFO HT). The latter may with advantage be stabilised, and it is even possible to adapt the now unused 1629 socket to take a VR-150 for this purpose, or stabilised HT may be fed from an external source. Even without a stabiliser, the note is an extremely good T9 or T9x, and the cathode keying of the PA does not pull the oscillator frequency to any noticeable extent. *With* stabilisation, the CW note is superb and simply cannot be distinguished from a crystal-controlled transmission.

Setting Up

The testing-out operation should be run through in the following order: Having carried out the heater mod., as described, apply 12 volts AC across terminals 1 and 6 of the power socket at the rear; confirm that the 1626 and the remaining 1625 light up.

Next, apply 150 volts DC across terminals 1 and 3 (1 being the common earth). The VFO should now oscillate and should be easily found on the station receiver. If the padder, C60, has not yet been touched, the dial calibration should be quite accurate. Now increase the capacity of this padder until a dial reading of 2·2 mc gives an actual frequency of 1·8 mc. Replace the cover on the VFO unit, which can now be left alone — no further adjustments will be necessary.

The PA may now be made "live" by applying around 200 volts, for its screen supply, across terminals 1 and 4; and finally 250-300 volts, for its anode supply, across terminals 1 and 7. With a resonance loop and bulb coupled to the tank circuit (mounted vertically on the top of the chassis), adjust the under-chassis padding condenser C65 — the one of the three similar condensers which is not driven by the slow-motion control—for maximum RF.

Now rotate the slow-motion dial until the transmitter is tuned to 2·0 mc (this point should correspond with an actual reading of about 2·55 mc on the dial) and again check C65 for maximum RF in the tank circuit. If it proves to be slightly out, tune to 1·9 mc and set it, once and for all, at the centre of the band. The tracking is normally excellent and needs no adjustment even at the band edges.

If the "mangle" has been removed, and the variably-coupled link coil led out to a co-ax socket, the transmitter can now be coupled straight into the station ATU, and optimum coupling for the link will soon be found. If a keying jack has been installed (between 1625 cathode and chassis, as mentioned earlier) a 0-100 milliammeter may be plugged into it and the necessary adjustments made to the HT supply and to the output coupling to give the statutory ten watts of input. The actual transmitter described runs at roughly 33 mA with 300 volts HT.

An external keying filter will be desirable, but this will normally be a piece of station equipment rather than a circuit installed inside the transmitter, and no further comment is necessary here.

The power pack, also, is a matter for individual preference. One which gives 300 volts at about 50 mA is perfectly satisfactory, with a screen dropper of about 20,000 ohms and another dropper of 10,000 or 15,000 ohms for the oscillator supply. If a VR-150 for stabilising purposes is mounted inside the case, as suggested, 10,000 ohms may be a little on the low side, but the value must be found by experiment. Naturally, on a voltmeter check, the voltage on the oscillator anode must not fall below 150 volts on load, or the stabiliser will be pointless.

A directly-calibrated scale could be fixed to the main dial, which now gives an excellent "spread" and can be accurately read to 10 kc divisions. Furthermore, it certainly will not vary, once everything has been anchored down and the power-supply adjusted. The 12 volts

AC supply may conveniently be obtained from a normal small power pack with a further 6·3 volt heater transformer wired in series with the existing 6·3 volt heater wiring (the right way round, please !).

Finally, if it is desired to run the transmitter from a 6·3 volt supply, this may be done quite easily. Substitute a 6J5 for the 1626, and an 807 for the 1625, after having suitably modified the valve-holder. The 1625 takes a seven-pin base, but two of the pins are unused ; and by a little filing away of the insulating material round pins 2 and 5, an 807 can be made to fit, with the necessary changes in base connections.

Although all the foregoing refers specifically to the matter of modifying the 2·1-3·0 mc transmitter for Top Band operation, most of it is also applicable to modification of other types of Command transmitter to other bands.

L.H.T.

Taking Facsimile Transmissions

DETAILS FOR THE DRUM, GEARING AND TRACKING STYLUS

PART III

J. B. TUKE (G3BST)

The earlier parts of this article appeared in our April and May issues, to which reference should be made in following the construction. — Editor.

WHILE the writer will describe in some detail his own set-up on the mechanical side, it is suggested that this should be used more as a guide than a design to be followed in meticulous detail, as it is here that individual ingenuity will come into its own. Also, those who may have a workshop and a lathe they know how to use will no doubt produce a better looking job than those who have not—though there is no reason why results should be any better or worse. Incidentally, the writer has neither workshop nor lathe, so do not be discouraged if you are not an expert mechanic !

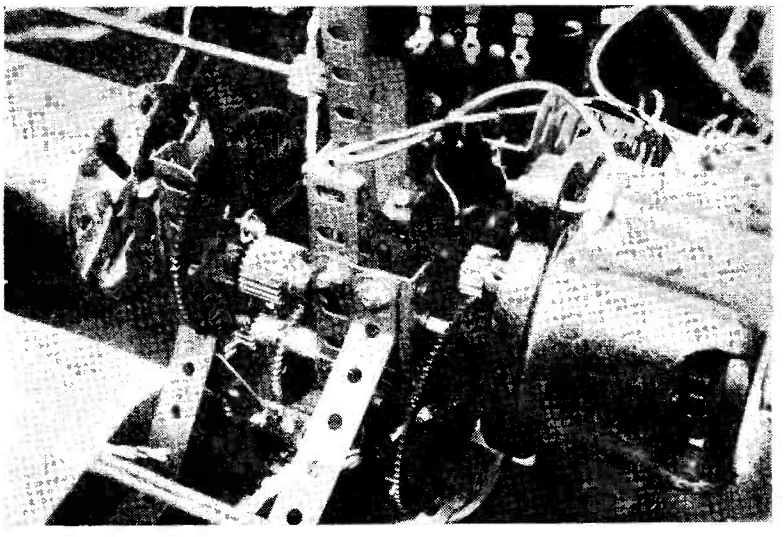
The first step is the construction of the drum. The writer uses a drum five inches long and two inches in diameter ; this size was chosen in order to economise on sensitive paper. The system as a whole is capable of very fine detail and in the light of experience it is felt that a larger drum would perhaps produce better detail under poor operating conditions. The small size will give all the detail required if the channel is clear but if " noise " is present in the transmission some of the finer writing is inclined to become fuzzy. If cost is a factor it must be remembered that doubling the map size will put the expenditure on paper up by four times. Whatever size drum is chosen, however, the construction can follow the same general lines.

Making the Drum

A length of 2-in. copper pipe was obtained from a plumber, cut carefully to exactly 5 ins. in length and tinned at the edges. Two Meccano plates (Part No. 109) having had all their paint removed were also tinned, then placed over either end of the drum with the brass bushes facing outward, and a Meccano rod (Part No. 13) run through the centre and pulled tight by the grub-screws in the face plates. The pieces of rod extending either end were then placed in temporary brackets made from Meccano strip so that the drum could be spun round by hand and the face plates adjusted so that the rod was exactly central. (The experts will, of course, do this in a lathe, but centering by hand is quite satisfactory considering the slow working speed of the drum when in use.) When the best possible adjustment had been obtained, the drum was supported vertically in a vice and the plates were soldered to the drum by means of a large electric iron (250 watts)—hence the reason for the tinning. If a large electric iron is not available, a small blow-lamp should be used as it is essential for plenty of heat to be available if the job is going to be a success. The end-product is a drum mounted centrally (one hopes !) on a long Meccano rod and the next step is to arrange gearing to drive it at the required speed from the 3,000 r.p.m. motor. The overall gear ratio will be either 50:1 or 25:1, according to whether 60 or 120 r.p.m. is required. Again, individual ingenuity can be brought into play and the mechanical expert can no doubt design a two-speed gear box without any further advice. The writer simply used Meccano gears.

Gearing Details

It is first necessary to remove the small 14-tooth gear which comes fitted to the motor.



The drum gear-train, set for the 120 r.p.m. drive, for G3BST's facsimile receiver. Meccano parts are used and have proved very satisfactory under practical operating conditions.

This is done simply by unscrewing the nut on the end of the shaft, when it will slide off. In its place is fitted a 19t. Meccano pinion (Part No. 26). This is of slightly too large an internal diameter and it was necessary to make a small metal tube to fit over the motor spindle to bring it up to the correct size. A small piece of brass rod was first drilled to correct inside diameter, then crudely " turned down " to correct outside diameter by using an electric drill mounted in a vice with the brass tube held in the chuck, and pressing down on it with a coarse file while it spun round ! However much the experts may gnash their teeth in horror, this produced a completely satisfactory job and can be safely recommended to anyone without that lathe. Since part of the tube is held in the drill-chuck and cannot be " turned down " the tube is made slightly longer than is actually required, and the finished piece is cut off.

The motor pinion (19t.) meshes with a gear wheel of 95 teeth (Meccano part No. 27C) attached to a layshaft which in turn drives a 25t. pinion (Meccano part No. 25) ; this meshes with a 50t. gear (Meccano part No. 27) on a second layshaft which drives a 19t. pinion ; the latter meshes with a 95t. gear wheel which is fixed to the drum-shaft. The reduction ratios are therefore 5:1, 2:1, and 5:1 giving a total reduction of 50:1 between motor and drum.

To cater for a drum speed of 120 r.p.m., the 95t. wheel on the first layshaft is removed and mounted directly on the second layshaft in place of the small fixing collar, the first layshaft running idle. This misses out the 2:1 reduction ratio making the total reduction only 25:1, therefore running the drum at 120 r.p.m.

The motor is mounted on a pivot and is swung over to make contact with the 95t. gear wheel in its new position. The arrangement is shown diagrammatically in Fig. 6, and in the photograph. When running on 120 r.p.m., since one gear stage is missed out, the direction of motor rotation must be reversed. This is arranged by switching the condenser lead on the motor from one side of the 50 c/s supply to the other— it will be remembered, from Part II in the May issue, that a 10w. reversible motor of " surplus " origin is used.

Having arranged for the drum to rotate at the required speed the next thing is the tracking of the stylus across the cylinder. It was this

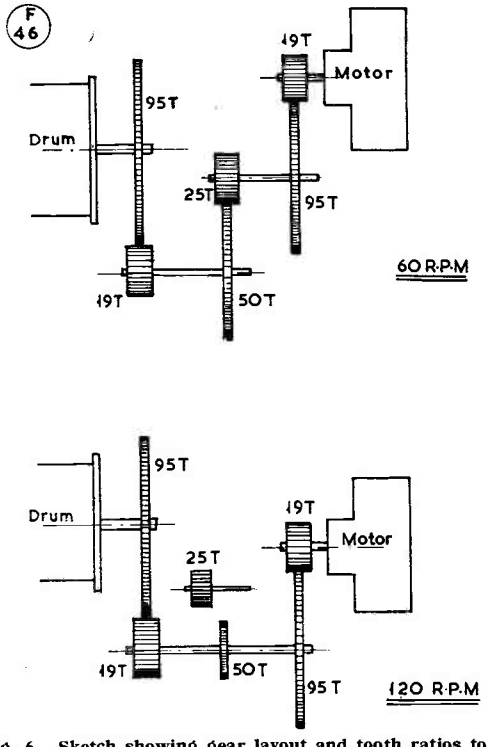


Fig. 6. Sketch showing gear layout and tooth ratios to get correct turning speeds — see text.

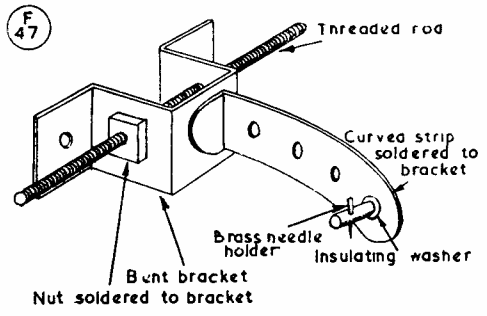


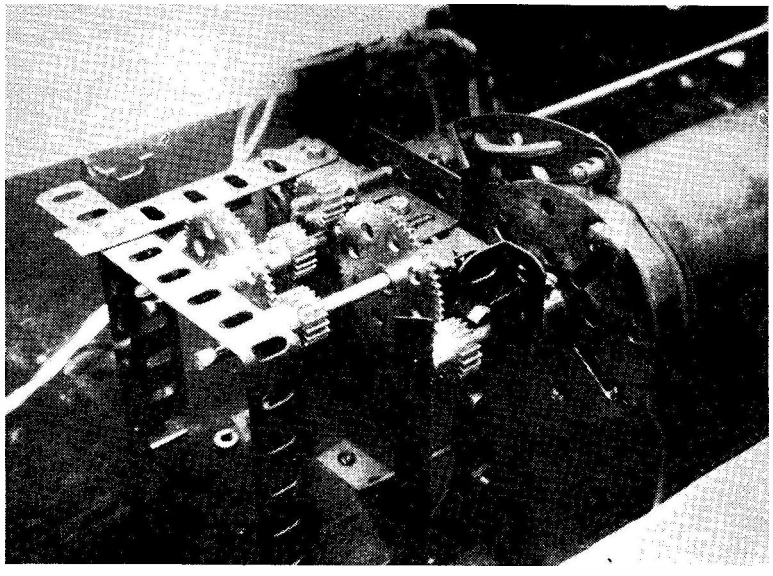
Fig. 7. The manner in which the stylus can be mounted; a gramophone needle is used, which has to be changed fairly often.

that set the greatest problem as the writer could find no books giving information about facsimile in any detail. It had been innocently supposed when the project was first started that a trip to the public library would provide plenty of technical information, but this was not the case. The local library produced nothing in spite of being well stocked with technical books, and a request card filled in for "Any book dealing with facsimile transmission or reception" eventually produced a book which dismissed the entire subject in three lines! None of the writer's friends seemed to know anything about the subject—indeed, one or two of them said the whole project was impossible—so that the only thing left to do was to determine the scanning rate by experiment.

It became apparent that most 60 r.p.m. transmissions lasted around 22 minutes. During this time the drum would make $22 \times 60 = 1{,}320$ revolutions. This figure of 22 minutes does not appear to be the same from all stations, but it seems to be a good all-round average. The stylus would therefore have to travel across $4\frac{3}{4}$ inches during 1,320 revolutions of the drum. To track the stylus it was decided to use a lead-screw consisting of a length of Meccano threaded rod (Part No. 78). This has a pitch of 32 t.p.i. and this rod will therefore have to rotate $32 \times 4\frac{3}{4} = 152$ times for 1,320 drum revolutions. If the rod is driven by gearing from the drum the reduction ratio will be 1,320/152 = 8·5 approx. This ratio is not possible with simple Meccano gears and it was decided to use 9:1 and see how it worked out. In fact it works out remarkably well, and the pictures appear to be correctly proportioned and to fill the space correctly. To arrange this 9:1 ratio, two 3:1 ratios are used, obtained by two pairs of 19 and 57 toothed gears (Parts No. 26 and 27A). A further 1:1 gear is necessary in order to obtain correct direction of the lead-screw and this is arranged by a pair of 19t. wheels meshing together. The set-up is shown in the photograph below.

All the gears are carried in Meccano strips, cut and bent to the required shape and the entire mechanical set-up is secured to a large wooden baseboard, as shown. The baseboard size should be about 19 ins. by 16 ins.

The stylus is carried on a small Meccano curved strip (Part No. 90) attached to a Meccano double bracket (Part No. 45). To provide tracking two Meccano nuts are soldered to the bracket, the rotating threaded rod passing through these nuts and so tracking the bracket along the rod and across the drum as shown in Fig 7. The stylus itself is a gramophone needle (medium or soft-tone type) held by a screw in a small collar of brass. This is insulated from the stylus carrier strip by insulating washers and a thin wire is led away from this to the transformer feeding the stylus from the signal amplifier (to be described later). The



The Meccano gear-train used for processing the stylus across the drum in the facsimile receiver designed and constructed by G3BST. Good charts are produced from Met. stations in many parts of the world, the degree of transcription error being so small as to be negligible.

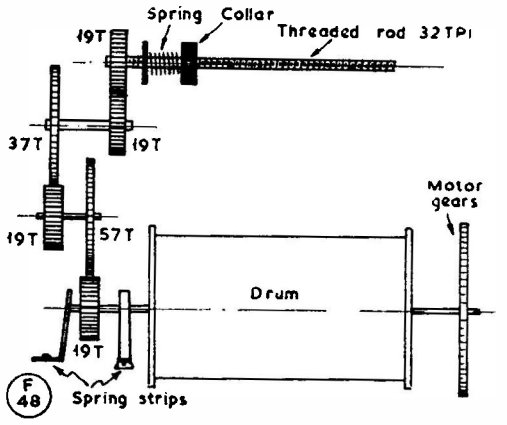


Fig. 8. The gear-train layout for the drum and the transverse drive for the stylus.

stylus pressure is not very critical; a light pressure seems to work best and the arrangement shown has proved entirely successful. If a different type of stylus carrier is used, then it should be noted that too light a pressure produces a very dark, but somewhat fuzzy trace, preventing fine detail from being realised, but too heavy a pressure tears the paper. The gramophone needle stylus does not last very long—about three or four maps is about all it will make before it develops a marked "flat," when the picture seems to lose contrast and take on a grey tone over-all. However, needles are quite cheap and easy to come by.

The small spring on the lead-screw (see Fig. 8) is to prevent lateral movement of the rod which would upset the line scanning. The spring strip pressing on the end of the drum shaft (made from a piece of hacksaw blade) is to prevent lateral movement of the drum for the same reason. The springy copper strip bearing on the drum shaft is to ensure good electrical contact with the rotating drum. It is no use attaching a wire to one of the Meccano strips and relying on a touch contact between strip and shaft to complete the electrical circuit!

The slack inherent in Meccano gears has not been found to give any trouble except a little noise. These gears are quite noisy when new—particularly the first layshaft when running at 120 r.p.m., but they quieten down in time, and have the overwhelming advantage that they are cheap, durable, accurately cut and easily obtainable.

The electro-sensitive paper is known as "Teledeltos," and is made by Creed and Co. Ltd., of Croydon, Surrey, from whom it is obtainable direct. It is available in rolls of any reasonable length and any width not more than 22 inches. The price is approximately 5d. per square foot, and two to three weeks should be allowed for delivery time. It is easily stored, does not deteriorate in keeping, operates perfectly dry giving a black record on pale grey paper. It should be bought in a width suitable to fit the drum in use, a length being cut from the roll to pass round the drum with an overlap of about half an inch. The overlap should be in the correct direction so that the stylus passes freely over it. The paper is secured to the drum by an elastic band at either edge.

One final point—when a picture is completed, the stylus carrier must be "re-wound" from right to left to bring it into a position ready for a new transmission. This is achieved simply by loosening the grub-screw on the 19t. pinion fixed to the lead-screw, and twisting the rod in the reverse direction between the fingers. It only takes a few seconds.

(To be concluded.)

RADIO AIDS FOR LONDON RIVER

The Port of London Authority has opened a new Thames Navigation Service, which will greatly increase the safety and speedier working of Thames shipping, particularly during bad weather. Basically, the service consists of a comprehensive radio-telephone system extending from London Bridge to the outer limits of the port beyond the Nore. Its purpose is to provide ships with information on berthing and all necessary complementary navigational data such at state of tide, position of wrecks and weather conditions which would help to assist individual ships in their passage up and down the river as well as speeding the flow of shipping generally.

Pye Marine, Ltd., have supplied and installed all transmitting and receiving radio-telephone equipment in the Port of London scheme, which is of the frequency-modulated type, as agreed at the Hague Convention and now being widely adopted at ports throughout the world. Also installed at the Gravesend control centre is a special tape recorder capable of recording simultaneously, on all five channels, conversations and messages for future reference.

The five channels, allocated under international agreement, are in the 156-165 mc Marine VHF Band, and are handled by individual transmitter-receivers at Shooters Hill in South-East London and at All Hallows, Kent. These stations are remotely operated from the control room at Gravesend, where three operators sit at a control desk facing a long illuminated map of the river. This map is marked with all information of nautical significance from London Bridge to the Thames Estuary.

Ships entering the Port of London and requiring information from the Navigation Service will call initially on Channel 16 (156.8 mc). The operations room will then switch to the relevant two-way information channel on which ship and shore can work direct.

Two More Bands on the TCS

MODIFICATIONS FOR TWENTY AND FIFTEEN

H. GRIST (GD3FBS)

Some informative articles on the Collins TCS equipment have already appeared—see SHORT WAVE MAGAZINE, *October, 1958, and April-May, 1959. What will interest TCS users now is that this one shows how the transmitter can be operated on 14 and 21 mc, making it a five-band unit, Top Band to Fifteen. Our contributor also offers some useful general advice on the operation of the transmitter.—Editor.*

FUNDAMENTALLY, the modification discussed here consists of utilizing the roller inductance L108 as a tuned anode circuit for the 1625 output valves and the variable condenser C116 as the output feed capacity. Used in this way and suitably padded as suggested, this permits doubling in the final from 7 mc in the VFO to 14 mc, or from 10·5 mc in the VFO to 21 mc in the output circuit. The roller inductance L108 will cover from 1·8 mc to about 24 mc with the VFO in its original state; the VFO itself could possibly be increased to 14 mc output by withdrawing the slugs and sacrificing the calibrated scale. This might even give a double output of 28 mc but owing to the arrangement of the components, some difficulty may be encountered in reducing the residual capacity of the VFO circuit to the required level.

Procedure

A couple of hours' work suffices for the modification for the 14-21 mc bands. All wiring associated with the PA coil L107 and the coupler should be stripped out, and all leads to the wave-change switch S102 from this coil—*see* Fig. 1(A). The whole of the aerial circuit associated with the coupler coil, ammeter M102, the roller inductance L108, and C121 should also be removed.

The roller should then be extracted through the panel. It will be found that the slider shorts one portion of the coil and this should be isolated from the end to provide an infinitely variable tap. A separate terminal should be located in one of the holes already punched in the end plate and the roller connected to this; the roller can then be returned to its mounting on the panel. It is then wired in between the RF choke L110 and the junction of the paralleled plates of the 1625's—*see* Fig. 1(B). The parasitic suppressors can be retained if required (E101 and E102). The slider of L108 is then earthed through a ·01 μF condenser (600v. test); RF output is then taken from V104, V105 to C117 and wave-change switch S102, and electrically or direct—according to the position of the switch—to the variable condenser C116. The opposite end of this

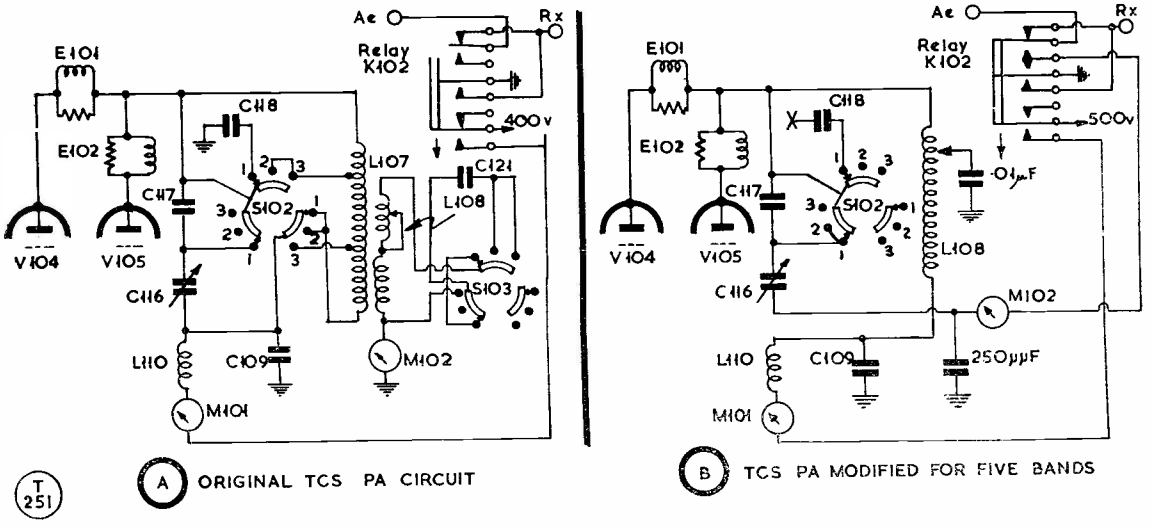


Fig. 1. The RF power amplifier section of the TCS (A) before, and (B) after modification for operation on the 14 and 21 mc bands. The essential change is the use of the roller inductance L108 as the PA tank coil for all bands 160-80-40-20-15 metres. This involves a fairly radical rearrangement of the PA section of the Collins TCS transmitter which, in the original, covers only the three LF amateur bands. Circuit element numbering is as used in the transmitter section of the TCS manual.

condenser is earthed *via* a 250 $\mu\mu$F blocking condenser (600v. test) and also connected through the ammeter M102 to the "make" contact on the aerial relay.

One further modification is an improvement: This is to jumper the first and second band contacts on the wave-change switch S102 so that C117 is shorted on both these bands. This brings the 3·5 mc position into the centre of the scale on C116 and takes the 7 mc second harmonic of the PA off the bottom end (thus preventing confusion !).

Setting Up

In tuning up, an 80-ohm dummy load should be connected across the aerial and earth terminals and the roller wound until maximum coil is in circuit. A low value of capacity should be put on C116, the Tx switched on, and the roller wound down to the first dip; this is 1·8 mc if the VFO is placed on this calibration; the second dip will of course be 3·6 mc and can be checked by an absorption meter placed adjacent to the roller scale.

However, to return to the first dip: This is not full loading so the capacity should be increased and the inductance reduced until the dip is "flattened." The circuit is then fully loaded on 1·8 mc. Switch to Band 2 and carry out the same adjustments. The first dip will be 3·6 mc and the second 7·2 mc (not recommended for transmission).

Switch to Band 3 and start again; the first dip will be 7·2 mc and the second 14·4 mc. Naturally, these being the highest limits of the bands it follows that with the VFO on 1·75 mc its associated harmonics will give output frequencies of 3·5, 7, and 14 mc. To obtain 21 mc, set the VFO to 10·5 mc and the second dip is 21 mc. (Only about two turns of L108 are in circuit on 21 mc.)

What one aims for is to get maximum RF output, on the desired band, by adjustment of C116 against L108 — taking care always to check the output frequency by absorption wavemeter.

The very slight chirp noticeable on low frequencies becomes marked on the higher frequencies, so it is recommended that the Oscillator Selection Switch "A" on the panel should be put to MO Test (netting position) and the VFO allowed to run with keying taking place, by relay, in the PA HT circuit. This gives a T9x note on all bands. Of course, this keying system prevents BK working owing to the beat of the VFO in the receiver but is most useful for DX operation in QRM as the note can be much more easily filtered. In the normal position for BK working, however, the note is above average.

Aerial Coupling

The TCS can be used in this manner to drive a QRO PA or to load any aerial *via* a Z-match, link or tuning unit, or it can be used direct on to a "length of wire" or a coax-fed dipole, or a ground - plane. No snags have been encountered providing the by-pass condensers are not under-rated. Loading to the same maxima as in the original circuit is obtained, but the aerial can now be loaded to any lower value required simply by altering the LC ratio of C116 and L108 — which, as already explained, means maximum capacity and minimum inductance for full loading, and *vice versa*.

The application of this circuit to the TCS is due to GD3GMH, with some suggestions and the testing by GD3FBS. GD3GMH also solved the modulation problem by scrapping the crystal sub-chassis and building in a pair of 6SJ7's, RC-coupled in cascade with the heaters in series, and feeding these to the secondary (either side) of the modulation transformer T101 in the original circuit; this still permits push-pull operation as in the original but makes it possible to use a crystal microphone. Modulation has been checked by 'scope to be about 90%, maximum.

Some Further Points

Regarding blocking condenser C118, it was found that sufficient loading was obtained with this simply disconnected from the earth point, X in Fig. 1(B). C116 is then practically all-in for Top Band, so if it is only possible to arrive at the 80-metre harmonic it is suggested that C118 be returned to the output side of C116, or possibly to earth. Further experiment is possible by utilizing the series-parallel switch S103 with three separate capacities (·00025, ·0005 and ·001 μF) selected as required for the by-pass to earth from the RF meter M102. This capacity is not at all critical. However, it will be found that C116 is very critical on 14 and 21 mc. It constitutes both the feed circuit and a series anode tuning on all bands, as will be noticed when two dips can occur with one setting of the roller inductance. A constant check should be made with the absorption meter on output frequency.

In a recent article on the TCS (*Short Wave Magazine*, October 1958) the writer mentioned that the relay circuit does not function well at high speeds. The writer can only say he has not

found this so. It keys admirably up to 30 w.p.m. providing sufficient current is available. A 100 μF electrolytic across the supply will assist here but in non-standard supply units provision should be made for 5 amps. at 12 volts. The voltage on the PA can be raised to 500v. quite safely, as in the original these circuits were wired in 1,000v. test insulated wire.

The power requirements are 500v. at 300 mA and 220 to 300v. at 200 mA for the HT, and 6 to 8 amps. AC at 12v. for the heaters. It is preferable to use three separate units, for the relay, HT 500v. DC and HT 220-300v. supplies. The heater supply can be obtained by using two 6·3v. windings phased in series. It is vital to have a generous value of capacity on the output end of the choke in the 220v. power pack (32-64 μF) or regulation will suffer ; the HT smoothing condensers must be suitably bleedered in both cases. Provision should be made for using the lower HT on the PA for Top Band work.

Care should be taken that drive is always available from the VFO, as the PA valves take off quite easily to damaging currents.

MARCONI I.S.B. TRANSMITTERS FOR PAKISTAN

Marconi's Wireless Telegraph Company are to supply three high power HF communications transmitters to the Posts and Telegraphs Department of Pakistan to provide additional telegraph and teleprinter circuits for the Overseas Telecommunications Service. The equipments to be supplied include a Type HS51 30 kW Transmitter and two Type HS72 10 kW Transmitters. Each of the transmitters is complete with drives to provide both independent sideband telephony and frequency shift keying services. All three transmitters are motor tuned for the selection of any one of six separate frequencies.

The drives, of the Type HD20 and Type HD51 series, will be in a separate screened room. The transmitters themselves will be installed in the main transmitter hall alongside similar Marconi equipment already supplied. The outputs from the frequency shift keyer and the independent sideband drive are both at a frequency of 3.1 mc, and are fed by coaxial cables to the mixer and harmonic generator chain in each transmitter, the appropriate drive being selected as required by simple U-link cross-patching. The radiated frequency is obtained by feeding into the same mixer the drive frequencies obtained from the crystal oscillators accommodated in the Type HD20 assembly.

MODEL-CONTROL FREQUENCIES

Arising from that note on p.102 of the April issue, there have been several enquiries as to what frequencies are used for model-control by radio. They are 26.96-27.28 mc in one band, and 464-465 mc in the other.

W3BIW

Above, W3BIW, of Brynmawr, a Welsh settlement in the Pennsylvania mining district, who was linked by simultaneous film with (below) GM3MBC of Glasgow. While making a normal QSO on 21 mc phone, they were being filmed, the two films then being processed as one, with the overs synchronised. The result is being shown on Television to Schools. The gear at W3BIW is all-commercial, with a Collins kilowatt transmitter, while GM3MBC runs 45w. to an 807, with a Cubical Quad. For the sound track, the audio was taken off his modulation transformer, to ensure good quality and a noise-free recording. It will be seen that by this technique of making a sound-film simultaneously at both ends of a QSO, the combined result would give a much better impression than simply by recording the other end as it came out of the receiver. The idea for the programme was put forward by GM3MBC and, for the televised version, the gear was provided by K.W. Electronics.

DX COMMENTARY

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

4S7FJ

CALLS HEARD, WORKED and QSL'd

RATHER a mixed bag to report this month, with conditions varying from day to day, activity depressed by spells of unusually fine weather, solar flares, long hours of daylight, and all the ingredients that make these things so unpredictable.

It seems that those who have had plenty of time to spend on the air think it has been a grand month; whereas the wage-slaves and toilers who have only been able to operate at certain fixed hours don't agree.

We have been much impressed with 21 mc on certain afternoons. The hasty type would swish round the band, say "Flat! No Yanks!" and either QSY or QRT; but the more wily bird, having a careful scratch around, would have unearthed DU, VS6, KR6, XZ, VS5 and quite a few Far Eastern beauties. Another rarish one on this band, also early in the day, was ZS7M. In short, when the W's aren't there, then it's time to sit up and take notice.

Working DX, these days, has turned more into a matter of dodging jammers and jingle-bells than waiting for conditions. The state of 21 mc goes from bad to worse, and from worse to shocking; and even 14 mc is now getting contaminated.

Last month we related the brave tale of a handful of amateurs scaring a new commercial off the band, but that could only happen on very rare occasions. There's nothing we can do about shifting jammers or their harmonics; nor is any amateur attack on pirate jingle-bells likely to have any effect. Meanwhile, we have to work in the cracks, with all filters fully squeezed — the day of the wide-open receiver has gone for ever.

Interesting thought: at least four times a day one hears a station on some band or other that sounds no better than a jammer with keying or modulation applied. These creepies are usually calling CQ (and no wonder —who on earth would reply to them?), and the interesting thing is that they almost invariably come from the Iron Curtain or satellite countries. One tries to be charitable and put this down to the scarcity, or high price, of smoothing condensers; after all, in countries whose major contribution to world-wide communication consists of jamming, what use would there be for smoothing condensers? On the other hand, they may do it because they like it . . . after all, some people wear Teddy-Boy suits quite voluntarily!

To return to the subject, though —DX is becoming more and more a matter of suitable receivers, selective eardrums, and *patience*. It may even become a little easier when propagation conditions are not quite so good as they are at present. Meanwhile, there's plenty of interesting stuff either on the air, just coming on the air, or (more frequently) just having gone off the air . . . that one you missed. Now read on.

DX Gossip

The Nepal trip mentioned last month is now joined by another. Six engineers from the Cook Electric Co., with their families, have left for Nepal, where they will be supervising the installation of a modern radio and telephone system This constitutes a 1½-million dollar contract and will take nearly two years to complete. At least two of the engineers hold amateur calls, and will do all they can to get on the air . . . look out for some genuine "9N" calls.

VK5BV is practically all set for a CR10 expedition—all he lacks is suitable gear! HL9KJ is a new and licensed Korean station—mostly AM on 14 and 21 mc . . . The ZL3DX expedition to ZM6, VR5 and ZK2 was said to be

"on" at the time of writing, but you will probably have heard or worked them by the time this appears, when it should be all over.

WØAIW and VQ4ERR are due to visit the Seychelles, VQ9, in August; present hopes are that they will be on the air on August 22 with a KWM-1 . . . DL9PF and DJ2KS will be operating LX1KA from June 5 to 13, all bands, CW only.

DL9PF and two others will also be working from Andorra from July 20 to July 30—again all bands, CW only, twenty-four hours a day . . . DL7AH is in Persia for one year as an air traffic controller; it's just possible that he may succeed in getting on the air. VS5JA is also going there, and says there's not much hope, but he'll try.

Four stations at present on the air from Afghanistan hope to be using their YA calls for about six months (one of them works 28 mc only with 3 watts!) YA1IW is the big noise, frequently on 21 mc phone, and he hopes to continue so until October. QSL *via* W6DXI.

MP4TAC intends to operate /VS9, from the Sultanate of Oman—most probably on SSB . . . MP4BBW, meanwhile, plans an expedition into Trucial Oman during June—also SSB.

SU1KH has hopes of going to the Yemen and coming on as 4W1KH; he will be there for a year, and is mostly a phone man—21 and 14 mc . . . VS5BY is back on the air in Brunei, after a lot of equipment troubles due to the climate . . . VK2FR is on from Lord Howe Island, 14150 kc phone.

ZL3VB is reported as "workable" on 14040 kc, around 0830 GMT *(yes,* he's on Chatham Island!) VR1B is active again and will be in the Gilbert Islands for two years; usually about 14080 kc CW.

CR5AC has left for Portugal, but his brother is now licensed as CR5AD, and hopes to be on soon with 100 watts; *he* is there until 1963 . . . The IP1ZGY who was causing such a stir on the bands soon after our last issue appeared was IT1ZGY operating from the Pelagic Islands; we stated originally that they would count for WAE but not for DXCC; now there seems to be some faint chance of the latter. Too bad if you passed him over!

HB9QP/MM was hoping to be in Goa for two weeks during May, and to make arrangements to operate CR8AC. No news at the time of writing . . . There is a possibility of operation from Franz Josef Land, by UA1CK, in July and August. UA1KEC used to be there some years ago, but the call is now assigned to a station in Archangel, and there is *no* F.J.L. activity at present.

The OK Expedition (that five-year affair whose programme has been subject to so many alterations) is now said to be working to the following sked: May 12 to June 16, Albania; June 16 to June 30, Greece; June 30 to July 16, Turkey. This itinerary doesn't seem to allow much transit time, but if they are working mobile they will presumably just change their call-sign as they pass through Customs. (Should be possible to work them in two countries at once!)

G2DC reports that Danny Weil has postponed his trip to British and Dutch Guiana, and is at present in the States . . . TA1BR has been heard on 14 mc phone, giving name as Kamal and QTH Ankara—he may be a phoney . . . VK2FR hopes to have new gear shortly for AM, SSB and CW, 28, 21 and 14 mc . . . FY7YF is on 14305 SSB.

CEØAC (Easter Island) is now active on 14 mc CW, 0215-0300 GMT, Wednesdays and Sundays . . . There was said to have been some activity from Aldabra Island (VQ7) around May 12, but no confirmation has arrived from anyone as yet.

GB2AC will be the call of a "DX-pedition" by GM amateurs

FIVE BAND DX TABLE
(POST WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	921	113	171	249	203	185	267
G3FXB	799	73	131	222	211	162	260
G2DC	772	84	113	229	192	154	260
G5BZ	771	64	118	263	199	127	273
G3DO	683	24	47	246	187	179	273
GW3AHN	644	16	55	198	231	144	255
G3BHW	585	15	35	196	189	150	234
G3ABG	571	51	88	185	127	120	212
W6AM	524	30	58	294	86	57	294
G8KU	431	26	57	162	86	90	?
G6VC	431	37	55	153	110	76	179
GM2DBX (Phone)	427	34	31	160	102	100	176
G3IGW	418	44	71	107	101	95	151
G3LET	406	23	73	171	101	38	186
G3AKU	380	47	80	147	43	63	147
W6AM (Phone)	379	13	52	274	39	21	274
G3JZK	378	17	60	85	126	90	175
ZB1CR	360	1	6	101	118	134	168
UR2BU	354	14	30	121	103	86	150
MP4BBW (Phone)	330	1	5	126	120	78	163
G6TC	321	18	68	128	67	40	146
G8DI	292	30	59	81	69	53	122
G2BLA	288	32	53	67	71	65	114
G3DNR	277	10	23	89	74	81	126
VO2NA	256	19	33	106	63	35	115
G3WP	253	17	34	80	24	98	136
UR2BU (Phone)	252	2	11	81	82	76	127
G3MCN	247	4	6	55	120	62	150
G2DHV	239	21	27	127	48	16	138
W3HQO	183	3	8	52	91	29	119
G3NBE	180	16	20	46	22	76	100
G3MJL	165	5	38	33	38	61	88
G3LHJ	163	5	23	93	31	11	101
G3MMP	150	5	24	30	32	59	80
G3DNF	147	7	31	44	39	26	66
G3IDG	122	11	15	32	27	37	54
G3NAC	82	2	10	35	30	23	60

(Failure to report for three months entails removal from this Table. New claims can be made at any time)

to Ailsa Craig in July. CW on 7, 14 and 21 mc is promised.

Summary of Results—
"CQ" DX Contest, 1958

The detailed listings came in just as we were going to press, and following is a digest of the main results, looked at from the U.K. angle:

Phone Section *—Single Operator:* There were 14 U.K. entrants, G2DYV being top scorer for G with 117,813 points derived from 291 contacts in 121 countries; GM3MBC with 33,696-198-55; and GW3FPH with 72,297-304-61. The U.K. entry was on the low side compared with some other European countries, *e.g.* DL (27), OH (23) and SM (23).

There was a small total European entry in the Multi-Operator category, 19 in all, DJ3VM being the high scorer with 357,775 pts. The U.K. entry in this clasification amounted to four stations only: GB2SM (82,620); GI3CDF (209,270); G3HTA (36,415); and G3MGL (12,008).

CW Section *—Single Operator:* The U.K. effort totalled 26 stations, with G2DC (358,570) the leading G entrant, his position on the European ladder being 11th to SVØWP with 878,853; PAØLZ (598,023); PAØRE (593,424); OK1FF (573,352); UB5WF (565,701); HB9QR (562,565); DL7AA (440,180); SM3AKW (375,380); PAØLU (368,784); and OH2HK (365,820). GI3IVJ made 243,162 pts., GM3FJP 88,150 and GW2DUR 19,425 points.

The total European entry in this CW section of the Contest was relatively high—about 350 stations in 37 prefix areas. For the Phone section it was barely half this, from 29 EU prefix areas only.

One other interesting individual U.K. CW score should also be mentioned—G4CP who, in the by-band classification, led for Europe on 7 mc by making a total of 60,310 pts., with 404 contacts in 55 countries on that band alone. The world-high scorer on 7 mc CW was W8FGX, with 82,677-311-66, using over 500w. input.

One's general impression from the results of this Contest is that the U.K. entry, in all categories, was far too low; it is also evident that many of our best DX operators did not compete at all. The *CQ* DX Contest is an interesting one, well organised, with numerous classifications right down to one-band leaders by country-prefix and continent; in effect, therefore, entrants are competing within their own prefix areas as well as on a world-wide basis.

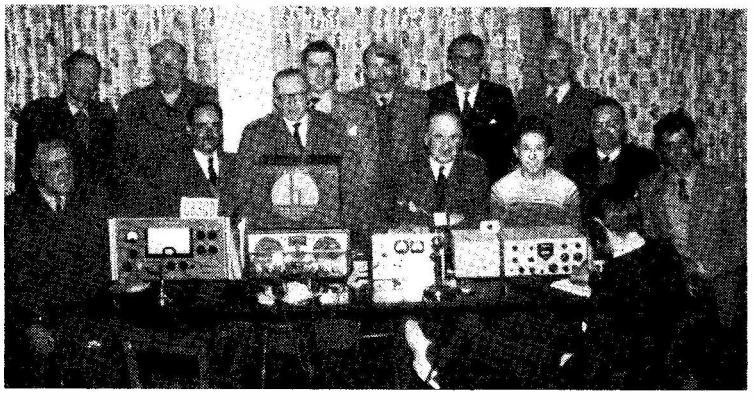
Miscellany

G3KZR (Cambridge) voices the views of many when he criticises the ARRL's arbitrary choice of "countries" for DXCC purposes. Referring back to our comments in the April issue about all the FF8 and FQ8 regions (Mauretania, Niger, Ubangi-Shari and so on), he points out that they have all been made autonomous republics under the *ægis* of Gen. de Gaulle, and therefore have far more right to be known as "countries" than Aves Island, Serrana Bank, Navassa and "a whole string of tin-pot dots on the map."

The amazing thing is that the ARRL recognises all these bogus "countries," but refuses to acknowledge Sicily or Ruanda-Urundi (OQØ), for reasons which no one can fathom. G3KZR continues: "Each state of the USA should be counted as a separate country, for each has more power invested in its own administration than have a whole series of accepted 'countries.' This state of affairs is exasperating a large body of amateur opinion here, in America and in many other countries . . . should we initiate a new Countries List with immutable standards of judgment, or should we all stick to WPX?"

Opinions welcomed, of course . . . just at this moment we rather feel that "WPX," with all its inconsistencies, is preferable to the DXCC list. After all, if you've worked an LA4 and an LA5 and can produce their cards, no one can argue about that or, subsequently, decree that they are the same. We will be delighted to start a WPX Roll of Honour if enough candidates send in their totals, but, to keep in line with the originators of the scheme, all scores should start from January 1, 1958.

G6LX (Croydon) writes that, despite our previous note concerning 3A2 QSL's, he is *still* getting about 95 per cent. of them. Please *do not* send 3A2 cards to G6LX, but to 3A2AH, 6 Rue Gastaldi, Monaco-Ville, Monaco. Pirates are very much in evidence, and during the four years he acted as QSL manager, G6LX returned or destroyed nearly 1,000 cards addressed to non-existent or bogus stations. If anyone still needs a 3A2AY card, G6LX will still be happy to oblige, either through the Bureau or on receipt of IRC



When the Norwich group visited the Isle of Man recently, signing GB3GD, one evening they were able to get together with the GD's. In this photograph are, front row, left to right: GD3FBS, GD3JIU, G5SX, GD3FOC, G3LDI, GD3HQR, G3CQE and G3MPN (operating). Back row: GD3JAE, GD3GMH, SWL, GD3FXN, G3IOR and GD3GQX. From GB3GD, their own station licensed for the occasion, the visitors made over 1,000 contacts in 60 countries, much else being worked under their personal calls suffixed /A.

or stamped envelope. (His own total score from 3A2AY is 168 countries worked; 149 on AM phone and 98 two-way SSB.)

G3JVL (Hounslow) puts in a prior claim to be the first G to work JZØDA (January 5, 1959). The latter says on his QSL that this was his first G contact. G3JVL has not been very active lately, but has built a small CC rig running 50 watts on three frequencies in the 14 mc band. With a vertical folded dipole and a 264-ft. long wire he has chalked up some nice DX. Now he is about to get married and shift to a new QTH in Ealing—where he will probably go VHF owing to lack of aerial space!

ZB1AJX, also known to us in the past as G3AJX and GM3AJX, is now bound for VK3, whence he will be looking for old friends for three years. He is taking the rig with him and can be contacted at S.U.K.O., Defence Registry, Victoria Barracks, Melbourne.

ZB1VJ has made a move in the reverse direction and is now home, already operating on Top Band as G3NJK. When his other gear arrives back from Malta, he will be on the HF bands again.

Self-take by G3IZJ, who is ex-VP8AZ, and now lives in a bed-sitter in a hostel at Farnborough, Hants. He says he chose this as the answer to the "digs problem" because in a hostel nobody cares what one does so long as it does not smell, make a noise or cause TVI. His transmitter runs 50w. to ground planes on 21 and 28 mc, with a Mosley vertical for 14 mc, the score being 88 countries and 47 states worked; he also keeps a daily sked with W4VNE, which has run to 130 contacts on four bands. When VP8AZ at Base A, Grahamland, 70 countries were worked and 2,000 contacts made in just a year, including 47 states, but not N. Dakota; now it's Nevada he cannot get as G3IZJ, though that state was worked several times over as VP8AZ. G3IZJ explains that the cord round the speaker is to prevent his room-cleaner knocking it to the floor more than once a week.

News from Overseas

VO2NA (Goose Bay) tells us that the winners of the GBARC QSO Party, in April, were VO2RC, himself and VO2RH. The GBARC boasts eighteen active members at present, including K1DHE/VO2, K5HZE/VO2, K6PDE/VO2 and WØWWH/VO2. VO2NA recently worked PY7AN and KP4CC on 7 mc, also three new ones, SVØWP, UA9CM and UC2AX on 28 mc. All on his usual 25 watts.

ZE3JO (Salisbury) writes to say that he and ZE8JJ are making a ten-day visit to ZD6-land at the end of July. They will use their own calls with the suffix /ZD6, and expect to work phone and CW on 14, 21 and 28 mc from a QTH in the Blantyre area. QSL "one hundred per" on return to ZE.

MP4BBW (Awali) has worked a host of new ones since he last wrote, almost entirely on SSB and mostly on 14 mc. With the help of the new ones—OY, KW6, M1, VQ8, XZ, KAØ, HH, FY and VP2A—he has now passed the 100 mark on two-way SSB. He hopes to be operating MP4TAD (June 18-20) and MP4QAN (July 16-18), again SSB only, and says that Ted Henry's famous SSB rig is now due to change hands again—from VS9AH to 15GN this time.

MP4QAO (Umm-Said, Qatar) has just been licensed, and in June he hopes to be on all bands from 28 to 7 mc, phone and CW. He is expecting a Minimitter and an 888A and intends to try to put Qatar on the air again. There is no other activity there at present, although MP4QAD is rebuilding and may soon be active again. Week-end activity from Tarif, with the call MP4TAO, is also promised.

Yet another of the MP4 group is MP4BCT, who will be on from Bahrein and promises all QSL's. We are also glad to hear from VK3YS (QTHR) to the effect that he is now handling the cards for VKØTF, located at Davis Base, Antarctica. Incidentally, if you want him, VKØTF is on 14 mc CW, mainly around 14080 kc.

ZD2HHT is now on from Port Harcourt, Nigeria and has a 7-14-21 mc transmitter, operating CW only. He is G3KDW when at home, and says that he "is extremely keen to work G's and will be pleased to QSL all contacts"—so look for him on Twenty CW.

Around the Bands

According to most of our regulars, it's been a pretty lean month. G2DC (Ringwood) thinks conditions have generally fallen off, and on top of the decline there has been abnormal solar activity, although it has had the effect (previously mentioned) of wiping off the mass of W and VE signals from 21 mc and disclosing some pleasing pieces from elsewhere.

G5BZ (Croydon) also thought the DX bands in pretty poor shape, and what with a week's

holiday and some intensive gardening he, too, sends a list which is a mere shadow of the usual effort. Notable, also, is the fact that while we have plenty of letters covering the three HF bands, and quite a few from the Top-Band specialists, there is hardly any news at all concerning 7 and 3·5 mc. These bands, when your Scribe has examined them, have been just about as interesting (to the DX man) as cold rice pudding.

Ten Metres

It's possible to dig out the odd new one, even on CW, as G3IGW (Halifax) found when he worked ZD7SA. Phone gave him a contact with ZS8I. GW3AHN (Cardiff) collected KP4, VQ8AD and VU2PS on phone — nothing new on CW.

G3NAC (Yatesbury) also stuck to phone, which brought him ZD2CKH, EA8, FF8, 9G1BA, ZS's, OQ5GU and VU2PS. G3NBE (Oxford) says that most of his activity has been confined to "milking Ten," which he did to the tune of ZS8I, CT2AC, VU2PS, HR2MT, HC1IF, VQ8AV, VS1JF, XW8AK, ZS9G and a few more. These were on 25 watts of phone, by the way, so things haven't been all that bad!

G3LTH (Starcross) worked TI9CW, VQ2EC and ZS's on CW; on phone, EA8CM, YV5EF, SVØWT, VP9WB and VE6QG/SU. He runs 30 watts on CW and 20 on phone.

G2DC says he raised nothing of interest, but tells us that VE3EGD/SU and VE6QA/SU are both working phone from the Gaza strip, where they are stationed with the UN Forces.

G5BZ quotes ZC4DP and LU7DAM; G3DO (Sutton Coldfield) raised VQ8AV and FB8CG on phone. G3WP (Chelmsford) added four new ones with PAØ, FQ8, XE and TI9, bringing him up to 98 countries on 28 mc.

SWL J. Baxter (Hull) logged CR7AG, CX1VP, FF8AP, OA4IA, VQ2, VQ4, YA1IW and ZD2CKH, all phone; P. Day (Sheffield) reports XW8AL and 8AN, both on phone, the latter working the States around 1730.

Fifteen Metres

Here we have a good deal more to report, for the band has not been too bad for most of the time. G3MCN (Liverpool) notched up six new ones with FG7XE, FQ8AW, ZS3AG, VR2DE, 4S7FJ and YA1IW—all on phone. Others worked were VP8CX, 8DW and 8EP, PZ1AE, KA8LF, JA, VP7 and the like. YA1IW asks for QSL's to go to W6DXI, and he will soon be joined by YA1AA and YA1PD—AM, SSB and CW.

G3IGW made his century on the band, thanks to UJ8AF and 8AG, XZ2TH, 4S7FJ and a host of UA, UD, UF and so on in the Russian contest on May 10. These were on CW; phone accounted for CO, HK, VP2AB, VP3MC, VS9MB, VU2PS and 2RN, YA1IW and 9M2DW.

GW3AHN worked CW with DU1FM, FG7XC, KM6BK, TI9CW, UI8AG, VP4DW, VP8EG and XZ2TH; phone brought in CO, FK8AU, FO8AX, FY7YF, HL9KS, KA, KB6BH, KH6 PZ, TI9SB, VP6, VR2AZ, 2BC and 2CC, VU2SS, YA1IW, 4S7FJ and 9M2DW, 2FR and 2FX. (Don't let us hear any more grouses about *this* band!)

G3NAC worked CO8ES, CN2BE, FQ8HA/TC and ZB2A, all phone. G5BZ raised 4S7FJ, IP1ZGY and some W's. G3DO worked YA1IW on phone.

G3LTH made CW contacts with KM6BK, TI9CW, DU1FM, VP8EG, EL4A, XZ2TH, 9M2DW, 4S7FJ, FE8AH and sundry U's; on phone his reward was VS1JO, VP8FG, CT2AI, VR2AZ and VK.

G2DC says "his favourite band" is sounding a bit dowdy these days, but he raised CX2BT, CE3AG, DU1FM and 7SV, FQ8AR and 8HD, HC4LQ, KM6BK, KR6AK, OA4FM, VP8EG and 8EP, UL7GL, 4S7FJ, 9M2DW and others including the wondrous IP1ZGY! (Rumour has it that he will *not* count for DXCC—but he's a snip for WPX anyway.)

G6TC (Wolverhampton) worked LA1OF/M (near Formosa), JA, UL7, EL4A, OQ5IG, and W7's. G3BHJ (Norwich), on phone, raised CT2AI, HS1E, HZ1AB, OQØPD, KR6DU, TI2LA, VE8, VK, VS1's, YA1IW, ZL's, 4S7FJ and 7YL, and 9M2DW. CW collected VK3ADG and 5NO.

SWL C. N. Rafarel (Birmingham) logged HS1E, YA1IW, 4S7FJ, VU2RN and VP8DG. J. Baxter (Hull) mentions VP2SL (St. Vincent), HH2Z, ZD1EO and 9M2FX. J. E. Paterson (Hatch End), with a four-valve battery receiver, mentions KR6DU, ZD1EO, OQ5DX, OQØPD and OQØBH—and an interesting one was LA8LF/MM in an oil tanker in the Persian Gulf. The latter was also noted by J. H. C. Farrar (Penzance). P. Day (Sheffield) heard VS9MB and YA1IW on phone; JZØHA and 4S7NG on CW.

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	98	98
G3AKU	98	98
G3JEQ	96	97
G6VC	96	96
G3JHH	93	93
G2FTK	91	94
G3FNV	91	93
G2AYG	88	88
G3KEP	85	85
G3KOR	82	86
G2CZU	81	81
G3DO	76	76
GM3COV	71	73
G2CZU (Phone)	66	67
G3ADZ	65	72
G3APA	63	66
G3LBQ	61	67
G3KQN	60	72
G3KEP (Phone)	60	62
G3LHJ	60	66
G3JSN	57	64
G6QN	57	63
G3LEV	55	61
G3MCP	54	67
G3MCY	47	54
G3LNR	46	52
G3NFV	37	47
G2AAM	28	33
G3LNO	23	41

(Failure to report for three months entails removal from this Table. New claims can be made at any time.)

Twenty Metres

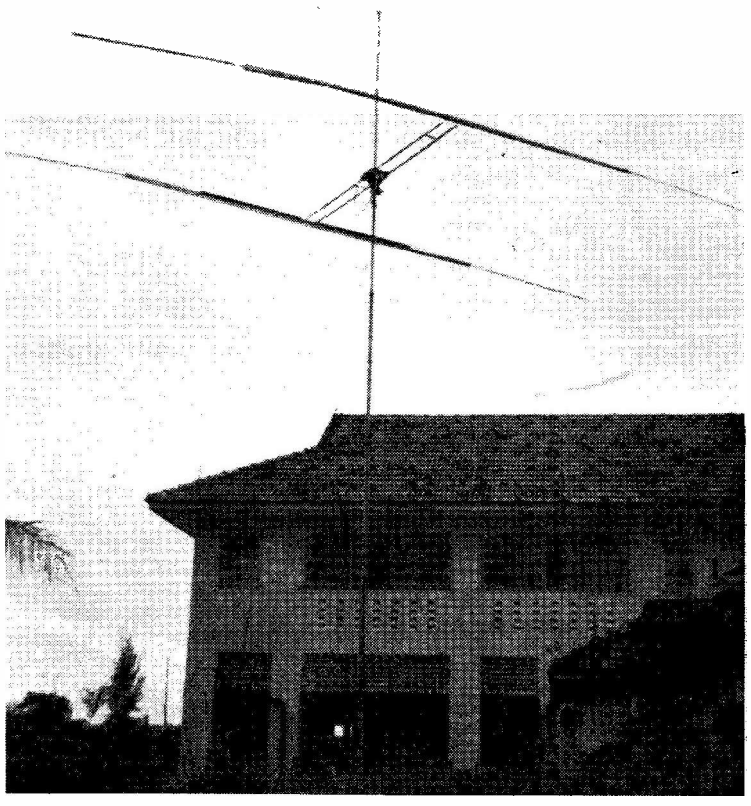
GW3AHN, having put up such a show on 21 mc, obviously didn't spend much time on 14 mc, but he did work KV4AA on CW, TI9SB and OA4AV on phone. G3NAC raised LA2JE/P, VE6 and VE8. G5BZ emerged with VK's, KL7, ZE, SVØWN (Crete), IP1ZGY and W's—he obviously wasn't even trying !

G3DO chalked up VK2FR (Lord Howe Is.) on phone for a brand new one, and also raised YA1IW. G3LTH had CW contacts with KV4AA and HB1TC/FL—for the benefit of those who may not know, these HB9's signing /FL are in Liechtenstein (HE-land).

G3HRU (Leeds) reports for Twenty only, where he runs 40 watts and an indoor bent dipole. Early mornings brought in VE4, W6, W7 and so on in plenty; LU2ARM (0610) was his first Argentine QSO, and KV4AA his first KV4. G3HRU finds that short skip from UA1 and such places makes early morning work trying these days and comments on some of the buzz-saw notes. (That's what we meant earlier on when we spoke of keyed jammers.)

G2DC also curses the short skip, and says that most of the gentlemen concerned still regard G as DX, judging by their response to CQ calls. He worked (despite this crowd) IP1ZGY, CR7, CR9, KH6, KL7FAR (St. Lawrence Is.), JA, LU, PY, VKØXE and 3A2CZ. G2DC tells us that VR1B is very active on the band, and hears the G's well, but directly he tries to work them the frequency is overrun with W6's calling *him*. He hopes to get a more directive aerial soon—one step towards dealing with that trouble. And finally G2DC comments on OK7HZ/ZA and the apparent impossibility of working him unless one has a kilowatt of SSB. A solid wall of badly-behaved types surrounds him continuously, and "one can usually cope with Clots on CW, but not on phone."

G6TC was disappointed with the band, having worked nothing much except VK, ZL, W6 and 7, and KH6.



A full-size 20-metre beam is quite a large structure — when G3CCN was VS1HS in Singapore, he had this two-element array for the 14 mc band.

The only one of our SWL's to report anything of note on 14 mc was P. Day, who logged VS4JT/SSB and VK9AD/SSB, also TI9CW on CW. He also tells us that MP4DAA is on every Thursday, 1200-2200, and Saturdays and Sundays 1200-1600.

Forty and Eighty

Precious little doing here in recent weeks, and who can wonder ? G6TC disagrees with G3JZK's comments last month (to the effect that these bands are best when the others are best, and only suffer from inactivity). He recalls that in 1950 and 1951, when the HF bands were as flat as a pancake compared with their present state, he used to work VK's on 7 mc in the evenings, together with W6, W7 and the odd ZL. Nowadays he can only raise W2 and 3 by staying up late at night, and the odd piece like OY8RJ crops up now and then.

G3LPS (Blackburn) keeps at it on 40 metres, and worked VP9WB for a new one during a late-night session; the PY's have been fairly numerous, with PY4AXN an outstanding signal. G3LPS has now had his VU2JA card for their recent 40-metre QSO; VU2JA says he is on 7 mc every day during 0700-0800 IST looking for G's—and after-midnight is not a very difficult time for U.K. stations to work DX on Forty.

The SWL's have little to say; J. Baxter logged VP3IG on 7 mc phone (0630) and a fair number of W's, and P. Day mentions CR4AX, PY7SR, OX3DL and UA9CM on CW (7 mc), also CN8BP on phone, and W2KSV/Mobile on SSB around midnight. On 3·5 mc he also logged many W's on SSB, mostly in Districts 1-4.

Top Band Topics

G6QN (London, S.W.19) has now worked 63 counties (57 confirmed) with his 33-ft. wire, not to

mention six OK's and three DL's. He says our odd mentions have aroused tremendous interest in how a short wire can be made to work efficiently on Top Band, and one reader even paid a visit to see for himself. G6QN has now changed over to 7 and 14 mc to see what the bell-wire will rake in on those bands (fed by a B.2).

G3AKU (Nottingham) thinks G2NJ looks lonely at the top of the Counties Ladder, so he has bracketed himself up there with him, having just qualified after waiting *years* for Orkney! Not being interested in WABC on phone, G3AKU is trying to work a second station in as many counties as possible, and has already reached the figure of 85 for "second-time-round." He thinks the GM activity has dropped off a lot, which makes it difficult.

GM3HSG tells us he is on Top Band from RAF Kinloss (Morayshire), and will be there on phone and CW until mid-August. He thinks he is the only one in the county, apart from GM3HRE/M, and says the QRM along the Moray Firth coast is *terrible*, what with BBC, aircraft beacon harmonics and the rest.

G3ADZ (Havant, Hants) says the Manchester area mobiles, notably G2ALN/M, G2AKR/M and G4LP/M, were putting in fine signals between 1900 and 2200 on May 10. If anyone still wants Hants., G3ADZ will sked on request, phone or CW.

G3LTH uses his 21 mc Quad, with feeders strapped and tuned against earth, for a Top Band aerial, and with this he worked phone with GM2UU.

General Chat

G3LTH says he has sent off 700 VS9AQ cards, but if anyone is still short of one, contact him . . . GB3GD made over 1,000 contacts in 62 countries, despite poor conditions during their stay in the I.o.M. They used a TA33 Jr. beam, which is now on its way out to VS1EB!

SWL J. E. Paterson hopes to have personal QSO's with ZB1GJ, IS1BCO and IT1TAI during his summer holiday, starting shortly . . . ON4QX sent us a card to say he would be operating as 3A2CZ between May 1 and May 20, but it was too late for the May issue, and the visit is now past history. Later, we received from him another card, posted from the REF reunion at Nice, and signed by F8FC (ex-CN8BQ), F8FS, F3EG, F9MM, F8GR, F9QV, ex-CN8MM and 3A2BN.

Though G3LPS got his card from VU2JA quickly enough—*see* further back—he has worked ten LZ's without yet having a single QSL from them!

Another MDXA

Hearty congratulations to G3BKF (Nottingham) on qualifying for the *Magazine DX Award*, which still has the reputation of being by far the hardest sheepskin in the world to collect. (It involves working 15 countries and three continents on Top Band, as well as plenty of DX on the normal bands.) G3BKF is all the more pleased to claim No. 6, since he thinks (rightly) that he is unique among the holders in having entirely home-built gear, including the bug key, and no beam. A 207-ft. wire brought the DX in, and formerly a 270-footer, 14 mc ground-plane, or 66-ft. centre-fed.

Previous holders of the MDXA, in order, are G2PL, G8KP, W2QHH, W8KIA and G8GP—two nationalities only are represented as yet!

While on the subject of Top DX People, we note in the May *QST* that there are now *three* G's in the DXCC Roll of Honour. They are G2PL (283), G3AAM (also 283) and G4CP (282). Top scorer is W1FH (292), and the Roll of Honour only includes those with scores above 280. For the record, it lists 30 W's, three G's, two ZL's, a PY, a KV4 and a ZS. The DXCC Phone-only Roll of Honour is topped by PY2CK (289) and includes nine W's, a VQ4, a ZL and a ZS, but—alas—no G's at all.

'Chaser Goes SWL

For at least seven days during the past month your commentator became an SWL—purely from choice. There wasn't much around that he wanted to work, during the hours available, so the receiver took over and the transmitter was given a rest.

Truly "the onlooker sees most of the game." Some of the goings-on were comic, some tragic, but all were interesting. First impression was one of amazement at the number of misread call-signs, both on phone and CW. On the key chiefly, of course, and without the slightest apparent reason. As an actual instance, we quote W4IKM, sending clearly enough and a terrific signal, working a UA9; long before the QSO

Short Wave Magazine

DX CERTIFICATES

The following have been issued since the publication of our last list, in the April 1959 issue:

MDXA

No.	6	G3BKF (Loughborough)

FBA

No.	147	DL1PM (Hamburg)
	148	G3FPK (London, E.10)
	149	G3FKH (Sheffield)
	150	UB5CI (Kharkov)
	151	W8KPL (Michigan)
	152	SM6AMR (Gothenburg)

WNACA

No.	201	G8UG (Mitcham)
	202	G3AIZ (Ilford)
	203	G3JBL (Lancaster)
	204	VQ3CF (Mwanza)
	205	GW3BNQ (Cardiff)
	206	G3JAF (Lymington)
	207	SM5BPJ (Nykoping)
	208	DL3RR (Duelken)
	209	EA2CR (Pamplona)
	210	G3LET (Westcliff)
	211	G4JW (Sheffield)
	212	G3IRD (Bagworth)
	213	OE8SH (Klagenfurt)

WABC

No.	180	OK1AEH (Prague)
	181	G3ADZ (Havant)
	182	G3LHJ (Newton Abbot)
	183	G3ZY (Rothbury)
	184	G3LUG (Wirral)

WBC

No.	127	VE1ADE (Prince Edward Is.)
	128	DL6UV (Stuttgart)
	129	SM5BPJ (Nykoping)
	130	SM5AJU (Linkoping)
	131	W1YIS (Maine)
	132	SM5DX (Bandhagen)

Details of MAGAZINE DX ADWARDS and CERTIFICATES, and the claims required for them, appeared in full on p. 134 of the May, 1959 issue.

Overseas claimants may send either (*a*) A check list, without cards, duly certified by the Hq. of their National Radio Society, or (*b*) An uncertified check list, from which any or all cards may be called in by us.

U.K. claimants must send the relevant cards for each award.

All claimants must include sufficient return postage for the cards and Certificate — five IRC's in the case of overseas claims.

was over, a UA6 on the frequency started calling "W3SMM." We didn't believe it could be the same, but it was; and this happy UA6 *worked* the W and gave him a 579 or 589 report, but still called him W3SMM until the bitter end.

Chief trouble on phone appeared to be the mix-up of F's and S's, and, for some strange reason, even the use of phonetics doesn't seem to straighten things out. It must just be that lots of people simply can't copy anything through QRM, and when they do (wrongly) they stick to their first impression like grim death and any amount of correction simply doesn't register.

How many people receive QSL's that make them write letters about Piracy, when simple misreading is probably the answer? Quite a few KX6's must have received cards that should have gone to YU's; and not a few ZL's cards that would have found their real home in Germany!

You Can't Define DX!

For once we have a little space to discuss the real purpose of this Commentary and (we hope) to silence the occasional 'chaser who writes "Why mention G3... and his contacts with W4 and ZC4? *That's* not DX." Well, it may not be to a lot of people, but it probably is to the G3... concerned, particularly if he has a very recent call. If we were to confine these columns to the exploits of those rare birds who never appear until a "new one" is let loose, we should only have a score or so of customers! A lot of interesting and worth-while stuff would go unrecorded.

Thus we work from the premise that everyone's attempts at DX-chasing, *at whatever level*, are of interest to someone else on roughly the *same level*. The chap with 25 watts and an indoor dipole who works his first W may not impress old G8... with his score of 250-plus, but he does cheer up someone else who is wondering whether it's even worth trying to work W's with 25 watts and an indoor dipole.

DX hasn't been a matter of absolute distance for some 30 years now—the "D" stands rather for "difficulty." One of the most interesting world-DX records (and probably one of the most difficult to achieve) is chronicled in *QST* this month. It took place on 50,000 mc, and the distance covered was—150 feet! And, in case even that doesn't impress you, we may as well add that the power was 1 microwatt . . .

So, in the future, as in the past, this Commentary will not be one long account of DX-peditions, "new ones," high scores and the Doings of the Great. Anything pertaining to communication, other than deliberate local-natter stuff, is of interest to *someone* who turns these pages. It is on this basis that "DX Commentary" has always been offered, and so it will continue.

In closing, we will make the usual acknowledgments to W4KVX ("DX"), to the WGDXC and their excellent *Bulletin*, and to all the other regular suppliers of up-to-the-minute information, not omitting our SWL friends.

Next month the deadline date is as early as it can ever be, and once again we appeal to readers not to pass it over. All material for this Commentary is required by **first post on Friday, June 12.** For August issue it will be *July 17*, which gives our overseas correspondents ample notice. Address it all, as ever, to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, and we will do the rest. Until then we wish you Good Hunting, 73, and — BCNU.

SCR-522 IRON-CORE COMPONENTS

By courtesy of G3AEX (Bromley) we are able to give the electrical characteristics of the various chokes and transformers to be found in the SCR-522 equipment, the two main constituents of which are the BC-624 receiver and the BC-625 transmitter. The Bendix reference codes as given below will be found on the relevant items.

Microphone Transformer:
(*Bendix Reference Code, A*103014)
Pri. Resistance 5.2 ohms CT
Sec. Resistance 4,000 ohms
Turns Ratio 1:45.7
Primary circuit impedance 200 ohms
Secondary circuit impedance 420,000 ohms
Neither winding is suitable for carrying a DC component.

Interstage Transformer:
(*Bendix Reference Code, A*103016)
Pri. Resistance 1,050 ohms
Sec. Resistance 2,750 ohms, CT
Turns Ratio 1:2
Primary Circuit Impedance 125,000 ohms
Secondary Circuit Impedance 500,000 ohms
This transformer is designed for parallel feed and will not carry any DC component with safety.

Modulation Transformer:
(*Bendix Reference Code, A*103018)
Pri. Resistance 690 ohms CT
Sec. Resistance 170 ohms
Turns Ratio 2:1
Pri. Circuit Impedance 22,000 ohms
Sec. Circuit Impedance 5,500 ohms
Each half-primary is suitable to carry up to 40 mA DC. The secondary is suitable to carry 80-100 mA.

Speech Amplifier Anode Choke:
(*Bendix Reference Code, A*103034)
DC Resistance 5,000 ohms
Inductance 430 Hy at 1 mA DC
Not suitable for DC in excess of 1-2 mA.

Receiver Output Transformer:
(*Bendix Reference Code, A*103024)
Total Pri. Resistance 870 ohms
Total Sec. Resistance 390 ohms
Pri. Circuit Impedance 15,000 ohms
Sec. Circuit Impedance,
Terminals 4—7:4,000 ohms
4—6:300 ohms
4—5:50 ohms
Turns Ratio
Pri. to Sec. Terminals 4 and 7, 1.94:1
Pri. to Sec. Terminals 4 and 6, 7.07:1
Pri. to Sec. Terminals 4 and 5, 17.3:1
This component comprises an output transformer and filter choke in the same housing. The choke carries the full anode current of the valve, 10 mA, and appears on terminals 2 and 3. The primary winding only appears on terminals 1 and 2. As used in the SCR522 the choke is wired in series with the HT end of the transformer primary.

Receiver AF Input Transformer:
Pri. No. 1 Resistance
Terminals 1—2:920 ohms
Pri. No. 2 Resistance
Terminals 3—4:6.9 ohms
Sec. Resistance
Terminals 5—6:2,450 ohms
Pri. No. 1 Circuit Impedance 250,000 ohms
Pri. No. 2 Circuit Impedance 750 ohms
Sec. Circuit Impedance 1 megohm
Turns Ratio.
Pri. No. 1 to Sec., 1:2
Pri. No. 2 to Sec., 1:36.4

Four-Band Aerial System

PARALLEL DIPOLES WITH A TEN-METRE ROTARY

C. J. LEAL (G3ISX)

AERIALS are aways news and no excuses are made for bringing them up again ; it is hoped that this article will suggest a new approach to the problem of an efficient radiating system suitable for the average back garden. The writer long ago decided that the best way to tackle the aerial problem was to settle for efficient operation on a few bands rather than a compromise for all bands. After much experimentation, the system shown in Fig. 1 was evolved.

The principle of paralleling dipoles has been known for some time ; from basic theory it follows that each dipole will only accept a signal at its own resonant frequency ; at other frequencies it will be non-resonant. So, in theory at least, dipoles can be put in parallel without affecting one another.

Practice

The two dipoles shown in Fig 1 work very well on 7 mc, 14 mc and on 21 mc, where the 7 mc section resonates as three half-waves. The spacers for the dipoles are made of 4-in. lengths of $\frac{3}{8}$-in. dowelling, pickled in paraffin wax.

The beam for 28 mc, Fig. 2, was designed and built from information published in *Short Wave Magazine* for August, 1956, and is constructed as follows : Start by cutting a piece of 2-in. by 2-in. section timber, 4 ft. 3 ins. long ; mark the centre of one side and drill a one-inch diameter hole right through, taking care that the drill goes through square. Next turn the timber on its side and again mark the centre ; this time measure outwards 1 ft. $11\frac{1}{2}$ ins. either way so that the new marks are 3 ft. 11 ins. apart and are equally spaced either side of the centre.

Now select four 8 ft. straight garden canes with the butts all equal size, measure the butt diameter, drill right through to this size at the two marks already made, and insert the butts half-way into these holes, so that they are a force fit, using an adhesive if necessary.

Next, cut two lengths of one inch square timber four feet long, and screw them under the main boom and the bamboo canes to form

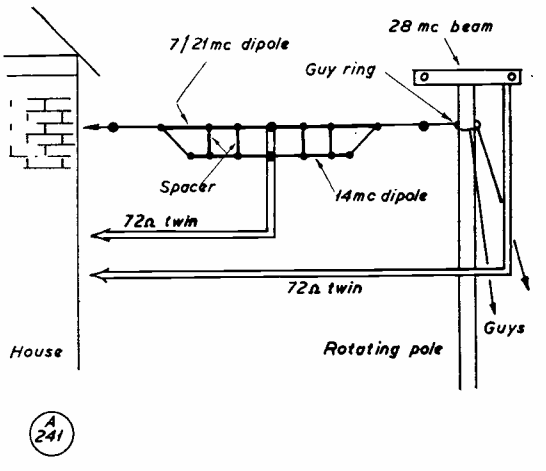


Fig. 1. General layout, showing the 7/21 mc dipole (half-wave on 7 mc, into three half-wave on 21 mc), with the 14 mc dipole physically "in parallel." The 10-metre ZL Special is on the rotatable pole, the dipole array acting as a horizontal guy. A sleeve or ring at the top of the mast is the termination for all three guys ; the pole rotates in this ring and in a drain-pipe support at the foot. The 10-metre beam is fixed to the top of the pole at the point of balance.

supports for the canes ; shape four wooden blocks to fit between these supports and the canes and lash with cord. Now give the whole frame two or three coats of creosote. If the above sounds complicated, reference to Fig. 2 should make matters clear.

Now form two folded dipoles from 300-ohm ribbon, one 16 ft. 3 ins. long and the other 15 ft. 5 ins. long, mark the exact centre and fix to the boom (with a temporary drawing pin) then tape the dipoles along the canes,

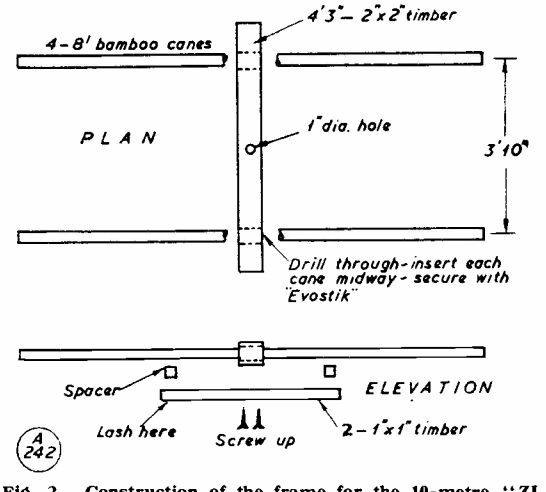


Fig. 2. Construction of the frame for the 10-metre "ZL Special." The cane lengths on which the dipole elements (made up of 300-ohm ribbon) are supported are themselves secured by a 4 ft. length of 1-in. by 1-in. wood strip, as shown in the elevation.

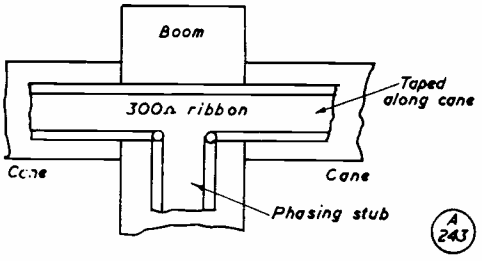


Fig. 3. The beam elements consist of lengths of 300-ohm ribbon, to the dimensions of Fig. 4, taped to the bamboo spreaders.

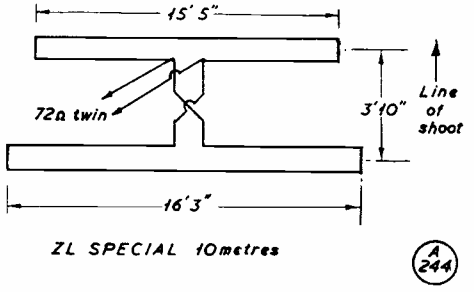


Fig. 4. Element layout for the 10-metre ZL Special, using 300-ohm ribbon feeder througbout. The transposition, or cross-over for the phasing line, is obtained merely by twisting the 46-in. length of ribbon connecting the centres of the sections.

as shown in Fig. 3. Remove the drawing pins, cut a length of 300 ohm ribbon 3 ft. 10 ins. long, put a twist in the centre so as to form the transposition and connect into the dipoles as shown in Fig. 4. The beam is coupled into 72-ohm line at the junction of the smaller dipole and the phasing line.

That is the beam finished. To rotate the system the cheapest and easiest is the Armstrong or "handraulic" method, which was adopted in the writer's case by fitting the pole in a section of drain pipe buried in the ground. The top swivel for the guys can be held up by a collar bolted to the pole, the strain layout being as shown in Fig. 1, where the dipole aerial run forms one guy line in the horizontal plane.

One's imagination is a great asset as regards general layout and assembly. At G3ISX, an old gramophone turntable was used as the top swivel, with the main beam fitted to it.

However, the beam could be mounted by shaping the end of the pole to fit the central hole in the boom, secured by right-angle brackets screwed to pole and boom. The swivel for the guys could be formed from strip metal, with five or six long, thick nails driven into the pole and spaced round it to make a shoulder for the swivel to turn on. This should be liberally greased, and all other exposed joints well coated with Bostik.

The beam is, of course, the writer's version of the famous "ZL Special." The four-band set-up as described here has produced DXCC and several other awards for G3ISX.

SHF/UHF MICROWAVE TV LINK

The G.P.O. has placed an order with Marconi's Wireless Telegraph Co., Ltd., for the supply and installation of an SHF and UHF wideband radio link between Birmingham and Norwich. The link, which is to be twin-path and bi-directional, will carry BBC television programmes between the two points, serving, en route, the new BBC transmitter near Peterborough. The project will be carried out in two stages. Initially, a UHF twin-path one-way link is to be installed between the BBC's Peterborough and Norwich stations. At Peterborough a BBC receiving point will pick up the Sutton Coldfield programmes, which will then be sent along the link to Norwich, using a complete 2000 mc system on a temporary basis. This will be withdrawn from service when phase two of the installation is complete.

The final installation will consist of a twin-path bi-directional link between Birmingham and Norwich *via* Peterborough, part SHF and part UHF. From the Birmingham terminal the first section of the link will operate at 4000 mc to a non-demodulating repeater station at Coalville. Thence the signal will be re-transmitted at 2000 mc to Peterborough *via* another non-demodulating repeater at Oakham.

The radio link in its ultimate form will employ the new Marconi 4000 mc equipment Type HM500 (terminal) and HM550 (repeater) together with the 2000 mc equipments Type HM200 (terminal) and HM250 (repeater). Such links are capable of carrying either a 405-line television signal (as in the present instance) or one of 525 lines or 625 lines. They can, if required to do so, carry an NTSC type colour television programme; alternatively, by substitution of the necessary amplifiers they can be used to transmit 600 simultaneous telephone channels. Both the HM500/550 and the HM200/250 series of equipments use the English Electric Valve Co.'s travelling-wave tubes throughout.

SELLING P.A. TIME

The firm of Sound Publicity, Ltd., undertake advertising by public address at sporting and similar events anywhere in the south of England. Time is sold on a duration/audience basis, on somewhat the same lines as with ITA contractors. The principal of this enterprising firm, already well booked for this summer and next, is G2DYM, of Kingsbridge, S. Devon, where he is in business under the style of R. B. Holman, Ltd.

SSB Topics

HT-32 CIRCUITRY — Q-PROBE TEST DEVICE
HF CRYSTAL FILTER POINTS — GATED G-C
LINEAR — NOTES AND NEWS

Conducted by J. C. MILLER, DJØBX (W9NTV)

THE current interest in single-sideband transmission and reception on the amateur bands has led many a neophyte to believe that this is an entirely new technique—a definite plunge into the mysteries of advanced electronics. It may come as a surprise to some that the basic techniques of single-sideband generation date back more than forty years and that the commercials have been using SSB since the early 1930's. In fact, the first known amateur SSB operation was in 1933 !

One of the points of confusion in understanding the generation of single-sideband signals is the meaning of the term "sidebands," which is usually associated with voice-modulation of a transmitter. Sidebands are, basically, groups of radio frequencies which result from modulating a single fixed RF signal with one or more audio frequency signals. The fixed RF signal is also known as a carrier, which by itself conveys no intelligence. The audio signals add to and subtract from the carrier frequency to produce these groups of closely related RF signals, both higher and lower than the carrier frequency. The number of individual audio frequencies in the modulating signal determines the number of individual signals present in both sets of sidebands at any given moment.

The mysteries of single-sideband techniques present a number of other formidable terms, such as: sideband filter, phase-shift network, balanced modulator, half-lattice filter, and so forth.

To add to the complication, two systems of generating an SSB signal are often mentioned. They are: (1) The filter system, and (2) The phasing system.

SSB output is derived from ordinary *amplitude-modulated* signals in both these systems. In the filter system a conventional amplitude-modulated signal is passed through a filter (or filters) which removes the undesired sideband by "brute force," leaving only the desired sideband. In the phasing system two amplitude-modulated signals are combined in such a manner that one set of sidebands is reinforced and the other set is cancelled out. In either system the carrier is balanced out from a signal that would otherwise be a completely standard amplitude-modulated signal. With proper adjustments, both systems will deliver the same type of signal.

The requirements for the filter system are quite rigid, since it is desired to pass only one sideband and attenuate the other at least 30 dB or more. This order of filter selectively is most easily achieved at frequencies below 500 kc. Therefore, many Sidebanders are using quartz crystal lattice-type filters, or mechanical filters operating in the vicinity of 450 kc. (However, there is a current interest in HF filters in the 5 to 10 mc range.)

The signal can be generated at any desired output frequency in the phasing system, but it is inconvenient and difficult to change frequency easily. In fact, it is a problem to design a bandswitching sideband exciter with either system.

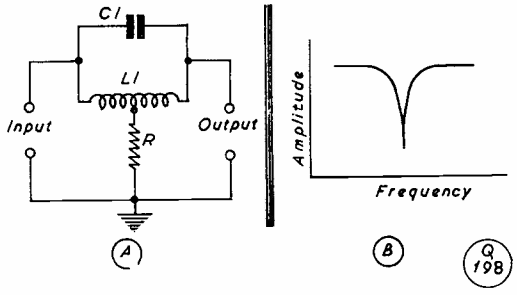
It should be noted that a further limitation is imposed by both systems—that of obtaining an SSB output signal on several bands. That is to say, the harmonics of the SSB generator cannot be used. This is because frequency multiplication depends upon non-linear operation of the multiplier stage, which would introduce intolerable distortion to an AM or SSB signal.

The practical solution to the band-changing and variable-frequency SSB generator problem is, at least for the home constructor, to use the same principle found in superheterodyne receivers—that is, to heterodyne the SSB generator output signal, which may be outside the amateur bands, to the desired amateur frequency.

More HT-32 Data

The basic design of this popular Hallicrafters' transmitter was outlined in the April "SSB Topics" feature. In answer to numerous queries from interested Sidebanders, several additional circuit details will be described this month, which may provide a few ideas for those who are designing a new SSB exciter.

The balanced modulator is of unusual design for carrier elimination. Variations of the bridged-T filter have been used quite widely in various amateur receivers for heterodyne interference elimination. To



At Fig. 1 (A) is the basic bridged-T filter arrangement. The resonant frequency of L1 with C1 determines the "notch" frequency; the depth of the "notch" is affected by the value of R. Fig. 1 (B) is a curve showing the transmission properties of the bridged-T filter when the value of R is equal to a quarter of the resonant impedance of C1, L1; when this condition obtains the "notch" is of maximum depth.

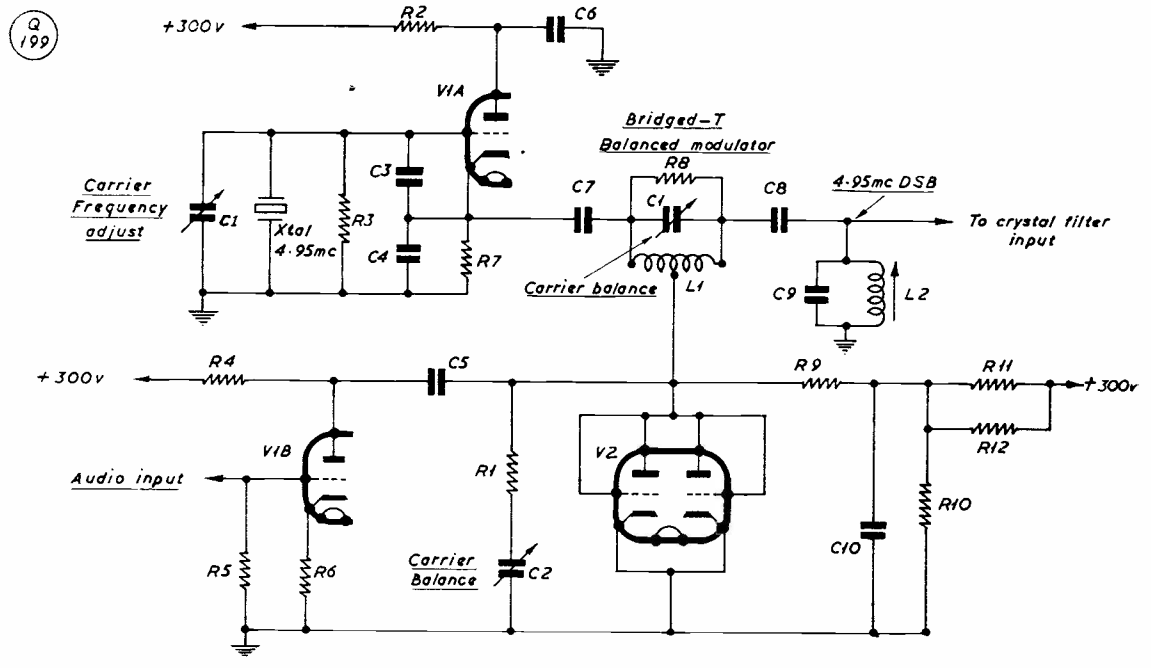


Fig. 2. The balanced modulator and associated circuitry in the Hallicrafters HT-32 transmitter. A bridged-T filter network is effectively used as a carrier eliminator, with the resistance of the diode-connected valve in parallel with R1 and C2, equal to the R of Fig. 1A. The carrier null is obtained by adjustment of the balancing condensers C1 and C2; R8 loads the circuit to prevent rapid changes in impedance with adjustment of C1. A small positive voltage applied to the anode of V2 makes it conductive. The dropping resistor is made up of R11 and R12. R11 is a thermistor which stabilises the voltage applied to the diode V2.

the writer's knowledge, this is the first application of this filter design in a commercially produced amateur sideband generating circuit.

The basic bridged-T "notch" filter is shown in Fig. 1A. The effective rejection frequency is determined by the resonant frequency of L1-C1. The value of the resistor R determines the depth of the rejection notch; when this resistance equals one-fourth of the resonant impedance of L1-C1, the circuit will have a very high rejection at the resonant frequency. This condition is shown in Fig. 1B. The rejection is upset by a change in the value of R—that is, increasing or decreasing this resistance reduces the depth of the rejection notch.

In the HT-32 transmitter a thermionic diode is used in place of the resistor and the bridged-T circuit is used as a balanced modulator. In this application, L1-C1 is tuned to the suppressed carrier frequency and R (the diode valve) varies at the modulation frequency.

The actual HT-32 circuit is shown in Fig. 2, where a 12AU7 (ECC-82), diode connected, is used as the balanced modulator valve, V2. The operation of the circuit is as follows: V1A is a crystal controlled oscillator operating on 4·95 mc. (This frequency is ultimately converted to the desired transmitter operating frequency by heterodyne action in later stages.) The 4·95 mc signal from V1A is fed directly to the tank circuit of the bridged-T balanced modulator network. The audio output from the third speech amplifier stage, V1B, is applied to the diode modulator V2, which is part of the grounding leg of the bridged-T network. Maximum carrier *null* is obtained by adjusting the carrier balance controls C1 and C2. A small positive voltage is applied to the anode of V2 to make it conductive. This voltage is stabilized by means of a thermistor, which is part of the voltage dropper.

With audio drive applied to the diode the effective resistance (diode resistance in parallel with the effective resistance of R1 and C2) is varied at the audio rate. The balance of the bridged-T network is thus upset at this same rate. Under balanced conditions the output of the balanced modulator consists of the upper and lower sideband of 4·95 mc.

The HT-32 high frequency filter circuit—which

Table of Values

Fig. 2. Balanced Modulator, HT-32 SSB transmitter

C1, C2	2-13 $\mu\mu$F, midget variable	R2	10,000 ohms
C3	33 $\mu\mu$F	R3	100,000 ohms
C4	120 $\mu\mu$F	R4	470,000 ohms
C5	.02 μF	R5	120,000 ohms
C6, C10	.005 μF	R8	12,000 ohms
C7	39 $\mu\mu$F	R9, R12	220,000 ohms
C8	390 $\mu\mu$F	R10	22,000 ohms
C9	18 $\mu\mu$F	R11	1.1 meg. thermistor
L1	12 μH	Xtal	4950 kc
L2	tune to 4.95 mc	V1	ECC83/12AX7
R1, R6, R7	2,700 ohms	V2	ECC82/12AU7

appeared in "SSB Topics" in our April issue—has prompted several readers to ask for the additional circuitry associated with the filter. The complete filter chain is set out in Fig. 3. It will be seen that two upper-sideband filters are actually used, with one in the input and the second in the output of the sideband filter amplifier stage, V1. The 4·95 mc double-sideband suppressed-carrier signal from the balanced modulator is passed through the two filters, where the lower-sideband is suppressed. The resulting upper-sideband signal is mixed in V2, with either 4·05 mc or 13·95 mc from the sideband selecting oscillator, to obtain upper or lower sideband at 9 mc. Additional suppression of the lower-sideband is obtained through the use of 4·949 mc shunt crystal in the grid of filter amplifier valve, V1.

The Q-Probe

A very handy device for sampling the field surrounding the output coil of an SSB exciter or linear amplifier, which can feed the station monitor oscilloscope without interference due to extraneous pick-up, has been placed on the amateur market by the Vantron Co., of Manchester, N.H., U.S.A.

Many Sidebanders connect a piece of wire to one of the vertical deflection plates of their 'scope to view the level of RF carrier, check the sideband envelope, measure sideband suppression, and adjust for optimum loading. Hanging the open wire in the vicinity of a high-impedance RF point not only changes the conditions at that point, but is extremely dangerous in any case.

A better approach would be to use a small one-turn pick-up loop, feeding into a few feet of coax cable, to take the RF information to the 'scope. This loop could be squeezed into tight places and be adjusted to discriminate between the fields surrounding nearby coils. When checking various tank circuits in an exciter one is apt to find only a few volts of RF at the output of the cable. This doesn't present much of a 'scope display when 50 to 100 volts RF is normally required at the deflection plates to obtain a useful presentation. A tuned circuit with a good Q—placed on the end of the cable—should improve on this.

Table of Values

Fig. 3. The HT-32 Sideband Filter

C1	= 5-25 μμF, midget variable	R2	= 470 ohms
C2	= 200 μμF	R4, R9	= 2,200 ohms
C3	= 5 μμF	R5, R7	= 4,700 ohms
C4	= .01 μF	R6	= 180 ohms
C5, C7, C8, C9,		R8, R11	= 47,000 ohms
C10	= .005 μF	R10	= 500 ohms
C6	= 47 μμF	R12	= 100,000 ohms
R1, R3	= 1,000 ohms	R13	= 10,000 ohms
		V1, V2	= 6AH6

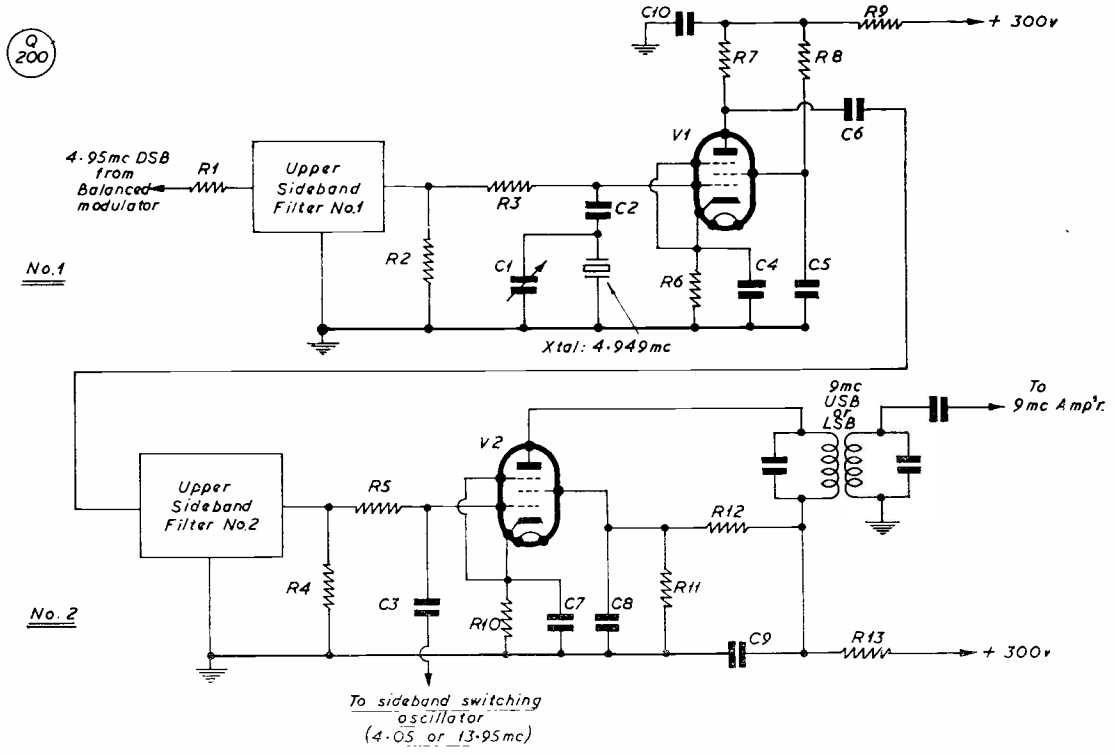


Fig. 3. The HT-32 sideband filter circuit in which two high-frequency filters are used in cascade to pass the upper sideband. This sideband filter circuit was shown in the April "SSB Topics." The 4.949 kc crystal in the grid of V1 is included to improve the suppression of the lower sideband. SSB output at 9 mc is obtained by selecting either 4.05 mc or 13.95 mc to mix with the 4.95 mc from the balanced modulator.

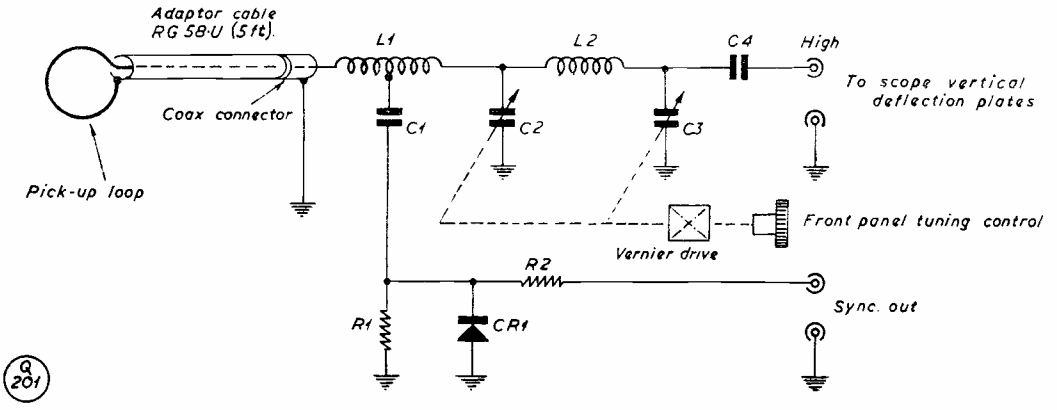


Fig. 4. The Vantron "Q-Probe" is an instrument designed to provide the necessary coupling and voltage step-up when measuring sideband equipment with an oscilloscope. A pick-up loop samples the RF energy and feeds the multi-band tuned circuit through a five-foot length of coaxial cable. The tuned circuit covers from 3 to 30 mc continuously. A detector is included which will provide the 'scope with a sync. signal obtained from the sideband wave form.

The Vantron "Q-Probe" includes several features of interest, which should make RF 'scoping a pleasure. The pick-up loop and connecting cable feed a fully shielded all-band tuned circuit requiring no plug-in coils or bandswitching. The unit contains a built-in detector capable of developing a sync signal, which can be fed directly to the *external sync* input of the 'scope. This will take care of the synchronizing problems.

The circuit of the unit is shown in Fig. 4, from which it will be seen that L1 and L2, C2 and C3 constitute a multi-band tuner capable of continuous tuning from 3 to 30 mc. The crystal diode rectifies a small amount of RF across L1 and feeds the demodulated audio signal to the sync-out jack through an RF filter. Connecting jumper wires from the output terminals to a vertical deflection plate and ground will feed the RF signal to the CRT.

A completely shielded, tuned all-band probe of this type should find many applications in the Sideband station.

Table of Values

Fig. 4. Circuit of the Q-Probe

C1	= .01 μF	L2	= 1.5 μH, 16 turns, 20g., ½in. dia. 1-in. length
C2, C3	= 20-250 μμF, split-stator variable (receiving type)	R1	= 220,000 ohms
C4	= .001 μF, 5,000-volt rating	R2	= 10,000 ohms
L1	= 5 μH, 12½ turns, 24g., ⅜-in. winding length, tapped at 1-turn, 1in. dia.	CR1	= 1N34, or standard crystal diode

HF Crystal Filter Experiments

The recent review of this subject—*see* April "SSB Topics"—has stirred up considerable interest among the Sideband fraternity, with a number trying the two half-lattice filters in the back-to-back arrangement. FT-243 HF crystals seem to be in plentiful supply on the "surplus" market; they are priced reasonably, which means that a substantial quantity of any one frequency can be obtained at relatively little expense.

One of the first reports on HF crystal filter experimentation comes from G2MA, who is planning to use a back-to-back filter in the IF-strip of his new receiver. The advantages of a high-frequency IF are most appealing when one considers that single conversion will give the same selectivity as is obtained in a normal double-conversation receiver. G2MA has found that the terminating resistances in the back-to-back circuit are very critical and suggests that potentiometers be used for filter termination during preliminary adjustments. The optimum value can then be measured when the tests are completed and a fixed resistor of this value substituted for the pots. He has found that the value of resistance decreases with an increase in the frequency separation of the crystals. Using crystals with 1·5 kc separation, he obtained a flat-topped pass-band with a shape-factor of 60:1, producing a measured bandwidth of about 2·3 kc at the 6 dB down points. With separations greater than 1·5 kc, the dip in the centre of the pass-band became quite pronounced.

GM3CIX advises that his first experiments with the back-to-back filter have been very encouraging. He started with some 8·5 mc crystals that were at hand, etching them to a 1·6 kc separation. A powdered-iron pot-core "of unknown characteristics" was used for the coupling coil former with fairly good results. However, he is planning to obtain some ferrite torroidal cores for further tests, before installing the filter in the new exciter.

A point of interest: Suitable ferrite torroids are manufactured by Mullard. A variety of characteristics and sizes are available. Further information may be obtained from: Mullard Ltd., Component Division, Mullard House, Torrington Place, London, W.C.1.

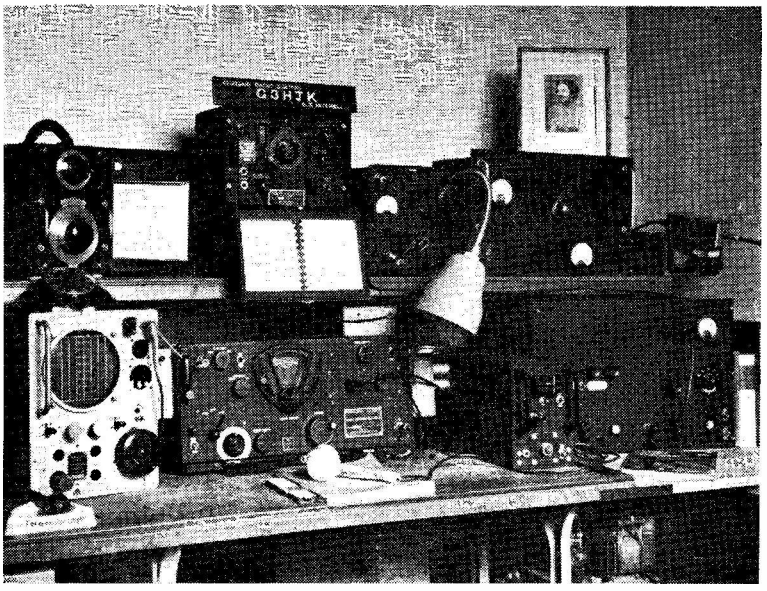
A Gated Grounded-Cathode Linear

The W6EDD screen controlled linear amplifier was described in SHORT WAVE MAGAZINE for February, 1959. The circuit as presented was for a grounded-grid arrangement, although it was mentioned that it had

been used with a conventional grounded-cathode amplifier.

In order to answer several queries (and relieve the writer's correspondence chores) the grounded-cathode gated linear is shown in Fig. 5. As in the original description, a 6F6 or 6L6 valve is used as the control valve, connected in series with the amplifier screen and the screen voltage supply. Without RF drive the grid of the control valve is at DC ground. As SSB drive is applied to the grid of the control valve, its anode current increases, the voltage drop across its cathode resistor increases and the amplifier valve screen voltage increases. The action is effectively that of a series-gate valve. It has been claimed by several users that this amplifier circuit will retain linearity when overdriven. However, the extent to which this can be done is not known.

The very interesting twenty and eighty metre SSB transmitter designed by G3HRO and described in SHORT WAVE MAGAZINE for January, 1959, will be produced in the near future by one of the firms now manufacturing amateur gear. While further information is not available at the moment it is anticipated that this item should be announced within the next few months. This should be a big help to those G's who have rather shied away from home construction of SSB gear !



G3HJK (Longsight, Manchester) is on SSB and runs a crystal/VFO mixer for heterodyning to the required output frequency, over 10 to 160 metres. The PA is an 813 as a Class-B linear amplifier. His receiver is now (the BC-348 visible being no longer in use) an arrangement incorporating two half-lattices in cascade, a Q-multiplier, and a switchable detector, with the audio channel restricted to the AF range 250-2,500 cycles only ; crystal controlled converters are used for the 10, 15 and 20 metre bands. A phasing-type exciter is available for all bands Ten to One-Sixty.

The Sideband column in *CQ Magazine*, covers

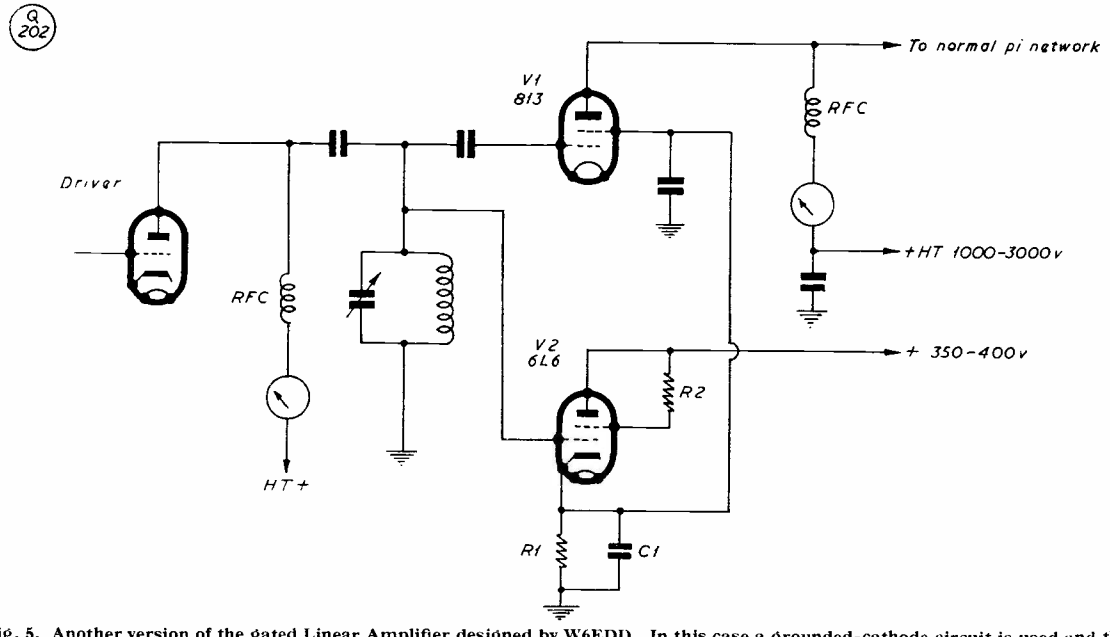


Fig. 5. Another version of the gated Linear Amplifier designed by W6EDD. In this case a grounded-cathode circuit is used and the amplifier screen voltage is controlled by the gate-control valve. Application of SSB drive increases the amplifier screen voltage. In this circuit, C1 is 2 μF, oil-filled, 600v. working ; R1 is 20,000 ohms, 10-watt, wirewound ; and R2 is 100-200 ohms, 1-watt.

many newsy items each month. W3SW has announced in the April issue that 45 awards for stations who have worked 100 countries on two-way sideband have been issued. In addition, ten of these stations have submitted proof of having worked 150 countries —all on two-way sideband! If you have the necessary QSL cards verifying the 100 contacts, send them to: W3SW, P.O. Box 625, Silver Spring, Maryland, U.S.A., together with a list of the countries in alphabetical order by prefix. Be sure to include sufficient postage for returning your cards, plus fifty cents (U.S.) to cover costs of sending the certificate—IRC's acceptable.

W3SW will also be pleased to send certificates for "Worked 50" and "Worked 75" countries. All that is necessary for these two awards is to send a list of stations worked, with a signed statement by another amateur that he has examined the cards. It is not necessary to send in the QSL's for these two awards. Just be sure that all stations were worked two-way SSB !

K2MGE and her OM, K2HEA, appeared on a television quiz programme a short time ago. They apparently knew the correct answers as they were the winners of $400! That should help in the purchase of some new Sideband gear !

F7AF, one of the most active Sidebanders from the Paris vicinity, has packed up for a return trip to the States. We should be hearing him shortly from W with his usual good signal.

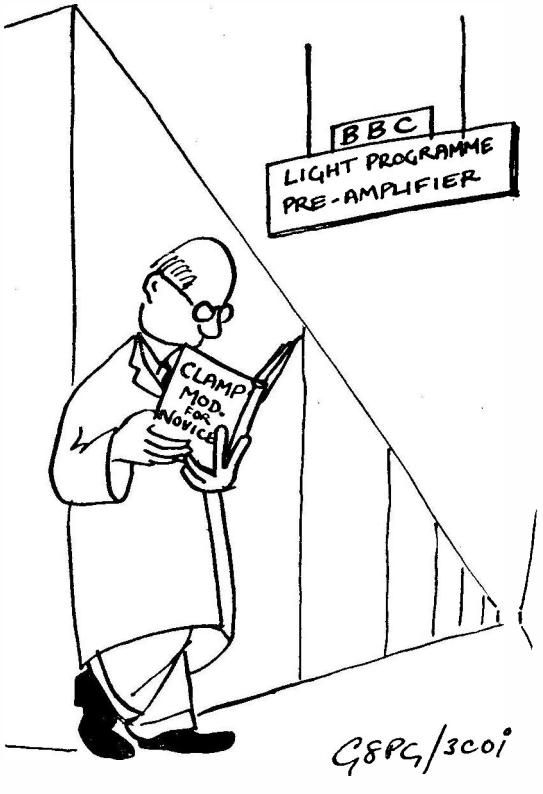
The U.S. authorities (FCC) are at the moment considering the matter of expanding the U.S. 20-metre phone band to include 14300 to 14350 kc. All *pros* and *cons* on this matter were to have been submitted by May 1, with a final decision following. If the W sideband stations suddenly appear in the high-end DX area of Twenty, the results of this action will be obvious. By the time this is read, the decision should be announced.

In Conclusion

The large correspondence received from our readers throughout the world is always appreciated. This column is interested in your activities, experiments, sideband circuits and suggestions. If you have a special SSB QSL card, or photograph of yourself or station, send it to this column for appropriate reproduction.

"SSB Topics" will next appear in the August issue, for which all correspondence should be in by June 30. Address "SSB Topics," c/o Editor, SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1, or direct to your contributor at Mauerkircher Strasse 160, Munich 27, Germany.

Until August, let's enjoy a Summer of Sideband. *Vy 73 de Jim, DJ0BX.*



" . . . . a 6V6 will be adequate . . . . "

SCOUT RADIO JAMBOREE

The Scout Jamboree-on-the-Air which took place in May of last year aroused considerable interest, but due to certain adverse factors—including insufficient advance publicity and poor radio conditions—its success was not as great as the project deserved. The period for this year's event, October 23-25, has been chosen so as not to conflict with summer activities and to give adequate time for preparation. What the Jamboree amounts to is a QSO-party for all radio amateurs, throughout the world, who are scouts or interested in Scouting. To this end, it is hoped that licensed operators will make contact with local scout groups and give them demonstration QSO's, during October 23-25, with other scout stations. The Hq. station of the Boy Scouts International Bureau will be on the air from Ottawa, Canada. The U.K. organiser for the event is: L. R. Mitchell, G3BHK, Katoomba, Tyneham Close, Sandford, Wareham, Dorset, who will be glad to give further details.

COUNCILLOR W. KROHN, M.C.S.P. (G6KJ)

At the recent local government elections, G6KJ was again returned for the Buckingham Borough Council, six candidates being up for four seats. This makes his fourth term on the Council over a period of ten years. As many readers will remember, G6KJ has been sightless from birth—nevertheless, this has not shut him away from many of the normal activities of life. He has been an active amateur since 1923, runs his own electrical and hardware business, is a chartered physiotherapist, and his work in both wood and metal would put many a sighted person to shame. He is also a confident and fluent public speaker, and brings a mature mind to bear on Council affairs.

Pre-Amp. for Two Metres

USING THE A2521 IN GGT

C. D. ABBOTT (G6TA)

One of the interesting UHF/VHF valve types now available is the GEC A2521, suitable for frequencies up to 900 mc using normal VHF valve circuitry. This article, by way of introducing the A2521, discusses its use as an RF pre-amplifier for a two-metre converter.—Editor.

WHEN the G.E.C. A2521 type valve became available it was at once realised that it would be very useful to VHF operators. It is a triode constructed specially for grounded-grid working at UHF. The manufacturers recommend an anode voltage of 130, when the cathode current will be about 16 mA with the grid one volt negative. Under these conditions the A2521 has a mutual conductance of 15, an amplification factor of 60 and, in a suitable circuit, will give a gain of 10 dB at 900 mc.

For some time the author has been using a converter on two metres consisting of a cascode stage followed by half a 6J6 as a leaky-grid mixer. It has a noise factor of about 5 dB.

Comparison

In order to get some idea of the performance of this new valve a second converter was constructed, similar to the one in use, except that an A2521 replaced the original cascode double triode. The results were most encouraging. The noise factor was definitely better than the cascode and there was hardly any difference in the overall gain. As it was felt that a little more sensitivity in the regular converter might occasionally be useful it was decided to add to it a pre-amplifier stage employing the A2521. The very good characteristics of this valve have been obtained by using relatively small electrodes and also a clearance between grid and cathode of only a few microns. For this reason it is essential to keep the plate and grid dissipation to the absolute minimum.

As in most cases a two-metre receiver would be used in the vicinity of a transmitter a simple grounded grid circuit would expose the valve to possible damage caused by heavy grid current when transmitting. Suitable circuit modifications to be described avoid any trouble in this connection.

Noise Factor Check

Before proceeding further it would be a good thing to check up on the performance of any existing two-metre receiver. If it has a noise factor of 5 dB or more, the A2521 RF amplifier will give a very worth-while improvement and in any circumstances it should produce about 12 dB more gain.

If a noise generator is not available, some idea of noise factor can be obtained by tuning to a spot on the band where there is no signal, noting the S-meter reading and then disconnecting the aerial. If the S-meter drops by one half S-point or more the receiver is most probably average or good; if the S-meter remains stationary the receiver is most probably poor; and if the S-meter actually goes up the receiver certainly needs attention, as this is a sign that the first stage is unstable and/or regenerative which invariably causes a poor noise factor.

Construction

The circuit of the pre-amplifier is shown in Fig. 1 and the physical lay-out, which should be closely followed, in Fig. 2. The chassis is 4 ins. x 4 ins. x 2 ins. deep and is made of

Table of Values

Fig. 1. Circuit of the A2521 RF Amplifier

C1, C7	= .001 μF midget ceramic	R2	= 100,000 ohms, ½-w
C4	= 4/.001 μF midget ceramic	R3	= 10,000 ohms, ½-w.
C2, C3, C5, C6	= .001 μF feed-thru type	R4	= 1 megohm
R1	= 2,000 ohms, ½-w.	R5	= 5,000 ohms, 2-w.
		R6	= *see text*
		RFC	= ¼-wave chokes (*see text*)
		V	= GEC A2521

COIL DATA

L1 = 9 turns 16g. enam., self-supporting, ⅜-in. i.d. by ¾-in. long, tapped one turn from cathode end.
L2 = 5½ turns 16g. enam., self-supporting, ½-in. i.d.
L3 = 2 turns on earthy end L2.

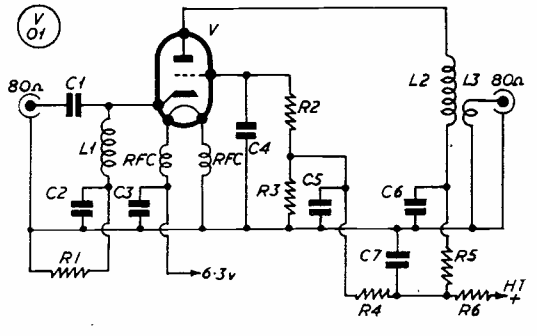


Fig. 1. Circuit of the RF pre-amplifier for two metres, described by G6TA, using a GEC A2521 UHF triode. This valve is capable of high gain with excellent stability. A suggested form of construction for the amplifier is shown in Fig. 2.

24g. tin plate. This is sufficiently robust and has the advantage that components are easily soldered direct to "ground." The screen dividing the anode circuit from all other components is made of similar material; it is $1\frac{7}{8}$ ins. high and cut to fit closely over the base of the socket; it is soldered to the centre spigot of the valve-holder and also to four points on the chassis. When fitting this screen, care must be taken to ensure that it does not touch pins 4, 5 and 6. To obtain the best results it is essential to use a P.T.F.E. valve-holder. This is soldered to the top of the chassis. Holders made of inferior material can degrade the noise factor by as much as two or three dB.

The heater is fed through two $\frac{1}{4}$-wave chokes, each consisting of 19 ins. of 24g. enamelled wire wound on a $\frac{1}{8}$-in. former about $\frac{7}{8}$ in. long. Suitable material can be obtained from $\frac{1}{4}$-in. co-ax. after stripping the braid and taking out the centre conductor.

L2 is $5\frac{1}{2}$ turns of 16g. enamelled wire, self-supporting and with an internal diameter of $\frac{1}{2}$ in. L3 is two turns of well insulated wire coupled to the "earthy" end of L2.

The only part of the circuit which requires further comment is that around L1. The capacity of the cathode-plus-heater to grid is about 4 $\mu\mu$F. A $3\frac{1}{2}$-turn coil was tried and the aerial coupled with a 3-turn loop; at resonance this gave good results but it was decided to experiment with other input circuits. After consulting various sources of information on this subject the writer tried several larger inductances than the one which was resonant at 145 mc. It was found that a self-supporting coil of 9 turns of 16g. enamelled wire, of $\frac{3}{8}$ in. internal diameter and $\frac{3}{4}$ in. long, with the aerial tap one turn from the cathode end, gave an excellent noise factor. This version of L1 is that now in use and it apparently behaves as a "high-Q" RF choke.

A final constructional point is that R1, R4, R5, R6, and C7 are on the top of the chassis: R1 is screened from the others by the valve-holder and its shield.

After completion the pre-amplifier should be connected to aerial and converter, but before switching on power supplies L2 must be adjusted, with the aid of a grid dip oscillator, to resonate at 145 mc. The HT should be between 200 and 250 volts and R6 must be of such a value that at its junction with R5 the voltage is just about 200v. As a precaution the voltages at cathode and anode should be checked. They should be 3v. and 125v. respectively. The actual grid voltage compared with

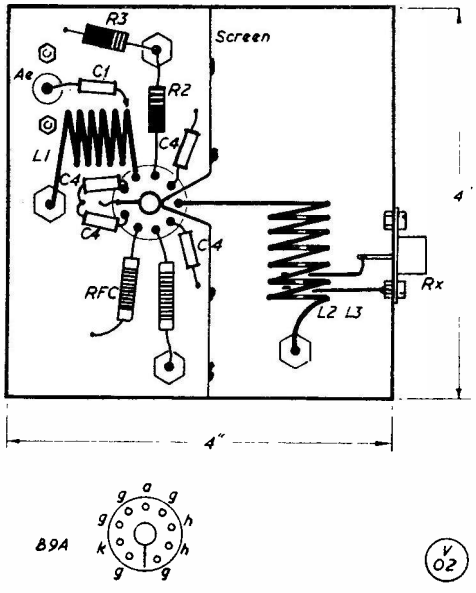


Fig. 2. Physical layout sketch for the RF pre-amplifier, as constructed by G6TA. It should be noted that by using a tinned metal chassis, good ground connections can be made; in the model, the screen is soldered to the shell at four points, and also to the spigot of the valveholder; note that four by-pass capacities C4 are used. All other details are given in the text.

cathode is −1v. as the resistances R3 and R4 produce +2 volts at the grid with respect to earth.

After allowing the amplifier to run for about ten minutes to warm up a steady signal should be tuned in and coils L2 and L3 finally adjusted for the best S-meter reading.

From the foregoing description it can be seen that the pre-amplifier is exceptionally easy to construct. There is no tricky neutralisation involved and the only adjustment necessary is that of L2 and L3, which takes but a few minutes.

And as to results, it can be said that the A2521 is a valve type which will find increasing use in amateur VHF work.

PLESSEY TELEPRINTER TERMINALS OVERSEAS

A new Radio Teleprinter Receiving Terminal, particularly suitable for regional point-to-point communication and meteorological broadcasts at airports and for Press broadcast reception at newspaper offices, has been introduced by The Plessey Company, Ltd.

The new radio teleprinter, type PVR500, is the latest of a series of Plessey radio teleprinter terminals, and incorporates many new design features. Equipment of this sort can also provide a valuable service to business organisations, civil engineering, oil and electric supply projects and in many other spheres where rapid and accurate communication over long distances is essential.

VHF BANDS

A. J. DEVON

Good European Openings—

Much EDX to Work in DL, OZ and SM—

G2XV/SM6ANR on Seventycems, May 17—

Notes, News and Comment—

IT is a pity that we always have to wait for the right weather for really good VHF conditions—but when we do get the weather, we can be fairly sure of the conditions.

Those who have grown wise in these matters read the signs aright last month, and over the period May 7-25, it can be said that VHF conditions were generally good, with very satisfactory EDX openings during May 17-18 and 24-25. There was plenty of EDX and GDX to be worked, and the activity level was correspondingly high—though, as usual, quite a number of people missed their opportunities, either by just not being on, or not realising the DX was there.

To take the happenings in chronological order, we can start with the two-metre field day on May 3. The weather was shocking, the turn-out not very good—it was a CW-only contest, but we are merely hinting that this may have deterred many keen /P types!—and the going rather slow, under poor conditions. Nevertheless, some excellent contacts were made: G8GP/P at Woldingham, Sy., worked GW2FVZ (Mold, Flints.) for best DX, and heard GI3GXP, who was worked by G3HBW in the middle of the afternoon. The G8GP/P group finished up with 41 contacts made by closing time, G2DTO/P having 26 and G3FD/P, 31. This was the order of scores in the south and nothing more need be said about either activity or conditions.

But the operating! Too many stations were sending unreadable Morse at break-neck speed (hurry was the one thing there was no need for!), repeating their numbers *ad nauseam* but giving unfamiliar location names once only—which prolonged the agony with further repeats. The few really well-operated stations stood out like beacons in this murk; one, in particular, patiently calling "CQ QHL" (or QLM, or whatever) would invariably be answered with short calls from the *other* end of the band, so the contact would, of course, be missed, whereat the answering station would break into a furious "CQ," only to miss a reply in his own part of the band. So, in spite of all the "high-speed operating," many QSO's took a long time to make, and some were never made at all.

It is true that your A.J.D. is criticising from the comfort of his own armchair, whereas the /P's were operating in distinctly uncomfortable and depressing circumstances. But the criticisms are justified by reason of the great disparity in the standard of operating as between /P stations, all of whom were in a CW contest under approximately equal conditions. (And we might add that A.J.D. has been out /P in the rain often enough himself.)

What it all comes to is that while this portable business is good fun (on a fine day), it does not prove anything we did not know years ago and, because of the low level of regular CW activity on the VHF bands under any conditions, proves that too many people do not know what to do when they are given a key to push in a CW contest.

"First" on Seventycems

The gradual improvement in conditions and activity after May 7 culminated in a resounding success for G2XV (Cambridge) at about midnight on May 16/17, when Gerry had a solid CW contact with SM6ANR on 70 cm, reports being 569 each way. According to our records, this is a "First" for the 430 mc band, and a very fine one, too, on which G2XV will be congratulated by all his rivals on that band! Gerry is not only an Old Timer who is as keen now as he was 30 years ago, but he has kept up-to-date and for long has been one of our more effective VHF operators.

Of course, the May 17-18 period also saw good EDX openings on two metres, with OZ and SM coming through and plenty of ON's and PA's; a station thought to be OH6OT was also heard (by G3LHA) very weakly at about 2230 GMT on the 17th, right at the LF end—can anyone confirm, as this would be the first appearance of OH as a workable country from the U.K.? G5MA worked SM6ANR on CW and also had three very good phone contacts with OZ3NH, OZ4KO and OZ9EA; SM6BTT was heard. In the week to May 19, G6NB worked the OZ/SM stations mentioned, plus SM6PU, several ON's, two F's and no less than 27 PA's! Nearly everyone who was on worked some of the EDX, and the OZ's in particular were very good signals, as it was a marvellous opening in the north-east direction.

Coming to May 24-25, following several days of warm weather with a high and steady glass, the opening that then developed was more easterly, in that it was the turn of the DL's. Stations like DJ1XX, DL1RF and DL9ARA were in great demand on the evening of the 24th, working G's on CW and phone, with the ON's and PA's also coming over. GM's were being heard in ON, but at the moment we have no exact details. Again on the evening of

May 25, the DJ/DL's were there, with DL1RX a very consistent CW signal. On this occasion, the opening was more widespread, as we had F, DJ/DL, ON, OZ, PA and SM all on the band together—it is not very often that this happens! Some of the more interesting EU calls noted were OZ3M, OZ7BR, SM7BAE and SM7BOR, all working or being called by G's in the central and north to south-easterly parts of the country. From where your A.J.D. sits, it was difficult to judge how they were doing in GW and the West Country, but one's impression is that the Scandinavians were not being heard in those areas.

Some of the Gleanings

The revised Zone Plan seems to be working out well, though everyone is not there yet . . . Your A.J.D. has checked the frequencies (for reference and record purposes only) of some 75 stations heard in the last three weeks . . . There is a good deal of congestion at mid-band on two metres, with a lot of heterodyning in the plus-or-minus 145 mc area . . . The new signal from G3DVV can only be described as colossal; his 829B is being run at 120w., into an 8/8 slot-fed, and is cooled; you can hear the blower; that beam is sharp, too . . . G6ZP is back on again from Malvern, and getting out well to the east . . . Conditions were good N/S on the evening of May 11 (A.J.D.'s birthday, when he felt 73 and spent the evening on the air) . . . We now have G5OX and G6OX active on two metres; they are near in frequency, too, when G6OX is on his other rock . . . There is a powerful beat between G2ANS/G3HBW, which in some directions must make them hard to separate . . . GM3HLH/A, 144.9 mc, was working northerly G's on May 11 . . . During the week May 11-15, PE1PL was a very consistent signal on his morning sked with G2NY, worked on the 12th-14th . . . G3JMA is another of those with two frequencies . . . It is a great pleasure to hear G3EHY, Banwell, Som., back on the two-metre air: Louis has been off for about six years . . . One of the very new stations on is G3NIH, Rotherham . . . ON4FG is making a photographic tour of England this summer . . . During the evening of May 25, G3JYT and DL1RX spent a lot of time calling CQ on the same frequency . . . SM7BOR is on Sideband, and putting out a very readable signal; he worked G3FAN on the 25th, for a distant G . . . We don't know if he heard or worked G3CCH or G3MED, but they could have made it a two-way Sideband QSO . . . F3LP must have been pleased to hear at least one G calling and then working him in good French . . . It is astonishing how well the Continentals make themselves understood in English—luckily for most of us! . . . You can always tell when G6NB is on his auto-CQ sender—it has a slight stutter; one imagines Bill sitting back with a cup of tea and watching the meters while the tape clicks through . . . G3HBW heard about 50 stations on the evening of May 11 . . . Looked at from where we are, one of the more distant G's is G3IKV in Barrow-in-Furness, Lancs.—practically in Cumberland . . . G2FM and G6TA are both very loud signals on their N/W beam headings . . . G2DUS is /M on Top Band and two metres, and can switch from one to the other very quickly . . . G3LAY/M has a neat two-metre V-dipole mounted on the radiator . . . G2CIW has started up from the new Birmingham QTH . . . If we get a spell of good conditions, with the high level of activity that would bring, most people will need much more Rx selectivity to get 'em sorted out, especially in that hot spot around 145 mc.

Blunt Statement

Heard one evening during the period, with a strong, dark-brown North Country accent: "If you can't give me S9-plus, you'd better put a hammer through that converter because you're a good S9 with me. You won't be very popular on the band if you can't give better reports than that" (!)

This interesting observation is worth a few lines, because is raises what is almost a moral issue. When we give S9, do we really mean S9 *on the meter,* or are we saying S9 just because it is a comfortable signal on the speaker, with plenty of audio gain in hand? On your A.J.D.'s equipment (admittedly rudimentary, and not being quoted as the standard) any well-modulated phone on the two-metre band will give a comfortable speaker signal when the S-meter is showing barely one S-pt. above noise; by any *audio* standard the signal is RS-59, with audio gain in hand and no background "sharsh"; yet the S-meter may only be reading about S3. In fact, apart from near-by locals, very few two-metre stations can push it much beyond S7; CW that can be read all over the house and down the garden will hardly move the needle with the BFO out. On the other hand, this S-meter has been carefully calibrated to communications receiver standards on the IF range tuned, and responds normally to what really are strong signals, local or otherwise. (Mark you, it can be *made* to read S9 plus 10 dB on almost any signal by appropriate adjustment "inside the box"!).

The question is, therefore: Is A.J.D.'s S-meter unique, or must he risk unpopularity by telling the truth? Alternatively, are the S-values being given, as a rule, exaggerated? If so, why?

VHFCC Elections

We are glad to announce the following as new members of the VHF Century Club: H. S. Woodhouse, G2AHY, Crowthorne, Berks., Certificate No. 240 (with phone endorsement); F. Jeanmonod, G3JYT, London, S.E.9, No. 241; H. van der Hooning, PAØDJ, Meppel, No. 242; and A. Pendl, OE6AP, Graz, No. 243.

The phone endorsement can be given on request (provided the cards prove it, of course!) but no separate listing is kept of phone-only certificates. The claim from G3JYT is interesting because he is one of the sightless, and is the second registered blind amateur to qualify; his cards included 96 G's, two ON's and two PA's. PAØDJ showed only one U.K.

station, G5YV, with three ON's, 19 DJ/DL's and all the rest *les Hollandais*.

Naturally, the claim from OE6AP was particularly interesting because he shows a majority of stations worked that are never heard, or heard of, in this country. His list includes nine HA's, 28 OE's and no less than 40 YU's—we've seen the cards, and they are all on VHF right enough. In fact, YU2HK was on 70 mc, and YU3EN and YU3BUV on 430 mc; of the OE's he worked, two (OE6HS and OE6RH) were both on 70 mc and 430 mc; he also had two DL contacts on Seventycems, DL3TC and DL6MH; the balance of OE6AP's lot is made up of DJ/DL and two SP's, 5EL and 5FM.

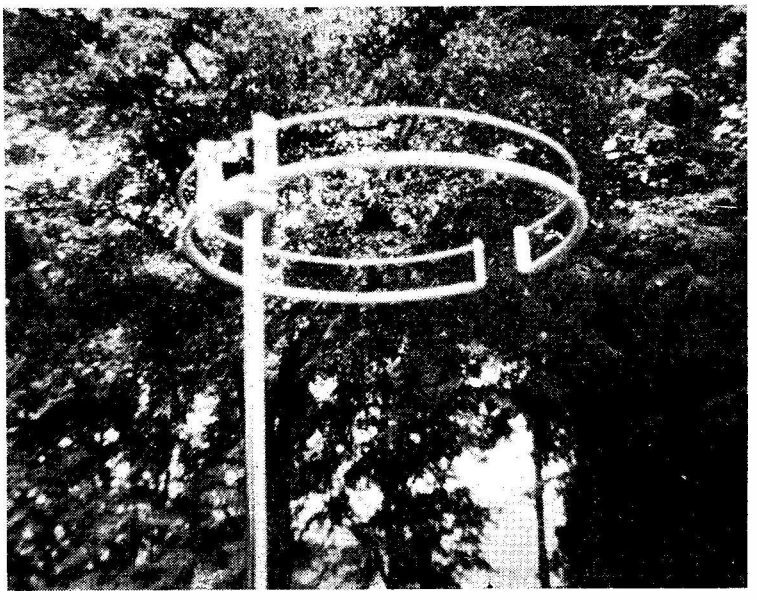
From all this, we may infer that there is quite a high level of VHF activity in south-east Europe. All OE6AP's cards were of recent origin, and in many cases showed the equipment in use to be of a high standard. Whether we shall ever hear HA, OE or YU in this country may be doubtful, but at least we know they are there.

Two-Metre Mobile

Pictured here is the two-metre halo now being used by an old friend of these pages, G6VX, of Cheltenham. Before moving down there from Hayes, Kent, Maurice was very active on two metres, and a well-known contributor to SHORT WAVE MAGAZINE on VHF topics.

On VHF, Cheltenham is a difficult place to get out of; it is not so much in a saucer or a valley but (to those who live there) down a deep hole. When they want to work anything in any direction except, perhaps, westerly, Cheltonians go up on the hills. This means mobile or portable, and /M is the more convenient.

The G6VX/M halo consists essentially of a 40-in. length of $\frac{3}{8}$-in. ali. tube formed into a 12-in. diameter circlet secured at its mid-point in a mounting block of ali. stock, drilled to take the short car mast; two inches at each end of this circlet are flattened and turned up to close the fold of the dipole —*see* photograph. The feed elements are two $17\frac{1}{2}$-in. lengths of 3/16-in. ali. rod, mounted above and parallel to the main ring spaced $1\frac{1}{2}$-ins. to it centre-to-centre, and held by polystyrene strips at the mast end and the upward bends of the thicker element at their other ends; the poly. strips are drilled to take the two element diameters of $\frac{3}{8}$-in. and 3/16-in. at the required spacing of $1\frac{1}{2}$ ins., c/c. As the thick circlet should be 36 ins. long (allowing the 2 ins. at each end of the 40-in. total length for the flattened turn-ups) and the feed elements total 35 ins. in length, it follows that for parallelism of the two circlets the feed-point separation at the mast end (*see* photograph) must be one inch. And it is across this separation that the 75-ohm feed line is connected. The result is a neat and effective two-metre mobile aerial which, for G6VX/M, gives contacts with London stations from the high ground in the Cheltenham neighbourhood.



The two-metre halo now being used by G6VX/M, Cheltenham. This is an interesting design and is most effective, London stations having been worked from the hills above Cheltenham. The feed impedance is 75 ohms and some further details are given in the text.

The Tabular Matter

Though not shown this month—we are tight on space and, as it turns out, could have done with another two pages for "VHF Bands"—all claims made have been taken into the Tables, which will appear again as opportunity offers. One of the more interesting movements is that of G6NB, now bracketed with ON4BZ at 17C in Countries Worked.

Concluding ——

As this piece was being put down, the two-metre band was cooling off again — but we shall have more of these openings as the summer advances. One of the important things is to keep your A.J.D. informed of how you get on; he may, or may not, hear you working the DX, but unless you make a claim it cannot be entered in the record. 73, and remember the closing date this time is **June 17,** addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

Late Flash: G3HBW and G6NB worked SM7BAE on Seventycems on the evening of May 25. For G6NB, the SM came back to a CQ!

MOBILE ACTIVITY REPORT

NORTH MIDLAND RALLY, APRIL 26— CORNISH MEETING, MAY 3— CHELTENHAM MOBILE RALLY, MAY 10— FORTHCOMING EVENTS

FOR the North Midlands event on Sunday, April 26, there was again a large attendance for what turned out to be an even more successful Rally than last year. With no less than 250 cars (and seven motor-cycles), *all fitted mobile*, in the park, it is estimated that the total attendance was about one thousand people—surely the largest gathering for an Amateur Radio occasion yet recorded in this country! This was in spite of rather cold and showery weather. However, the organisers had done a great deal of ground-work, by way of publicity and circularising, and as there is plenty of covered accommodation at Trentham Gardens, with a full restaurant service and other facilities, the weather was not a serious deterrent.

Of the 250 vehicles fitted /M, something like 200 were checked in as being on 160 metres—if anything, the popularity of Top Band for mobile operation seems to be increasing. At any rate, the North Midland organisers had foreseen this by providing three Top Band talk-in stations—G3GBU/A on the ground, and G3EHM and G3HVI at home locally—to clear the heavy traffic on that band. The other talk-in stations were G3MAR/A covering 10-80 metres, and G3BA/A for two metres. After Top Band, the next most used /M bands were Two and Eighty.

The arrangements for visitors included a bring-and-buy stall, a display of radio-controlled models, and a show of manufacturers' apparatus. The local B.A.T.C. group again put on a very efficient demonstration of closed-circuit TV, used for interviewing and generally keeping people in touch with what was going on through conveniently-placed monitor receivers. All their TV equipment is home-built and the results reflect great credit on those concerned.

During the afternoon, G3MED gave a talk on two-metre SSB, with which he is doing very well, and after the certificates for the best mobile gear in each of the classes had been presented, the prize draw took place—with the usual unexpected results for a number of people. Visitors had come from all parts of the country, including Leeds, Liverpool, Manchester, Yorkshire, the West Country and the South of England — they departed with memories of a very successful meeting, well rewarding the long preparations of its organisers.

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The rally at Penryn, Cornwall, on May 3, organised by the Cornish Radio & Television Club, was, in the nature of things, a very much smaller affair, as Penryn is far from the main centres of amateur activity. However, 28 holders of call-signs were registered, among whom were G3WW/M and G3XC/M, who were visiting in the district. The talk-in was undertaken by G6LV/A, with G3AET, G3KFP and G4IV assisting as out stations. Judging of the mobiles was by G2DDR and the manager of the local marine depot of Marconi's; the winner was announced at G3XC/M (from Farnham Common, Bucks.), with G3GDC/M and G3WW/M as runners-up. G3LPB, hon. secretary of the local Club, was responsible for the organisation; this was the first effort of its kind in Cornwall, and was well supported by local amateurs.

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For the Cheltenham Mobile Rally on May 10, the weather was good, and the attendance excellent, some 90 mobiles being registered, including a contingent from South Wales. A distinguished visitor was Gerry Marcuse, G2NM, who gave away the prizes. For the contest—which was designed to test gear, motoring and navigation—there were 12 entrants. Five local mobiles (G2DUG, G3GMN,

Under the glare of the arc lights of the British Amateur TV Club cameras, on closed-circuit, G3BA (centre) conducts the prize draw at the North Midlands Mobile Rally. G3BA is in charge of the BBC's TV transmitting station at Sutton Coldfield, so he was not on strange ground, though on this occasion he was, of course, appearing in a strictly amateur capacity. As last year, the B.A.T.C., with entirely home-built TV gear, did an excellent job of local coverage for the Rally.

G3JFH, G3MOE and G8ML) were located at prearranged spots round Cheltenham and, working on different frequencies on Top Band, gave their locations by 6-figure map references. The contestants had to find these positions on the map, visit each in turn to collect full points, and also work as many other stations as they could for the points build-up. The contest was monitored by the rally control station G3GPW/A, with G3KFT/M on patrol. A separate frequency was reserved for emergency working and proved to have been a wise precaution, as one of the competitors had a breakdown and had to be rescued from a remote spot. The first three in this interesting and original contest (which all the competitors thoroughly enjoyed) were G6NW/M (Hayes), G3DTG/M (Northfield) and G3KSW/M (Cheshunt). General talk-in was handled by G3GPW/P on 160 metres, and G3MA/P assisted by G5BM/M on two metres; seven /M's were worked on the latter band, all the rest being on 160 metres.

The site for the Cheltenham Rally is both pleasant and convenient, and the town being a good centre for the West Country, there was virtually a capacity attendance. The event was organised by a committee of the Cheltenham Amateur Radio Society, and in addition to the mobile contest, they had arranged a prize draw, always so popular.

At the North Midlands Mobile Rally at Trentham Gardens on April 26, there was a total attendance of about one thousand, with 250 cars actually fitted mobile — and of these, fully 200 were for Top Band. The meetings for the Rally were held in the building shown in the background of this photograph.

At the Cheltenham Mobile Rally on May 10 — G2NM (left) and G6FO discussing a point after G2NM found he had won a "Short Wave Magazine" voucher in the free prize draw!

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THE MOBILE RALLY CALENDAR

The Mobile Rally meetings now to be worked off are as follows:

June 14: West of England Mobile Rally at Longleat House, near Warminster, Wilts.—*see* opposite for details.

June 21: Annual Topsfest and Mobile Rally at Walsall Road School, Cannock, Staffs., 2.00 p.m. onwards. Meeting, demonstrations, tea, station visits. Approach on A34; location is ¼-mile south of Cannock town centre. Talk-in will be given on 1900 kc.

June 21: Harlow & District Radio Society Mobile Rally at Magdalen Laver village hall (Essex). Talk-in on LF bands. Refreshments.

June 28: "Bucket and Spade" Party at Worthing, on the raised promenade, Beach House Park. Talk-in on Top Band will be by G3GVM/A. Any further details from: J. R. Tootill, Worthing & District Amateur Radio Club, 113 Kings Road, Lancing.

July 5: First /M meeting of newly-formed Amateur Radio Mobile Society, at Maldon, Essex — full details not yet available. Write: G. Storey, G3HTC, 10 Avon Road. Sunbury, Middx.

July 19: New Forest Mobile Rally, at Stoney Cross airfield, 7½ miles west of Southampton on A.31, NGR 41/250118. Organised jointly by the Bournemouth and Ringwood Amateur Radio Societies. Talk-in by G3KCJ/P, 1900-2000 kc, and by G2HIF/P on two metres. Visitors should bring picnic lunch and/or tea, though some refreshments will be obtainable near the site. Further details from: C. R. Davies, G3JAU, 107 Talbot Road, Bournemouth, Hants.

August 16: South Shields Mobile Rally at Bents Park Recreation Ground, South Shields, Co. Durham, in conjunction with the local Annual Flower Show.
August 16: Derby & District Amateur Radio Society Mobile Rally.
August 30: South Manchester & Stockport Radio Societies' joint Mobile Rally — details later.
September 6: London Mobile Rally, Festival Gardens, Battersea Park.
September 13: Woburn Abbey Mobile Rally.
September 20: Hamfest and Mobile Rally, Lincoln.

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The West of England Mobile Rally on Sunday, June 14, is being held at **Longleat,** the home of the Marquis of Bath, and one of the finest show-places of its kind in the country. Longleat House stands in a park, the entrance to which is two miles out of Warminster, on the A.362, Warminster-Frome. The charge for admission to the park is 1s. a head and, to make sure of being directed to the reserved car-park, show a QSL card; there is good catering at the site. G3CHW/A will be looking for Top Band mobiles, with G3FKO/A covering the two-metre /M's; prizes are being given for the best distances worked by mobiles with their controls, and also for the longest distance travelled to and from the Rally on the day. The control stations will be on the air ready for contacts from 10.00 a.m., and as regards G3CHW/A on 160 metres, Top Band mobiles are particularly requested to avoid his frequency, as the whole band will be searched for calls. The park will be open from 10.00 a.m. to 6.00 p.m.

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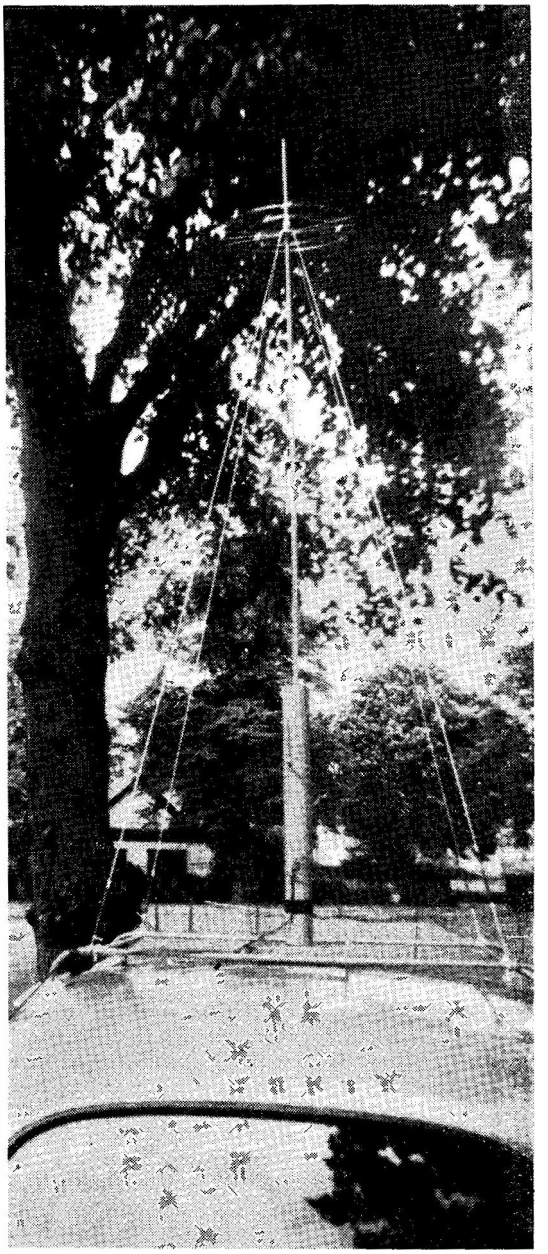
Rally Organisers: Please note details on p.155, May issue SHORT WAVE MAGAZINE, with reference to reports for publication.

PHOTOGRAPHS ALWAYS WANTED

If you have any photographs you think may be suitable for appearance in SHORT WAVE MAGAZINE—either of equipment, stations or personalities of Amateur Radio interest—we shall be glad to see them for possible publication. Prints should be clear and sharp, and accompanied by descriptive notes. Those we can use are paid for on publication.

STANDARD OF QUALITY

One of the points brought out at the recent International Transistor Exhibition and Convention, promoted by the I.E.E., was the very high standard of chemical purity demanded in the manufacture of transistors—not more than one part of impurity in 100 million. This is exactly the same as demanding that out of 100,000,000 eggs only one shall be bad. This sort of standard makes the production of pure germanium and silicon, used for the transistor elements, an extremely expensive business. The present practical limitations on the use of transistors are, broadly, that they cannot be operated at high power, on very high frequencies, nor at a high working temperature.



Seen at the Cheltenham Mobile Rally — the 160-metre "pyramid," complete with loading coil and capacity hat, on the roof of G3GTN's car.

"THE OTHER MAN'S STATION"

We are always glad to have offerings for this popular and long-established feature of the *Magazine.* The first essential is a good, clear photograph (size not important, but ½-plate preferred) with a detailed description of the station in "own words." We do the rest, and pay for the material immediately on publication.

KNOCK THE ROCK

FRED'S FIRST TRANSMITTER

By G3COI

DID we ever tell you about Fred's first rig? We have to go back a few years, because he is getting to be quite an old timer—that is to say, *he* is beginning to regard himself as one. This is shown by such characteristics as never calling his contacts by their handle and referring to his antenna as an "aerial"; he also calls tubes "valves," and omits the *de* between call-signs when on the key. When he hears a new one on Twenty, he no longer fires up his rig in indecent haste, but takes his time over the job —and invariably misses it. All these symptoms add up to the fact that Fred has had his licence since the time when 1155's fetched about £25 and surplus bargains abounded. Those were the days, indeed! One could (and did) buy some unknown piece of gear weighing half a hundredweight at the snip price of £2-19-6 and use it to sit on.

At the time of which we are speaking, Fred had not quite actually got his licence — but he had qualified by the skin of his teeth and the ability to read someone else's examination paper obliquely at a range of two yards in poor light. He was therefore sweating on the top line and pushing ahead with urgent arrangements for the great switch-on. His practical knowledge was scant indeed, and hitherto he had performed no greater technical feat than attaching a bayonet plug to a reading lamp; even this had resulted in a fuse blowing, so early success did not come easily to him. However, he was badly bitten and was determined to add to the congestion on Eighty just as soon as the postman pushed the buff envelope through his letter-box.

Strangely enough, although ex-Govt. gear was plentiful, he never gave it a thought when he decided to build his first transmitter. Armed with various magazines and roneo'd catalogues, he set about collecting the parts together. He really paid highly for his initial experience, because most of these parts when they arrived were seen to bear the letters A.M. or W.D. His first 807 cost him 25/-, was marked with a broad arrow and rattled when it was shaken. (Please don't mention this to him; it is a very sore point because, nowadays, Fred considers himself to be the Yehudi Menuhin of the Surplus Market.)

At that time, there were very few really practical articles on "How to get going on Eighty," and the only circuit that Fred could find was a CO-PA thing which was a splendid circuit *drawing*, but gave none of the component values, it being assumed that the reader would be a knowledgeable type. Accordingly, Fred studied receiver circuit valves and used them. He worked day and night on the job, and a bigger lash-up you never saw; though he used up a large box of cored solder, the joints were at least 50% dry. The power supply he built separately on an enormous steel chassis with a massive Admiralty transformer rated 500 volts at 100 mills—Fred subsequently found that he could take nearly an amp. from this job without it getting more than slightly warm. He was obsessed with smoothing condensers, and as he couldn't find suitable 8 μF oil-filled types, he made do with 16 one-microfarad units, which he fitted on a kind of bridge over the whole pack. Later on, as he had no bleeder resistance, he used to discharge these condensers by shorting them to the ground with a screwdriver. It amused him to see the resultant sparks which crackled venomously and on one occasion he called his XLY into the shack to see the display. "Just watch this," he said and thrust his pitted screwdriver into the pack. There was the usual snap-crackle-pop and this time the general illumination was increased by the rectifier valve which glowed a pretty blue and then went out. Fred's smile faded as he realised that shorting an unfused power pack with a screwdriver when that power pack is switched on, is just a waste of a rectifier.

However, to resume—the rig was finished, wired up, placed in position on two shelves of an office filing cabinet, aerial connected and all ready to go. His licence arrived just at the right time; that is, when Fred's conscience was on the point of breaking down and he was about "to try her with a dummy aerial." He dashed upstairs clutching his ticket, whipped the bulb out of the overhead light and plugged his power pack in. Clang went the electric-fire type switch as he applied the juice to his transmitter. The PA meter needle moved slowly and then gathering speed finally smacked against the stop at 200 mills; the 807 sang like a kettle and there was the click of rapidly heating glass; the mains transformer hummed urgently and the 5U4G rectifier glowed an eerie blue. All these signs of dire trouble Fred ignored as he feverishly tuned across Eighty with his 1155, searching for the beat from his brand new 3525 kc rock. He heard nothing. *Ping!* went the 5U4G as it died a hero's death. The maniac humming ceased, and the 807 cooled off with a few delicate clicks.

Such is the hold that radio had upon him, that without even a smoke, Fred started to investigate immediately. He tore the rig apart and rebuilt it practically from scratch. The church clock was bonging the small hours when he inserted a new 5U4G and switched on again. This time, nothing happened at all. No reading on the PA meter, no hum from the transformer and of course no 3525 kc signal on the 1155.

Fred staggered off to bed, bloody *and* bowed. He was thoroughly fed up with Amateur Radio. The following evening he plodded slowly up to his shack, switched the recalcitrant rig on and peered into it to see if he could *will* it to work. As he bent over, his midget screwdriver fell out of his breast pocket and dropped right on the crystal.

And that, impatient reader, was the end of Fred's troubles, for he had been unlucky enough to have been supplied with what we've all had at one time or another—a "sticky" crystal. I don't suppose he has still got this rig, but if you ever have a chance to take a look at it, do so, because there aren't many rack-and-panel jobs left which have a small toffee hammer fitted in a clip beside the crystal socket—Fred will tell you that he found it indispensable.

Modifying the Masteradio 700/701

FOR TOP BAND MOBILE

S. E. JANES (G2FWA)

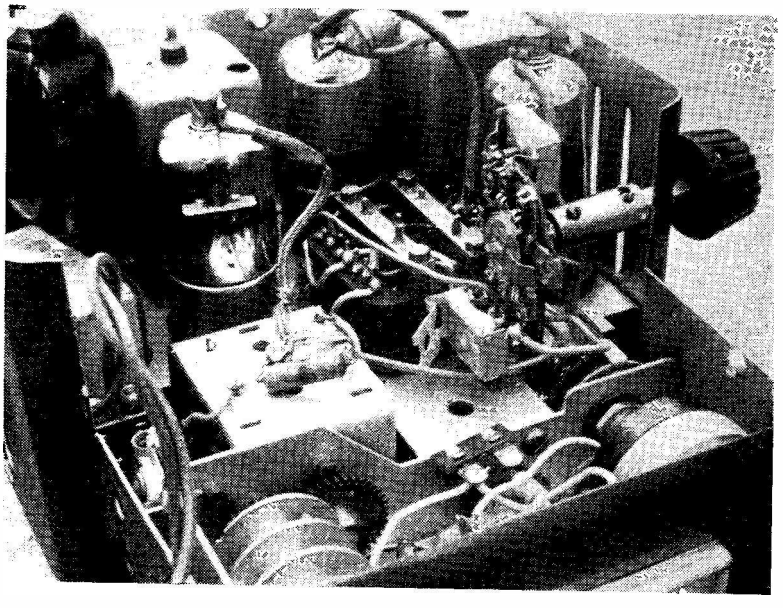
THE Masteradio car radio models 700 and 701 are still providing satisfactory service on many cars at the present time. The simple modification as carried out by the author in order to have a compact Top Band mobile receiver may therefore be of interest to present and future mobileers.

First, it was hoped to retain the medium and long wave features of the receiver. This started thought in the direction of reducing C rather than L. Consequently, the first step was to find out what the oscillator frequency would be when a small trimmer was introduced in series with the medium-wave oscillator coil. At minimum capacity (you can see the adjusting screw has been removed and the trimmer opened out) the oscillator was found to be on 2485 kc. This could not be better for the HF end of Top Band, and when the tuning gang at full mesh produced a signal some 250 kc lower it was felt that the coils must have been designed with Top Band in mind! It should be noted, however, that the tuning range is somewhat cramped at the high end. Therefore, 1800 kc will come in at a point about one third of the scale from the LF end.

With a similar trimmer in series with the mixer coil it was found that the adjustment was not critical, the trimmer being left in the closed condition, as this was considered to be the optimum setting. The important point to remember here is that the introduction of the trimmer leaves the mixer grid "up in the air." Therefore, a 2-megohm resistor was connected between this grid and chassis (seen across the tuning gang in the photograph).

The remaining point to be considered is how to get back the medium-wave band, for ordinary BC listening. This presents no problem at all and the installation of a double-pole single-throw switch to short both trimmers at one position provides a satisfactory solution. This switching arrangement also can be seen in the photograph. Care must be taken with the Model 700 Masteradio to see that the speaker does not foul the trimmers and switch.

The outcome of these simple modifications is a three-band receiver for the cost of a few shillings. While a receiver without an RF amplifier cannot compare with the normally accepted receiver standards, the arrangement provides satisfactory mobile reception under what are undoubtedly difficult conditions.



The modification devised by G2FWA to get the Masteradio model 700/701 car radio receiver on to Top Band. The only additional items are the switch, the trimmers (one shown opened out) and the resistor seen on the tuning condenser gang, this being to provide a grid return for the mixer. The view is looking into the receiver with its panel to the front of the photograph.

THE QSL BUREAU

Readers entitled to make both-way use of the QSL Bureau we operate—that is, those who obtain SHORT WAVE MAGAZINE by post direct from us, by subscription of 33s. paid in advance—are reminded that the only address for the Bureau is: *BCM/QSL, London, W.C.*1. This is full and sufficient, and ensures expeditious handling of the cards. Packets of QSL cards sent to our office address involve us in double-handling and extra postage charges, besides delaying distribution. This note applies, of course, only to cards for normal Bureau service. Certificate claims, for which QSL cards are necessary, should be addressed as given at the foot of the panel on p.134 of the May issue.

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.

DL2AN, L. Littlewood *(ex-G3HVN)*, c/o Sgts' Mess, R.A.F. Station, Sundern, B.F.P.O.39.

G3NEK, W. D. Kaye, 151 Halifax Road, Brighouse, Yorkshire.

G3NEW, C. Sykes, 102 Gramfield Road, Crosland Moor, Huddersfield, Yorkshire.

GM3NFF, W. G. Dobbie, 32 Limeside Avenue, Rutherglen, Glasgow.

GM3NFR, A. Reid, 213 Nithsdale Road, Glasgow, S.1. *(Tel.: IBROX 0934.)*

G3NIA, C. C. Wright, 215 Romford Road, Forest Gate, London, E.7.

G3NIA/A, C. C. Wright, 6 Hartford Road, Huntingdon, Hunts.

G3NIC, K. Plant, 54 Ridgeway Road, Warsop, nr. Mansfield, Notts.

G3NJF, M. Knights, 16 Clyde Street, Grimsby, Lincs.

GW3NJJ, D. H. Phillips, B.Sc., 1 Danygraig, Abertridwr, Caerphilly, Glam.

G3NJK V. J. de Bono, M.D. *(ex-ZB1VJ)*, Burnley General Hospital, Casterton Avenue, Burnley, Lancs.

G3NKE, W. Locke, Trewerry Cottage, Trewerry, Newquay, Cornwall.

G3NKH, R. Dowling, 117 Southfield Road, Almondbury, Huddersfield, Yorkshire.

G3NKS, D. Thom, 12 Willow Road, Redhill, Surrey. *(Tel.: Reigate 5033.)*

G3NKT, F. D. Thom, 12 Willow Road, Redhill, Surrey. *(Tel.: Reigate 5033.)*

G3NKW, H. White, 23 Edale Grove, Sale, Cheshire. *(Tel.: PYRamid 1758.)*

CHANGE OF ADDRESS

G2FFO, R. Johnson, 1 Ormerod House, Higher Red Lees, Cliviger, Burnley, Lancs.

G2HCZ, E. S. G. Fish, The Lodge, South Ockendon Hospital, *via* Romford, Essex.

G3AAJ, R. J. C. Broadbent, 94 Herongate Road, Wanstead Park, London, E.12.

G3AGL, M. D'Arcy, 27 Theydon Grove, Woodford Green, Essex.

G3AJX, G. Stanton *(ex-ZB1AJX)*, c/o S.U.K.O., Defence Registry, Victoria Barracks, Melbourne, Vic., Australia.

G3APY, J. Spragg, Brook Street, Sutton-in-Ashfield, Notts.

G3BZJ, B. Woodward *(ex-GM3BZJ)*, 82 Coniston Road, Fulwood II, Preston, Lancs.

GM3EDQ, J. R. Woods, 369 Glasgow Road, Wishaw, Lanarks.

G3FOZ, J. D. Slater, 3 Pebbleford Road, Kettering, Northants.

G3FZX, S. A. Money, 109 Locksway Road, Milton, Southsea, Hants.

G3GEW, F/O H. Jordan, c/o The Vicarage, Bisley, Stroud, Glos.

G3GKO, H. A. Kearsey, Ph.D., Dormer Cottage, West Hagbourne, Didcot, Berks.

G3HBP, J. W. Scott, 1 Aberdeen Terrace, Pasture Lane, Clayton, Bradford, Yorkshire. *(Tel.: Queensbury 2195.)*

G3HDB, J. H. Whitby, 24 Newfield Avenue, Kenilworth, Warks.

G3IYL, Stella W. Fish, The Lodge, South Ockendon Hospital, *via* Romford, Essex.

G3JFF, M. J. Matthews *(ex-VS2MA / VS1HU / 9M2MA)*, 5 Mount Pleasant, Kingswear, S. Devon.

G3JJJ, J. J. Johnson, 70 Claife Avenue, Windermere, Westmorland. *(Tel.: Windermere 1069.)*

G3JKO, M. Dransfield, The Spinney, Kings Lane, Southwater, Horsham, Sussex.

G3KFD, D. J. Billingham, Omega, 216 Off Standhills Road, Kingswinford, Staffs.

GM3KZH, A. F. Halcrow *(ex-G3KZH)*, 2 Wheatfield Place, Edinburgh, 11.

GM3LGU, R. I. Pryde *(ex-G3LGU)*, 3 Mount Vernon Road, Edinburgh, 9.

G3LWS, E. H. Ross, 6 Chaveney Manor, Chaveney Road, Quorn, Loughborough, Leics.

G3LXL, A. Davis, 76 Wendover Drive, Aspley, Nottingham.

G3LZQ, J. Dunnington, 34 Heathcote Street, Beverley High Road, Hull, Yorkshire.

G3MAY, H. F. Stenhouse, 11 Hanover Road, London, N.15.

G3MBT, P. A. Watson, 107a, Moulsham Street, Chelmsford, Essex.

G3MEF, T. C. Wylie, Wylcot, Old Bideford Road, Barnstaple, Devon.

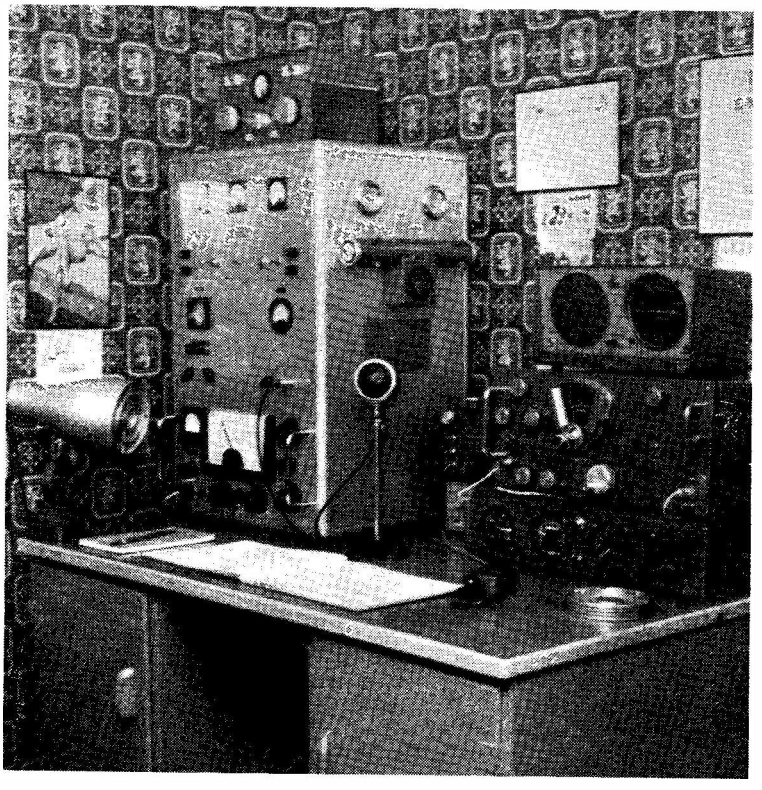
G8FG, H. G. Cunningham, c/o 292 Kingsway, Valetta, Malta.

CORRECTION

G2DTD, L. W. Limb, 10 Oldfield Crescent, Cheltenham, Glos.

THE OTHER MAN'S STATION

G3JDK



THE neat layout shown in our photograph is owned and operated by H. N. Kirk, G3JDK, 54 Allendale Road, Rotherham, Yorkshire. Some months ago, the stage was reached that most amateurs come to sooner or later — dissatisfaction. Dissatisfaction with his station, its performance and appearance. This point, in the case of G3JDK, also coincided with the arrival of a new son, who required somewhere to howl in peace. Ultimately, G3JDK was obliged to vacate his upstairs shack and take up residence in a new one—the dining room.

Somehow, the Command equipment didn't quite fit into its new surroundings — knobs and black crackle do not go well with contemporary furnishings —that was soon obvious, and the XYL was soon dropping the more obvious hints.

The result of a rebuild is shown in the photograph —a new station from start to finish, and well worth the effort. The transmitter, consisting of a Geloso 4/101 driver and 6146 PA, running up to 75 watts, is contained in the bottom shelf of the table-top console, at left. This deck also carries the driver power supply and PA blower motor (the PA is in a mighty small compartment!). The next deck in the console accommodates the push-pull 6L6 modulator, and also a CRT modulation monitor; this gives either trapezoid or amplitude indication at the throw of a switch. The top deck contains the HT supply for the RF side, and also the modulator power unit.

The odd tubular gadget clipped to the side of the transmitter is the dummy load and power meter. It is actually an 80-ohm carbon resistor fitted inside a length of 2-in. aluminium tube, the power meter being the usual diode rectifier circuit.

On the top of the transmitter is the Z-match unit and standing wave indicator—the output from the transmitter is at 80 ohms, and of course the Z-match deals with long-wire working. Between the transmitter and the dressed-up BC-348 are the monitor speakers and control/output unit; the latter contains three receiver output points—one "high" and one "low," the third being the output from an FL-8 audio filter. Also on this unit is a Tx/Rx key switch, the whole station being controlled by 24-volt relays from this point. On top of the BC-348 is a "magslip" beam indicator and second speaker, although this speaker is now being replaced by a 24-hour electric clock.

The piece of apparatus below the BC-348 is odd but useful. It contains a voice-control unit for the transmitter, an S-meter for the receiver, a 3-in. slave magslip, the beam drive motor ammeter, and a 300-to-500 cycle frequency meter which just fills up a hole! All these meters are the 3-in. aircraft type, neat, very cheap, often overlooked, but very useful.

Along the rear apron of this unit is a row of 3-pin sockets for station supplies.

All the cabinets are home-made and finished in hammer paint—at which point G3JDK would like to express his thanks to SWL Knowles for valued assistance in creating "some wild dreams in metal."

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Deadline for July Issue : JUNE 12)

THERE are many ways in which this regular feature could be made of more assistance to Club officials throughout the country than it is at present. From the material sent in by Club secretaries and scribes we are able to compile an account of what the Clubs are doing, but it occurs to us that more variety could be introduced on occasions.

For instance, a small Club in the less densely-populated part of the country has difficulty in attracting members. There must have been other Clubs faced with the same problem, some of which have faded away while others have surmounted it and survived.

How did the successful ones do it? And why should they not pass on their recipe for the benefit of colleagues? To start the ball rolling, we invite the Secretaries of Clubs with special problems to air them in these columns, in the hope that others will be helpful enough to make suggestions.

Major problems at the moment appear to be (i) how to attract members; (ii) how to keep them; and (iii) how to find a suitable place for use as a Clubroom. All comments welcome; also any pleadings concerning other problems. We will act as an advice exchange, but we can't invent the material—please send it to us.

Activity Reports

Barnet meet on June 30 for a talk on the all-important subject of Interference Suppression, given by a member of the GPO staff. This meeting will be at the Red Lion Hotel, High Barnet. **Bradford** will be hearing about Oscilloscope Design and Construction (Mr. G. F. Craven) on June 9; on June 23 G3EKE will be talking, subject not yet announced.

Enfield, at a recent meeting, heard G3AAE's talk on the subject of DX Working, Certificates and Awards. On May 10 they held a joint meeting with the Southgate Group, which was virtually a battle of wits in the manner of "One Minute, Please." **Halifax** announce, for their June meeting, a recorded lecture on Aerials; their July fixture is still "Open." **Overstone** held their AGM and elected Mr. A. Hazelwood chairman and Mr. P. Crane secretary. They run at least half-an-hour of Morse practice each week; new members will be heartily welcomed.

Purley held their AGM on May 15, and their next meeting will be on June 19 in the Railwaymen's Hall, Whytecliffe Road, at 8 p.m. On this occasion Ken Seddon, G3NFG/VK3ACS, will talk on the experiences of an Australian amateur, using colour slides for illustration.

R.A.I.B., whose journal *Radial* we acknowledge, continue their good work of lending a helping hand to bedfast and chairbound amateurs. Parcels of books and all kinds of small assorted items of "junk" will always be welcome and will be put to good use. **Romford** have a Mobile Evening on June 9, a lecturette by G3NBC on June 16 and a "Visit to Surplus Stores" on June 23. June 30, in their calendar, is labelled "Guess What?"

Slade will be meeting on June 5 (the night of publication) for a talk by G3DO on Contest and DX Working (on which he is an acknowledged expert), followed by an informal discussion. On June 19 the subject will be The Design of D-F Receivers, by two members, also to be followed by a discussion. **Spen Valley** will be attending a demonstration of a radio-controlled boat in Batley Park on June 10; on the 24th they visit the Birstall Carpet Co.

West Kent have a Natter Night on June 19, at Culverden House, Tunbridge Wells; and on July 3 they have a discussion on The Amateur's Ideal Receiver. For outdoor events they plan to visit Worthing's Bucket-and-Spade Party on June 28, to hold their own Mobile Rally on August 23, and also to visit the BBC Receiving Station at Tatsfield on some convenient date.

Wirrall held a most successful Annual Dinner on April 10, at which no less than 115 members and guests were present, including many visitors from neighbouring Clubs. A Fashion Show was a feature which has not been tried before, and it proved most successful!

Worthing are all warmed up for their famous Bucket-and-Spade Party on the beach on June 28, which will follow the usual informal pattern, though extra attractions are being arranged. They meet on the second Monday, 8 p.m., at the Adult Education Centre, Union Place, and there is a varied programme of talks and events. There will be no meeting in August.

Crystal Palace forward their *Newsletter*, from which we gather that they spend a lot of time "going portable." On June 20, however, they are holding a Junk Sale, and on the following day the informal event is a "dismantling party" for the aerials of G3GQK, who is moving out of the district.

Lothians visited the Air Traffic Control at Turnhouse, and members also saw the Locator Beacon, the Localiser and the Inner Marker—this must have been an interesting visit! After the AGM on June 11 the Club goes into summer recess.

North Kent report a full house for their recent

lecture-demonstration on sound-reproducing equipment. Forthcoming meetings are on June 11 (NFD Inquest and Junk Sale); June 25 (Receiver Servicing); and July 9 (Film Show). On August 3 they will be operating GB3ENT from the Erith Show and Sports in the Recreation Ground, Erith.

Portsmouth reports that Field Day preparation has been the main topic for some time, and that a good site was finally chosen for operations. Meetings are held every Tuesday above Scarrs' (Drapers), Albert Road, Southsea. **Tees-Side** had a Field Day during May, when they installed a Top Band rig and an LG.300 at a cottage in the village of Potto, between Stokesley and Thirsk. Many mobile visitors turned up on the Sunday, and a few days afterwards a visit was paid to Richmond, where the Catterick amateurs entertained the Middlesbrough types. Future meetings June 15 and 19, July 3 and 17 at Middlesbrough Settlement, Newport Road.

Torbay have recently acquired the Club call G3NJA, and have twice used it, "/A," from hobbies exhibitions. At Club headquarters an all-band transmitter is under way. Two SWL members took the R.A.E., one the XYL of G3LFL, the secretary (*see* "The Other Man's Station," p.159, May issue). Morse classes for beginners are now under way, given by G3ABU at the Hq, Belgrave Road, Torquay, every Tuesday. Next meeting is on June 13, but the Club is open every Tuesday and Friday, 7.30 to 10 p.m.

Cornish met in April for a talk on VHF Mobile Radiotelephones, as used by local firms, and described by the secretary. Next meetings are on July 1 (Falmouth YMCA) and August 5 (Cornwall Technical College, Redruth), both at 7.30 p.m. Visitors who may be on holiday in the area will be most welcome.

Crosby is the new name for the former West Lancs Radio Society, and they meet on Tuesdays, 8.30 p.m., at Colonsay, Crosby Road South, Waterloo, Liverpool 22. June 9 is an Open Night; June 16, TV Servicing, by G3IZF; June 23, Junk Sale; and June 30, another Open Night. Technical and Morse classes are held on alternate Tuesday evenings.

East Kent recently held their contest for the Williams Cup (for the neatest piece of home-built gear). Mr. K. Mills won for the second year running, with his FM Tuner Unit and Amplifier. The Club hope to enter into the local Carnival, and the Committee are discussing it.

Leicester will meet on June 8 (NFD Inquest), June 15 (Amateur Radio and the Home Constructor, G3KKV) and June 22 (Pi-Networks, G3GAP). All 7.30 p.m. at Old Hall Farm, Braunston Lane.

Nottingham have a lecture on Wired TV and Wired Radio on June 9; on the 11th they visit the premises and Social Club of Central Rediffusion Ltd. (Castle Rock, 7.15 p.m.). On June 20 G3EKW will be on the air from the Sherwood Community Association Garden Fete, and on the 23rd the "Mimephone" will be explained and demonstrated by its inventor, Mr. Maurice J. Staines. R.A.E. classes and slow Morse periods are held every Tuesday and Thursday.

Reading are devoting their meeting on June 27 to slides and tape recordings concerning the amateur stations of **Slade** members; these will be followed by a Junk Sale. Forthcoming talks will be on SSB equipment, receiver design, radio operating in the Merchant Navy and many other subjects.

Southgate will be holding a Junk Sale on June 11, at Arnos School, Wilmer Way, N.14. Their station GB3SRA will be operating at the Friern Barnet Summer Show on August 21 and 22, and again from the Wood Green Show and Fete on September 4 and 5.

Surrey (Croydon) tried a "mixed bag" for their May meeting, with three short talks covering VHF, Receiver Measurements and an introduction to Amateur TV. Next meeting is on June 9, 7.30 p.m., at the Blacksmiths Arms, South End, Croydon, when Mr. E. R. H. Castle will talk—probably on BBC micro-wave links.

The **Ravensbourne** group meet every Wednesday evening, 8.00 p.m., at the Malory Secondary School, Launcelot Road, Downham, Kent, where their station G3HEV is put on the air by G2DHV, G3FTI, G3MOW and G3MPX. SWL's are particularly welcome to meetings, and are invited to listen to the

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE

ABERDEEN: W. K. Heggie, GM3NHW, 80 Leslie Terrace, Aberdeen.
BARNET: E. W. Brett, G3LUY, 28 Edward House, Edward Grove, New Barnet.
BRADFORD: D. M. Pratt, G3KEP, Glenluce, Lyndale Road, Eldwick, Bingley.
BRITISH TWO-CALL: G. V. Haylock, G2DHV, 167 Engleheart Road, London, S.E.6.
CIVIL SERVICE (London): G. Lloyd-Dalton, 2 Honister Heights, Purley, Surrey.
CORNISH: G. W. Hubber, 9 Cardrew Terrace, Redruth.
CROSBY: A. Treanor, G3FZG, 13 St. Johns Road, Liverpool 22.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
EAST KENT: D. Williams, G3MDO, Llandogo, Bridge, Canterbury.
ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
HALIFAX: A. Robinson, G3MDW, 7 Upper Brockholes, Ogden, Halifax.
HULL: G. G. Wray, G3MVO, 93 Wolfreton Lane, Willerby, Hull.
LEICESTER: P. G. Goadby, G3MCP, 535 Welford Road, Leicester.
LOTHIANS: L. Lumsden, 33 Hillview Drive, Edinburgh 12.
NORTH KENT: D. W. Wooderson, G3HKX, 39 Woolwich Road, Bexleyheath.
NOTTINGHAM: E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.
OVERSTONE: P. Crane, 120 The Drive, Northampton.
PORTSMOUTH: A. C. Cake, G3CNO, 7 Wheatstone Road, Southsea.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
R.A.I.B.C.: W. Harris, 25 Playford Lane, Rushmere, Ipswich.
RAVENSBOURNE (Kent): J. Wilshaw, G3MPX, 4 Station Road, Bromley, Kent.
READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.
ROMFORD: L. S. Owen, G3MDP, 53 Applegarth Drive, Newbury Park, Ilford.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHAMPTON: P. A. L. Shoosmith, G3MDH, 31 Fairfield Close, Hythe, Nr. Southampton.
SOUTHGATE: A. G. Edwards, G3MBL, 244 Ballards Lane, North Finchley, London, N.12.
STOKE-ON-TRENT: V. J. Reynolds, G3COY, 90 Prince's Road, Hartshill, Stoke-on-Trent.
SURREY (Croydon): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.
TEES SIDE: A. L. Taylor, G3JMO, 12 Endsleigh Drive, Middlesbrough.
TORBAY: G. Western, G3LFL, 118 Salisbury Avenue, Barton, Torquay.
WEST KENT: H. F. Richards, Culverden House, Culverden Park Road, Tunbridge Wells.
WIRRAL: H. V. Young, G3LCI, 9 Eastcroft Road, Wallasey.
WORTHING: J. R. Tootill, 113 Kings Road, Lancing.

Club Net, on Top Band on Sundays and on 10-metre phone on Monday evenings. Ravensbourne also run an annual field day in June, at Chislehurst.

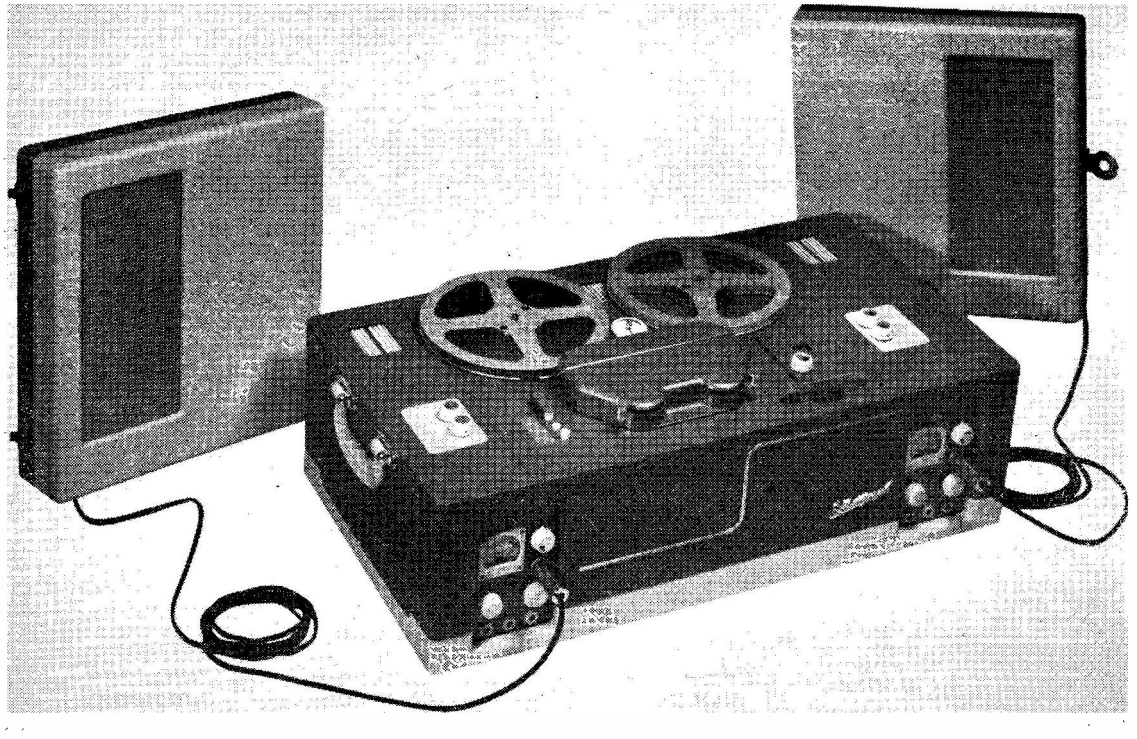
At **Hull,** the forthcoming programme is a Junk Sale on June 9, and Getting Going on Two Metres, by G3FCY, on June 30. **Stoke-on-Trent,** who were responsible jointly with M.A.R.S. for the recent very successful Mobile Rally at Trentham Gardens, have Beginner Lectures each week, given by G3EHM and G3DML, which are proving of great value and interest. Visitors and new members are always welcome to meetings, which are held every Monday and Thursday, at 8.00 p.m. Full details from the hon. secretary—*see* panel. Among Stoke's recent activities was a lecture-and-demonstration on Amateur Radio given to the Young Conservative Association of Newcastle-under-Lyme.

The **Aberdeen** Clubroom is at 6 Blenheim Lane, and arrangements for the immediate future include a Recorded Lecture on Aerials, June 19, Hints and Kinks on June 26, and A Beginner's Transmitter, by GM3FKS, on July 3.

New president of the British **Two-Call** Club is GM3IAA (ex-VS1AA), with ZC4CH (ex-G2HIL) as vice-president. Applications for membership are invited from licensed U.K. operators who have held at least one callsign overseas.

At their recent AGM the **Civil Service** Radio Society re-elected its officers, and details of the programme for the new session will be published shortly. Members of this group operate GB2SM, the Science Museum station, which gained first place for England in the 28 mc Multi-Operator section of the 1958 world-wide DX Contest organised by *CQ*.

The **Southampton** group will, as usual, be exhibiting at the annual Southampton Show, running three transmitters 160-10, 80-10 and two metres, under callsigns G2FGD/A and G3JLS/A. They will be showing home-built equipment, and also running closed-circuit TV. The dates for this enterprising undertaking are July 10/11, and contacts will be most welcome, on all bands.



The new Reflectograph Stereophonic Recorder is believed to be the only such instrument at present available which records and plays back either stereophonically, monophonically or two-channel. It incorporates a variable speed tape deck, four amplifiers and two speakers, with a peak-level meter for each channel and separate record and playback gain controls. The maximum output is 3 watts undistorted, which can be used to drive an external high-level amplifier if required. The tape deck incorporates a neon stroboscope to set the tape speed precisely to either 7½ or 3¾ ins. per sec., and instant start or stop of the tape drive is given, with inching either way if required. Another facility is that of immediate comparison, while recording, between the input signal and the tape output. With the two-channel facility, it is possible to record two different programmes on the tape, and play them back simultaneously in different rooms, or to transpose from one track to the other, or to superimpose one programme on another by isolating the erase heads. The dimensions of the instrument itself are 11¼ ins. high, 14¾ ins. wide and 29 ins. long over handles, the weight being 65 lbs. The U.K. price of the Reflectograph Model 570 Stereacorder is 149 guineas.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

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COLLINS 51J-2 Receiver for sale, 0·5 to 30·5 mc by one kc divisions ; price £200. 3E19 (829B), £1 plus postage.—Fletcher, 62 Moorbridge Lane, Stapleford, Notts. *(Sandiacre 3446.)*

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WANTED: Wavemeter, range 3 mc to 30 mc.—Particulars and price to: Shewan, 31 Panmure Street, Arbroath, Angus.

LATEST Geloso VFO Model 4-104, complete with dial and escutcheon ; scarcely been used ; £7.—G3JUR, 177 Stoke Road, Slough, Bucks.

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R107 RECEIVER, excellent order and appearance ; fitted professional logging scale. Official manual, with 21 mc/28 mc converter, £10.—G3JOM, 1a Princess Terrace, Ripon, Yorks.

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BENDIX TA12C, CW/Phone, 80/40/20, 50w. with power supplies and modulator, TVI-proofed, £20 (o.n.o.). Exchange S.640 or similar.—G3JZB, 15 Holmcroft Road, Stafford.

FOR SALE: Radio Hallicrafters SX-24, good condition, complete with matching speaker and spare valves; genuine bargain; £22 (o.n.o.).—Watkins, 99 Mayall Road, Herne Hill, London, S.E.24.

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SMALL ADVERTISEMENTS, READERS—*continued*

EXECUTOR'S QTH SALE: G2NS removal bargains for callers with cash: Two Panda Cubs, each £30. G5RV 150-watt Tx, without pack, £10. *Short Wave Magazine* 813 PA, without valves, £5. Eddystone 750, £35. Eddystone 640, £10. Sky Champion, £5. Three-band Minibeam, with automatch, £10. GM3BQA Dual Quad, £6 (purchaser dismantles easily). GEC 75-watt modulator, with UM3, £10. Two-metre and 3·5 - 28 mc crystal converters into IF/AF amplifier, £8. Much other gear. Callers only, with cash.—Spooner, 7 Foxholes Road, Southbourne, Bournemouth, Hants.

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SALE (Amateur Spring-cleaning): 12v. No. 4 Mk. I Vib. units, 250v. 60 mA; two at 15/- each. Type 1 rotary trans., 12v. in 265v. 110 mA, and 500v. 26 mA DC out; two at £1 each. HT-11 rotary trans., 12v. in, 310v. 70 mA DC, 10/-. All above unused except for test. UM3 mod. trans., used one week. £2 10s. Williamson O/P trans. (Gardner), £1 10s. Brand-new valves: 813, £1; 6J4 (2), 5/- each; 5B/254M (2), £1 10s. each; GU50 (2), £1 10s. each. Add postage for heavier items.—Box No. 2139, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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3-channel U.H.F. Receiver ; uses plug-in crystals (not supplied): operating on 332.6 ; 333.8 ; cd 335 Mc/s. Unit contains 7—6AJ5 ; 28D7 ; 2—12SN7 ; 12SR7 ; Relays etc. BRAND NEW and boxed : a bargain at **59/6** P.P. 5/-.

V.H.F. TRANS/RECEIVER TYPE TR1920

★ 9.72 MC/S IF ★ 4-CHANNEL CRYSTAL CONTROLLED
★ 40 KC/S BANDWIDTH ★ 100 to 120 MC/S COVERAGE

Unit complete with 21 valves ; crystal ; 24 volt rotary power unit, etc., in metal case. In new condition with full circuit diagram.

£8/19/6. Carriage 10/6. Circuits separately, 1/9 post free.

V.H.F. TRANS/RECEIVER TYPE 1986

★ 9.72 MC/S IF ★ 10-CHANNEL CRYSTAL CONTROLLED
★ 23 KC/S BANDWIDTH ★ 124.5 to 156 MC/S COVERAGE

Sub-units	Type	With valves	Less valves	P.P.
TRANSMITTER	81	75/-	25/-	2/6
RECEIVER	114	27/6	7/6	2/6
IF Amplifier	476	37/6	12/6	2/6
Modulator	105	20/-	—	2/6
24v. Rotary unit	3	15/-	—	2/6
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All the above are in absolute new condition. Full circuits available, 1/9 post free

SYNCHRONIZER UNIT

Includes : 3—6L6M ; 12—6AC7 ; 6SQ7 ; 5—717A ; 6—6SN7GT ; 6H6 ; slow motion drive, blower motor, transformers etc. **£4/19/6** P.P. 5/-.

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Type 229

600 Mc/s.: in transit case.

£5.10.0 P.P. 7/6

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Complete with screened case with 6SL7GT ; 28D7 ; leads, jack plugs, relay, handbook, etc. Sealed in carton. Only **12/6** P. & P. 2/-.

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24v. D.C. to 230v. A.C. 50 cycles. 100 watts. Brand new and unused. **£5.10.0** Carr. 7/6.

RCA 6½-inch P.M. SPEAKER in Cabinet

With vol. control and 600 ohm Line Trans. **27/6** P.P. 2/6.

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The ideal F.M. conversion unit as described in "P.W." April/May, 1957. Complete with 6 valves, three EF91's, two EF92's and one EB91. I.F.T's, etc., in absolutely new condition. With circuit and conversion data.

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Postage and packing 2/6 (either type)

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Switched Tuning 30 to 40 Mc/s. Includes 3 SP61's. Carriage 2/6. **10/-**

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All complete in new condition less valves **35/-** P.P. 5/-.

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(Junction Type PNP)

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XA104 6 Mc/s. osc./mixer : R.F. amplifier	18/-
XA103 4 Mc/s. I.F. and R.F. amplifier	15/-
XB104 1 Mc/s. Audio output and driver	10/-

(A pair in push-pull will give up to 250 mW audio output.)

Continental

OC44 12 Mc/s. osc./mixer : R.F. amp.	30/-
OC45 6 Mc/s. I.F. and R.F. amp.	25/-
OC72 325 mW in push-pull	20/-
Red Spot 800 Kc/s. Audio Amplifier	7/6
White Spot 2 to 5 Mc/s. R.F. and I.F. amp.	12/6
Green/Yellow 600 Kc/s. Audio Amplifier	7/6
Red/Yellow 1.5 to 8 Mc/s. R.F. and I.F. amp	15/-

NEWMARKET POWER TRANSISTORS IN STOCK.

Send for Complete Free List of Transistors, Data and Circuits.

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Input 6v. D.C. Output approx. 100v. D.C. at 3 m/amps., fully smoothed and R.F. filtered. Size : 6½ x 5 x 2in. Fitted with Mallory 629C vibrator, BRAND NEW Boxed **12/6**

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