The SHORT WAVE Magazine

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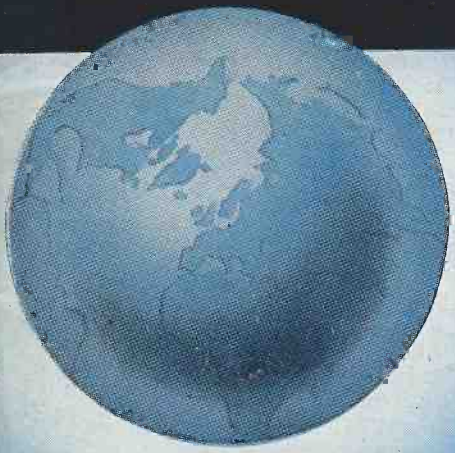

EXCLUSIVELY FOR THE RADIO EXPERIMENTER & TRANSMITTING AMATEUR

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INDEX TO ADVERTISERS

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CONTENTS

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THE *SHORT WAVE LISTENER* ASSOCIATED WITH THIS MAGAZINE IS SPECIALLY FOR THE RECEIVING ENTHUSIAST

EDITORIAL

Progress

In this issue are several articles and comments which together suggest new directions in which Amateur Radio can progress and develop.

While the main body of amateurs confine themselves, quite rightly, to operation upon the DX communication bands, using well-tried methods and techniques—some of which have been standard practice for at least 25 years—there are others who probe in fresh fields and investigate new ideas and methods.

For generations now, amateurs have shown themselves to be particularly ingenious and adaptable when a new band has to be opened or a practical solution found to some fresh problem. It is this ability to cope with the unexpected which has made Amateur Radio what it is ; our present very favourable position in the world of radio is largely due to the work of the pioneers of Amateur Radio, which has gone on right down to the present day and will so continue in the future.

There are many who hold that Amateur Radio has no new contribution to make—that the commercial and Government-sponsored research organisations can do it all much better. This is very largely true. But it is forgotten by those who expound these views that what is not new in the laboratory is in many instances quite new in the field of practical application. And it is the amateurs who are very often best able to develop the application.

Surveying the world of Amateur Radio as a whole, one is impressed by the great concentration of ability, knowledge and experience which amateurs collectively possess. Hence, it is certain that amateurs will continue to seek in new fields ; and so Amateur Radio will progress and develop, remaining the living and expanding force which it always has been.

Practical Single-Sideband Working

Application of S.S.S.C. Technique in Amateur Radio

By J. WOOD (G3VG)

THIS article is intended to amplify, from the point of view of amateur operation, the first notes on the subject by the writer in the June issue of the *Short Wave Magazine*.

The design of the drive unit to generate the system is of first importance in amateur suppressed carrier working. With the usual D.S.B. suppressed carrier system, no filters are necessary. The only requirement extra to a normal amateur system is a balanced modulator. A suitable design for amateur requirements is shown in Fig. 1. SP41's have been chosen as being most suitable, though any similar short-grid based RF pentode may be used.

In order to keep distortion to a minimum, the audio input to the grids of the balanced modulator should only be about a quarter of the carrier input, thus giving a lower modulation depth which considerably reduces distortion level. A high modulation depth is in any case not necessary because the carrier is ultimately cancelled out.

Suitable values of AF and RF drive to the balanced modulator valves are about ½-1 volt of audio and 2-4 volts of RF at the grids of the SP41's. Higher levels would result in slightly more drive with a higher distortion level.

The stage is balanced by means of adjustments to C1 and R1. To do this, RF only is applied to the balanced modulator and adjustments made until zero output is obtained in L1. If a complete balance is not possible, a fresh pair of valves should be substituted.

The output from the balanced modulator will not be sufficient to drive the transmitter, and a pair of 6V6's in push-pull can be employed as an amplifier. Little need be said about this as it is a conventional RF amplifier, and the output from the balanced modulator can be coupled to it by any usual method. It will be necessary to operate this further stage as a linear amplifier. Being a low-level stage, it can be operated in Class-A, which will ensure good linearity ; the loss in efficiency is of little consequence. The level of the output need not be greater than 1 watt, this being sufficient to provide drive to the linear final amplifier.

This article, following on our contributor's discussion of S.S.S.C. technique in the June issue, outlines single-sideband operation strictly from the point of view of its amateur application. It is the first such article to be published in this country, and will be the basis on which British amateur S.S.S.C. working will develop.—Ed.

Rather better operation will be obtained by the use of triodes for this B/M amplifier, particularly if careful attention is paid to neutralising. In any case, no grid current should be allowed to flow in this particular stage, and its anode circuit should be loaded as heavily as possible consistent with adequate output level. In the physical layout of the units of the whole SSSC transmitter, the aerial feeder must be kept well away from the early stages in order to eliminate the effects of "throw-in" and coupling back between output and input ends.

The Linear Output Stage

Almost any amateur transmitter could very quickly be converted to a linear amplifier and made to give results. However, in order to add success to the system it is desirable to redesign and partially rebuild the existing transmitter in order to accomplish good linearity with low distortion.

The design of a linear transmitter is dependent upon several factors acting together :

(1) Choice of valves.
(2) Correct bias.
(3) Driving power.
(4) Anode loads.
(5) Interstage coupling.
(6) Output coupling to aerial.

Valve Choice

Triodes should always be employed wherever possible. The linear operation of tetrodes and pentodes is generally unsatisfactory—especially in drive stages where, owing to grid current in the succeeding stage, the triode or pentode, being a high impedance type, is presented with a varying anode load.

Bias

The linear stages are normally biased to "projected cut-off", *i.e.*, a figure slightly less than cut-off, or Class-B.

However, in practice, a figure can usually be found which gives better linearity than this. Distortion should be checked at both high and low level of speech input, since a low bias gives good distortion at low levels and bad distortion at high levels, and *vice versa.*

The grid-cathode resistance of the stages should be kept low and the bias voltage should not change by more than about 10 per cent. when the grid current varies from zero to maximum.

Driving Power

In order to preserve the linearity on peaks of modulation it is usual to provide about 50 per cent. more driving power than is normal for the stage. Resistors are fitted across the grids or anodes in order to help stabilise the grid impedance as a result of varying drive. These resistors dissipate about 25-50 per cent. of the driving power, and must be the non-inductive (carbon) type.

Anode Loads

The anode load of the drive stage is chosen to give the greatest linearity. Its value depends upon (*a*) valve impedance, (*b*) drive level, and (*c*) step-down radio of coupling.

A suitable value of anode load can often be determined from inspection of the valve characteristics, bearing in mind the available drive to the stage, the allowable anode dissipation and the drive required to the stage following.

Inter-stage Coupling

Inter-stage coupling is rather critical in linear RF amplifiers, owing to the need to minimise the effect of the grid current in the succeeding stage on the anode of the drive stage. To effect this it is usual to employ a type of coupling giving a step down in voltage. Three methods are shown in Fig. 2.

Method "A" is inductive coupling and the degree of step-down voltage is determined by the tapping points on the tank inductance of the driver stage. "B" is capacity coupling and the degree of step-down is governed by the reactance of C1 and C2. "C" is link coupling. This method will probably be preferred by most amateurs. The dimensions for, say, 7 mc could be two turns on the driver end and four turns on the grid inductance of the driven stage.

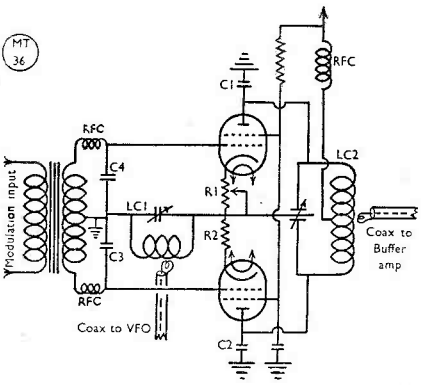

Fig. 1. Circuit of the Balanced Modulator—values as in in the table below. (*C1 above should be shown variable.*)

Table of Values

Fig. 1. Balanced Modulator Unit

C1	= 30 $\mu\mu$F
C2	= 15 $\mu\mu$F
C3, C4	= ·01 μF mica, non-inductive
LC1	= Tuned to carrier frequency
LC2	= Tuned to carrier frequency
R2	= Determined by experiment

Aerial Coupling

It will be found in practice that best results—that is, lowest distortion compatible with good efficiency—are obtained when the coupling is adjusted rather more tightly than is required for best efficiency. The average efficiency of the final stage is not likely to be greater than 50 per cent. with a tone modulation with good distortion characteristics.

Measuring Distortion

Linearity is obtained when the amplitude of the modulated output wave is proportional to the grid drive. There are several methods of observing this :

(1) By the use of an oscilloscope, observing the actual modulated wave-form.

(2) Valve voltmeter, measuring peak RF volts output as a function of grid volts drive. (It must be remembered that peak RF volts can be as high as 1·8 times the applied plate volts in a push-pull stage.)

An alternative method would be to make all the adjustments to the transmitter—drive, coupling, and so on, with modulation applied and monitor the signal simultaneously.

As the anode feed to each stage is a

function of the modulation level, it is necessary to ensure that the HT supply regulation is good. The use of mercury-vapour rectifiers, with choke input filters having the lowest possible inductance consistent with adequate smoothing will be found the most effective.

Adjustment for Operation

Lining up a Suppressed Carrier Transmitter can be rather complex, but if it is done in the following order it will reduce possible snags to a minimum.

After the balanced modulator has been tested it should be connected to the linear amplifier by means of coaxial cable. HT can be applied to the balanced modulator and transmitter stages. The steps are :

(1) Modulation input to the balanced modulator is switched off and the only drive into the balanced modulator is the carrier RF from the VFO. The balanced modulator stage is then thrown into a state of *unbalance* by altering the balancing condenser and bias resistor tapping. This allows the carrier to appear in the output of the balanced modulator, thus providing drive to the transmitter. The transmitter stages can then be lined up on this.

(2) Now re-set the balanced modulator stage by restoring the correct settings of C and R. These can be found by repeated adjustments until no carrier output appears.

(3) Apply modulation input to the balanced modulator. It is preferable to use a tone signal from an AF oscillator for initial line-up. Adjust the level of the audio input to the balanced modulator until the transmitter is driven to the proper output.

(4) Check distortion on transmitter monitoring continuously and make repeated adjustments to drive level, bias, inter-stage coupling and aerial output coupling for lowest distortion.

(5) Take tone modulation off and apply speech input to balanced modulator.

Care must be taken to ensure that the speech level on peaks does not exceed the level predetermined by the tone input tests, otherwise the transmitter will be over-driven and high plate current and distortion will result.

Reception of SSSC Transmissions

In amateur working a suppressed carrier signal can be successfully demodulated by various methods. The carrier could be re-inserted in the RF or IF stage of the receiver. In the case of a TRF receiver with reaction it is possible to render a suppressed carrier signal intelligible with the aid of the reaction control, but distortion may possibly result.

Those possessing communications receivers fitted with variable pitch BFO can use this to simulate the carrier. The BFO should be switched on, and the pitch adjusted to zero beat at which its oscillating frequency is that of the incoming signal. The received D.S.B. suppressed carrier signal will then be intelligible.

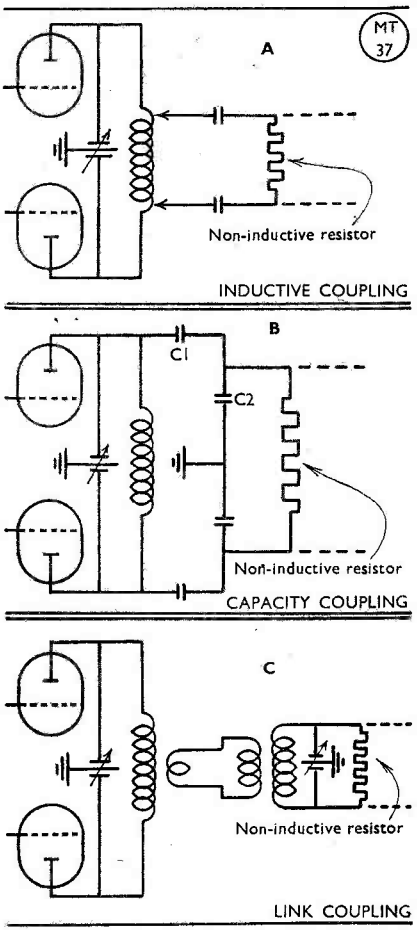

Fig. 2. Inter-stage coupling methods, discussed in the text.

A recommended method is to utilise the VFO driving the S.C. transmitter. The VFO can be loosely coupled to the receiver by means of a single-turn loop and coaxial, or by mounting a short rod aerial upon the VFO. In practice the amount of pick-up necessary for carrier re-insertion can be ascertained by experiment for average value and the loop coupling or rod aerial fixed at that.

It must be remembered that the success obtained in suppressed carrier working depends entirely on the frequency of the re-inserted carrier respective to that of the original (*See* notes on Carrier Re-insertion in the June issue) and a VFO of good frequency stability is essential. The Frequency Meter BC-221, which is used by a good many amateurs, would be excellent. It provides a high degree of stability correct to ±005 per cent., and is temperature compensated. There is also a short rod aerial mounting.

This instrument may not give sufficient output to drive into the balanced modulator of the transmitter, but a small amplifier stage could always be added to it.

Practical SSSC Operation

The question which will obviously arise is " How can suppressed carrier working ever be successfully applied to amateur operation since one has to re-insert the carrier at the correct frequency to make the signal intelligible ? "

A block diagram of a suggested operating system under amateur conditions is shown in Fig. 3. It will be noted that a common oscillator for carrier suppression and re-insertion is employed. The following notes, with the aid of Fig. 3, explain the working.

Assume station "A" is calling CQ on, say, 7100 kc. Station "B" looking round the band hears the unintelligible signal of "A" and moves his VFO up to the frequency indicated on his receiver, *i.e.*, 7100 kc. This VFO then provides the re-inserted carrier and the signal is demodulated normally.

On station "A" going over, "B" calls

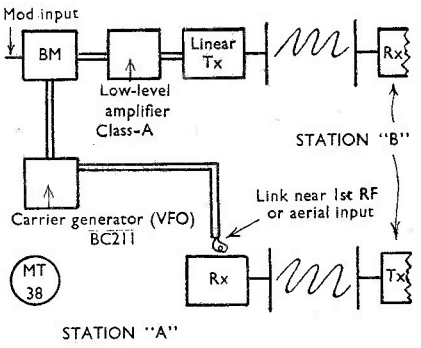

Fig. 3. Block schematic showing operating system in amateur SSSC working. Basically, the Tx VFO is used to provide carrier re-insertion on the receiver side, in the case of stations tuned to the same operating frequency.

him on suppressed carrier on the same frequency, 7100 kc, since the VFO is common to the transmitter also. Station "B" will automatically hear "A" replying if he moves his receiver frequency to that indicated on his VFO 7100 kc, and a normal QSO should result.

Conclusion

In conclusion, it should be stated that the reception of suppressed carrier signals in commercial practice entails the use of receiving equipment employing highly complex circuits involving automatic frequency control, automatic gain control, limiters and filters. Even then this does not guarantee a 100 per cent "circuit" against the effect of very severe multi-path and selective fading, and adjacent channel interference.

The design of such equipment is probably rather beyond the scope of amateurs at this stage in the development of SSSC working and the notes on suppressed carrier reception outlined earlier in this text are suggestions which, in the writer's opinion, are likely to be most suitable and convenient for amateur purposes.

ERROR CREP' IN STUFF

Some slight, but important, mistakes in the June issue fall to be corrected.

In G5IH's article on p. 240, the IF value in the formula on Line 9 in the right-hand column should read 3/2 IF ; this same value should also appear in Line 32, instead of "O IF." Both these quantities could have been obtained by working back the examples which were given.

In G3DJD's article on p. 253, the resistor R3 should be shown connected across the jack in his circuit diagram ; the point is covered in the text.

Sorry if anyone has been misled, but as they are all fairly obvious errors, they should not have caused too much trouble.

The B2 on 1·7 mc

Notes on Modification

By **A. P. KERFORD-BYRNES (G6AB)**

There seems to be no limit to the versatility of the B2, of which there are a great many now in use. Here is the way to make it go on the Top Band, thus providing coverage from 1·7 to 14 mc inclusive with the single unit.—Ed.

NO doubt there are many amateurs who are fortunate enough to possess a B2 transmitter and have already discovered what excellent results can be obtained on the 20, 40 and 80-metre bands.

The writer managed to obtain one of these very efficient transmitters and after using it on 3·5, 7 and 14 mc from a 230-volt DC supply it was decided to try and modify it for use on 1·7 mc.

Examination of the circuit diagram indicated that additional capacity across the PA grid tuning condenser and the 80-metre coil (L1A) should contribute towards the solving of the problem, and with this object in view experiments were carried out by G4CG and myself when he was on a recent visit to this station. First a 160 $\mu\mu$F condenser was connected by a pair of flexible insulated wires to the PA grid tuning condenser, and the capacity altered to produce a grid drive reading in Pos. 3 of the B2 meter. 160 $\mu\mu$F was found to be insufficient for the LF end of the band, so additional capacity was added until grid drive could be obtained on 1,930 and 1,740 kc. Then the condensers were sorted out and finally a small plug-in unit was constructed (see sketch) using a midget 100 $\mu\mu$F variable with 180 $\mu\mu$F shunted across it.

Mounting

A piece of paxolin was then drilled suitably, fitted with two sockets and bolted to the underside of the top of the cover with two 6 BA bolts and nuts. Clearance holes $\frac{3}{8}$ in. diameter were drilled in the cover (see diagram) so the sockets could not short to earth as one of these is "hot" as far as RF and DC are concerned. These two sockets were connected by means of flexible insulated wires across the PA grid tuning condenser taking care that when replacing the cover these two flexible leads were guided well away from the 6L6 valve so that the insulation did not melt. The plugs on the additional capacity unit first described were selected and centred to fit the two sockets now mounted on the B2 cover so that the unit could be instantly plugged in.

Naturally when this unit was not inserted the B2 continued to function in the normal manner on 3·5, 7 and 14 mc.

The next stage was to obtain resonance in the PA tank circuit. Fortunately a spare set of B2 coils was available and a mica condenser capacity ·0001 μF was soldered across the outer terminals of the 80-metre coil (L1A); it was found that this resonated perfectly on both 1,930 and 1,740 kc when used in connection with the additional PA grid tuning condenser unit. The ·0001 μF condenser was then mounted out of the way inside the PA coil and it is not noticeable. Those who have no spare coils could wind a special coil for 1·7 mc and mount it on the base of one of the higher-frequency coils, such as L2. This was actually carried out in the early experiments at this station; a coil was made up of 34 turns of 18 SWG enamelled wire spaced with thread on a paxolin tube 2 in. diameter, and bolted to the base of another B2 coil was found to resonate successfully.

Aerial Coupling

The peculiar aerial system in use at G6AB (152 ft. end fed, coil series tuned against a 102 ft. counterpoise) did not seem to lend itself to the modification, except by link coupling. The link from the aerial unit, as normally used, was connected across the aerial terminal of the B2 and its chassis and then the system was found to load up nicely. But as these

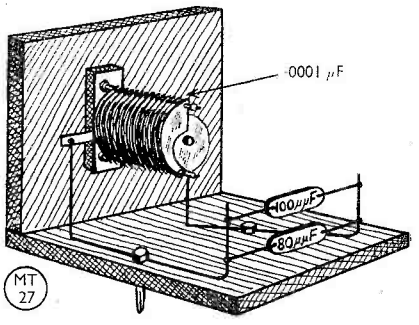

Fig. 1. Rear view of the plug-in modification assembly; this is a sketch for guidance only.

transmitters were designed for use with an end-fed aerial of any length no doubt a 66-ft. wire would be quite efficient when connected direct to the aerial terminal.

Experiments were carried out with G3GW at a distance of about 30 miles using the link coupling system and changing over to the ordinary end-fed method for which the B2 was designed. Although there was a considerable drop as indicated in the RF meter at this end there was very little difference in carrier level at G3GW's own location.

Warning

It was found that using 230 volts on the PA put the wattage input above the limits of the licence and the power was reduced by inserting a 230-volt 15-watt lamp in series with the HT supply ; this brought the voltage down to 150 and the input was then well within the 10 watts allowed.

Incidentally, the B2 transmitter is used on CW and Phone at this station. Modulation is applied to the anode of the 6L6 only and ample control is obtained. Reports of S9 have been received from EI, PAØ and OZ on 80-metre telephony, all with an input of 16 watts using a 230-volt DC supply. The transmitter

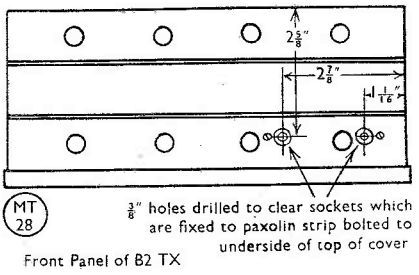

Fig. 2. The top of the B2 Tx cover, showing position of sockets for the plug-in mod. unit for 1·7 mc operation.

can also be controlled nicely by a Type 145 VFO unit by plugging the output of the 145 into the left-hand female pin of the crystal socket.

It is hoped that these notes may be the means of introducing some operators to the 1·7 mc band, which is the ideal for short-haul rag chews—once one has got used to trawler and Loran interference at night ! In conclusion, I should like to record my thanks to G4CG and G3GW for their co-operation in the experiments.

MICRO-WAVE DX WORKING

On p. 24 of our issue for March last, we made some general observations on the possibility of obtaining DX communication on the new micro-wave bands by using the moon as the reflecting medium—since these frequencies of course penetrate the normal reflecting layers, and are not returned to earth.

An exceedingly interesting article in the May issue of the American *Proceedings of the Institute of Radio Engineers*—entitled "Consideration of Moon-Relay Communication"—discusses this same idea in considerable detail, as a practical engineering project. The authors show that the transmitting and receiving points must each be in a direct line from the moon, and that frequencies above about 50 mc should be suitable for penetrating the ionosphere to reach her. In a careful mathematical analysis of the whole problem, they conclude that considering the moon as a smooth reflecting surface, signals of all types (including wide-band television) could be returned ; if, as is of course more likely, the moon is "electrically rough" thus causing a degree of diffusion, the transmission system would be limited to CW working and what is called "narrow-band telephony." The article also suggests that the present scale of transmitting power should be adequate, though this is meant in the commercial and not the amateur sense.

Anyway, the whole conception of moon-relay working is quite sound, and is obviously well worth the serious attention of amateurs interested in the practical application of the higher frequencies. Our promised 144 mc band should be useful for the first experiments, since there are so many other amateur groups, relatively DX to us, who are or will also be licensed for it.

★

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As your subscription falls due, a notice is inserted in your copy a month before the date—followed by the red notice with the last issue due you. As we cannot afford wasted copies, please act on these renewal notices, which save you time and money, and us a great deal of accounting work. Our system is smooth enough but it does require your co-operation to make it effective!

Combined Monitor Instrument

Self-Contained Heterodyne Wavemeter, Crystal Calibrator, Signal Generator and 'Phone/CW Monitor

By F. H. LANE (G3GW)

THIS frequency measuring unit has proved a valuable asset at the writer's station. It contains no sensational new circuits and each stage is of well-tried design, proving easy to build, adjust and operate. One point in its favour from the amateur aspect is that it uses standard octal-base receiving valves and no unusual components.

The equipment provides the following facilities :

(A) 100 kc crystal-controlled markers useful up to 30 mc.
(B) 10 kc crystal-controlled markers.
(C) Signal generator for receiver calibration—the range 1,700-2,000 kc providing useful harmonics in the amateur bands.
(D) Heterodyne wavemeter.
(E) CW and 'phone monitoring.

The measurements and checks which are provided by a unit of the kind outlined here are almost essential for efficient operation. At many stations a variety of instruments are employed to serve these purposes. This article suggests how all these functions can be combined in one piece of equipment.—Ed.

Circuits

V1 is a 100 kc crystal oscillator.

V3—Interpolation oscillator, multivibrator circuit synchronised by V1 and providing 10-kc markers.

V2—Harmonic amplifier, into which is fed the 100 kc and 10 kc outputs. This stage emphasises and boosts the higher harmonics.

V4—Signal generator using ECO circuit. The controls are bandset, main tuning, and panel trimmer to compensate for slight drift (used in conjunction with 100 kc and 10 kc outputs).

Outputs of V4 and V2 are fed out to a common panel terminal and used with a 2-ft. aerial.

V5—Audio oscillator used to modulate V2 and V4 at will.

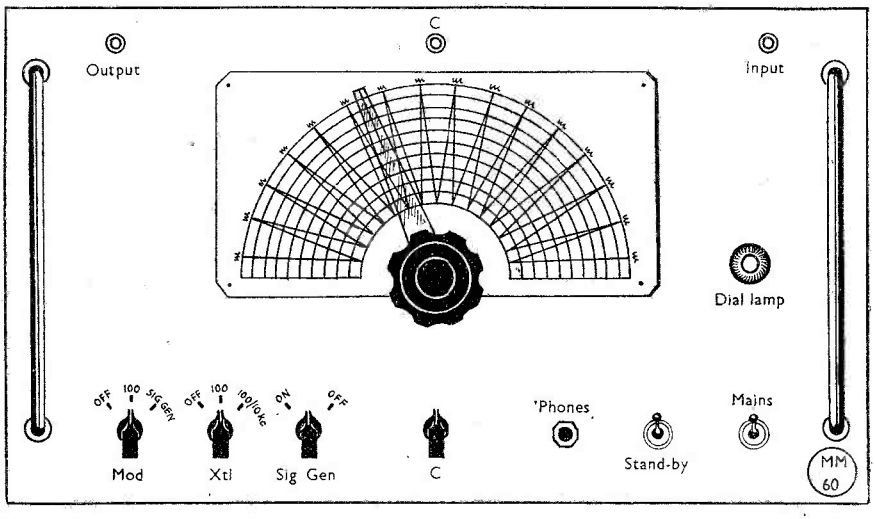


Fig. 2. Panel layout as used by the author.

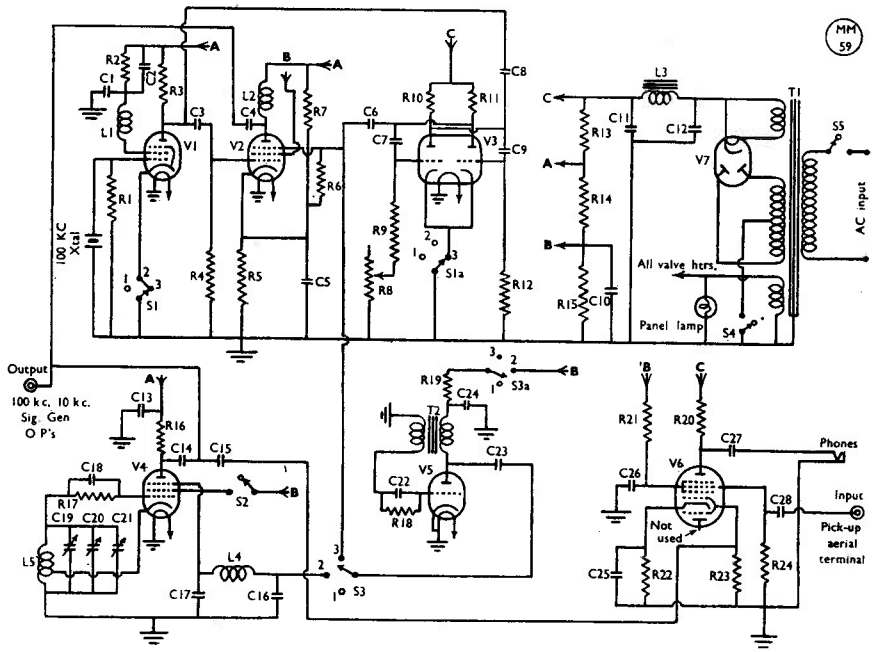


Fig. 1. Circuit of the unit, which provides all monitoring functions and is self-contained for power.

Table of Values

Fig. 1. Combined Monitor Instrument

C1, C2, C24 and C26 = 0·1 μF paper 300v DC wkg.
C3, C18 = ·0001 μF mica
C4 = ·0005 μF mica
C5, C13 = ·005 μF paper 300v DC wkg.
C6, C8 = 10 μμF silvered mica
C7, C9 = ·001 μF mica
C10 = 0·5 μF paper 300v DC wkg.
C11, C12 = Dual 8 μF elect. 400v DC wkg.
C14 = 50 μμF silvered mica
C15, C28 = ·003 μF paper
C16, C17 = ·0002 μF mica
C19 Sig. Gen. Tuning = See text
C20 Sig. Gen. Band Set = See text
C21 Midget Variable = 15 μμF
C22, C23 = ·01 μF paper
C25 = 25 μF elect. 25v DC wkg.

R1 = 5 megohm ½ watt
R2, R6 = 22,000 ohms ½ watt
R3 = 220,000 ohms ½ watt
R4 = 500,000 ohms ½ watt
R5 = 1200 ohms 1 watt
R7 = 39,000 ohms 1 watt
R8 = 50,000 ohms Variable
R9 = 4,700 ohms ½ watt
R10, R11 = 56,000 ohms 1 watt
R12, R23, R24 = 20,000 ohms ½ watt
R13 = 10,000 ohms 2 watt
R14 = 20,000 ohms 5 watt
R15 = 33,000 ohms 5 watt
R16 = 100,000 ohms ½ watt
R17 = 69,000 ohms ½ watt
R18 = 250,000 ohms ½ watt
R19 = 50,000 ohms ½ watt
R20 = 50,000 ohms 1 watt
R21 = 50,000 ohms 1 watt
R22 = 220,000 ohms ½ watt

S1 and S1a Two pole 3-way Yaxley type switch
S4 Stand By = Toggle on-off
S5 Mains = Toggle on-off
S4 Sig. Gen. = Toggle on-off
S3 and 3a = Two-pole three-way Yaxley type switch
L1 = Eddystone Type 1066, RF choke
L2 = 2·5 mH RF choke
L4 = Eddystone Type 1066, RF choke
L3 = 20 Hy smoothing choke
L5 = 60 Turns 26-gauge enamelled on ceramic former 1 in. diam. 2½ in. long, tapped ⅓rd from end and shellaced.
T1 = Power Transformer, Outputs 250-0-250 80 mA., 5v 1a, 6·3v 3 watts
T2 = Intervalve 1/3

V1 = 6F6, V2 = 6J7, V3 = 6SL7, V4 = EF50, V5 = 6J5, V6 = 6K8, V7 = 5Z4.

V6—Mixer stage allowing beats to be heard in telephones between (*a*) 100 kc/10 kc and signal generator, (*b*) between signal generator and received external signal (own transmitter). It is thus a heterodyne wavemeter; also, used as such, it is a good CW monitor. V6 used alone as a speech monitor.

V7—Usual full-wave rectified power supply.

When this set was in process of design it was thought desirable to provide voltage stabilisation owing to the fact that the total of stages in use at one time would differ, thereby imposing different loads on the power pack and it was considered that this would affect the signal generator. On test, however, it was gratifying to find that the frequency setting was not changed by the number of stages in use and thus no voltage stabilisation was incorporated.

Construction

The unit is built on a dural chassis (16 gauge) measuring 16 in. by 9 in. by 2½ in. It is realised that mild steel would have provided a more robust job, but at G3GW it was also realised that dural is easier to work ! The chassis is housed in an ex-Government cabinet which originally contained a relay panel. Measurements are 19 in. long by 10 in. high by 10 in. deep. The panel is braced against the chassis by solid end brackets; brackets are also provided each side of the tuning condenser to obviate any effect due to panel "give." Chrome handles are used to protect panel controls from damage when the set is placed on the bench with the panel downwards. Ventilation holes (1 in. diameter) are bored along the top of back and sides and backed by perforated zinc. The signal generator should be wired with 14-SWG tinned copper wire.

Controls

S1 (1 and 1*a*) Three position : 1 - off ; 2 - 100 kc on ; 3 - 100 kc and 10 kc on.

S2 Signal generator on - off.

S3 (3 and 3*a*) 1 - off ; 2 - Signal generator modulated ; 3 - 100 kc modulated.

The small knob under the tuning dial is used to compensate for any drift, and to correct dial reading-checking from the 100 kc and 10 kc markers by listening to beats in the headphones.

Main tuning condenser is a Raymart standard type reduced to three fixed and three moving vanes. Slight adjustment of end vanes may be necessary to obtain the desired band (1,700-2,000 kc). The dial is home-constructed, as shown in the illustration. A perspex pointer is fixed to the underside of the knob and a scratch is made in the perspex and filled with red ink to provide a marker.

The capacity of the band-set condenser can easily be determined by trial and

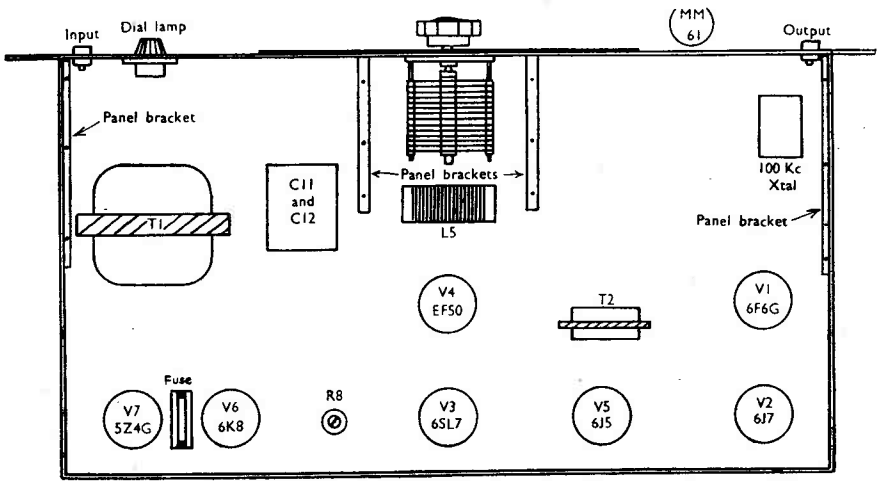


Fig. 3. Placing of the components. All other parts and wiring are sub-chassis.

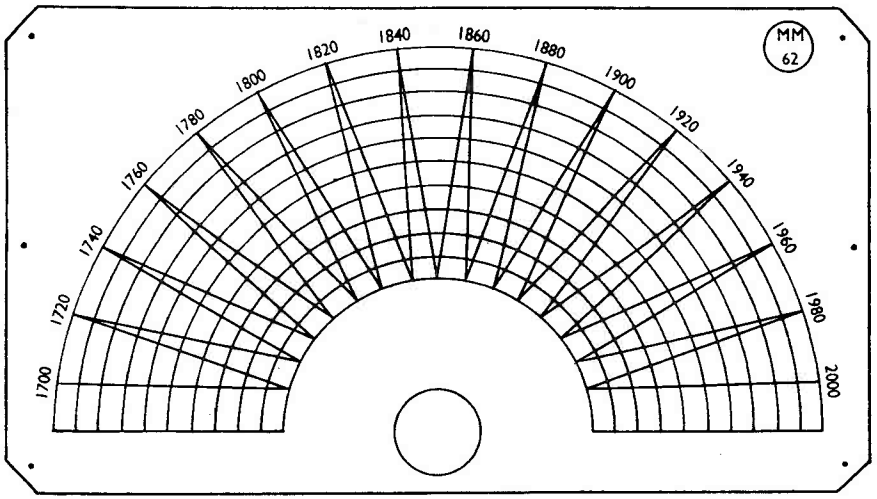


Fig. 4. The home-made calibration scale.

error. The pre-set control on the chassis is adjusted until nine 10-kc. markers are counted between two 100-kc markers. This control is then locked.

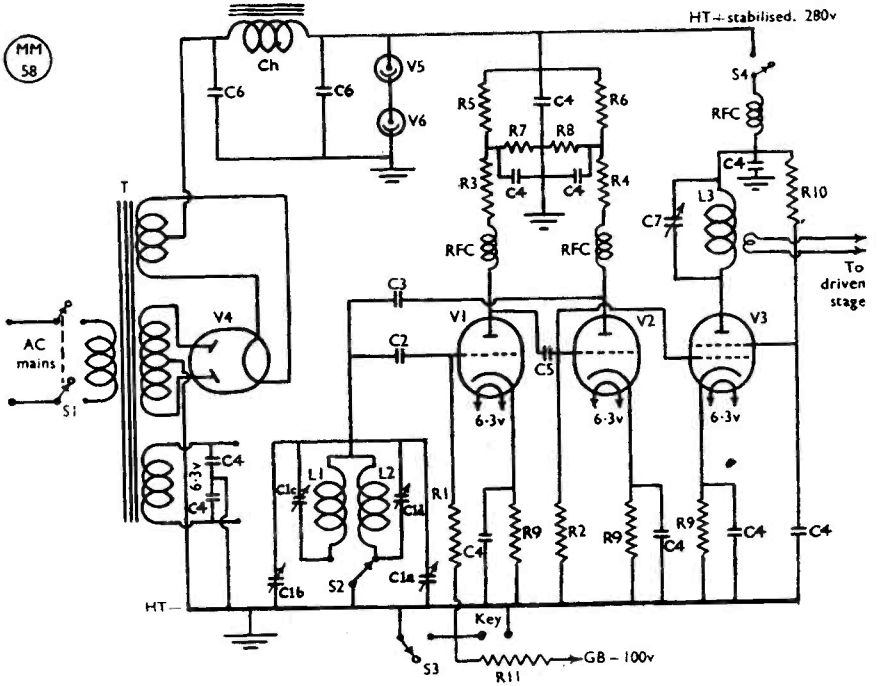
If, on checking the 100-kc crystal against WWV, it is found to be too high in frequency, a small variable condenser (30 $\mu\mu$F) in parallel with the cystal will provide a means of adjustment to exact zero beat with WWV.

LABGEAR WIDE-BAND COUPLERS

These units deserve to be better known and more widely used, as they can be made to serve a variety of useful purposes. Consisting essentially of pre-tuned dust-iron core coils, they provide virtually constant coupling between stages in a low-power exciter unit over any given amateur band. For instance, the 7 mc coupler covers the range 7000-7500 kc. To drive, say, an 807 from a 6V6 all that is needed in the grid and anode circuits of two such stages is the appropriate wide-band coupler and a (British) 5-pin valve-holder into which to plug it.

Each coupler unit is provided with two trimmers for correct setting of the coupler relative to the input and output capacities across which it is to be connected. Once this is done, no further adjustment is necessary. Thus, a band-switched exciter becomes no more than a set of couplers for the bands to be covered and the necessary selector switching. No inter-stage tuning is required, and the VFO at the input end will swing the frequency about the band with a constant value of drive into the final amplifier. Constant drive power over a wide change of frequency is the important point.

Each coupler unit is no more than 3½-in. high by 1½-in. square, in a neat black crackle-finished drawn aluminium container. Very complete instructions, with circuit diagrams, on the application and operation of the unit are supplied with it. Couplers are now available for all bands 1·7 to 28 mc, and cost 17s. 6d. each. Labgear, Ltd., Fair Street, Cambridge.



Circuit complete of the modified Franklin VFO, fully discussed in the text. Values are as below.

Table of Values

Modified Franklin VFO

Condensers

C1A = 250 $\mu\mu$F bandset
C1B = 35 or 50 $\mu\mu$F bandspread (select value to bandspread whole of 160-metre band over 100 deg. scale)
C1C = 6-24 $\mu\mu$F air trimmer } to trim each coil so that scale readings on 160 and 80 metres correspond as described in text
C1D = 6-24 $\mu\mu$F air trimmer }
C2 = 3 or 5 $\mu\mu$F fixed
C3 = 3 or 5 $\mu\mu$F fixed
C4 = ·005 or ·01 μF RF by-pass
C5 = 100 $\mu\mu$F coupling
C6 = 16 μF smoothing
C7 = 100 $\mu\mu$F buffer tuning

Inductances

L1 = 40 turns 24 DCC, close wound on 1½-in former (160 metres)
L2 = 25 turns 24 DCC, close wound on 1½-in. former (80 metres)
L3 = Buffer coil: 18 SWG enamelled, slightly spaced on 1½-in. former; 60 turns for 160 metres, 35 turns for 80 metres, separate plug-in, each with 3-turn link at cold end.
Ch = Smoothing choke, 100 mA
RFC = Broadcast-type RF chokes. Screen from one another or mount with fields at right angles
T = Mains transformer 300-0-300 volts at 100 mA 6·3V 2A and 5V 3A

Valves

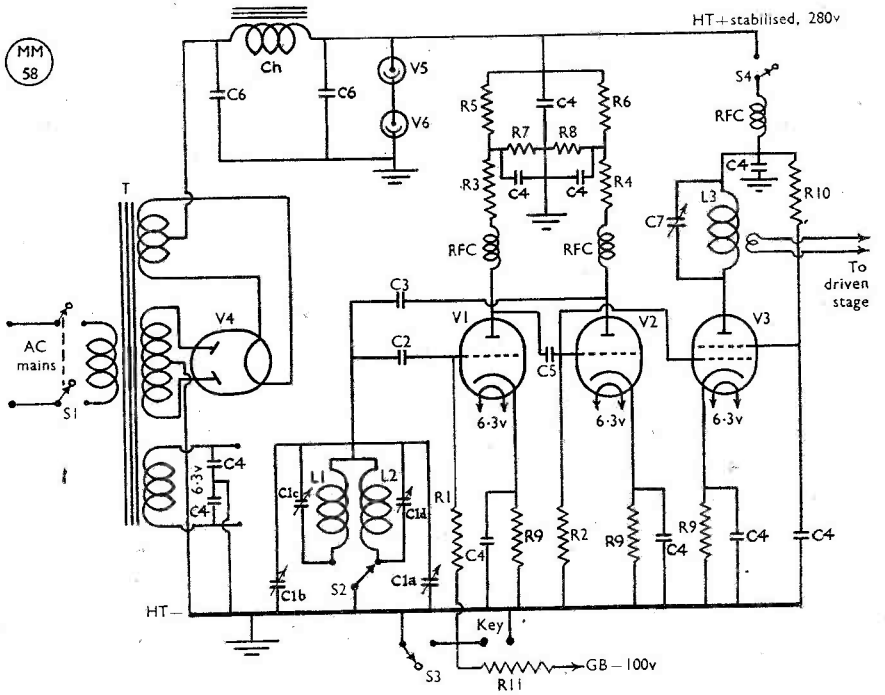
V1, V2 = Marconi ML6 or American 6J5
V3 = Mullard EL32 or American 6K6 or 6V6
V4 = 5Z4 or two Mazda UU6 in parallel (4V heaters)
V5, V6 = Cossor S130 neon stabilizers

Resistors

R1, R2 = 80,000-ohm grid resistors (½ watt)
R3, R4 = 3,000-ohm anode decoupling (2 watt)
R5, R6, R7, R8 = 30,000-ohm potential divider (5 watt)
R9 = 500-ohm cathode bias (2 watt)
R10 = 25,000-ohm screen decoupling (2 watt)
R11 = 1-megohm grid bias decoupling (1 watt)

Switches

S1 = Double-pole mains on-off
S2 = Bandswitch
S3 = Oscillator switch ("off" for keying, "on" when oscillator is to be kept running)
S4 = Buffer HT switch (to cut HT from buffer when tuning oscillator)



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the VFO box is more than a foot from the driven transmitter. To demonstrate the loss which may otherwise occur, it is most illuminating to try various lengths of wire direct from the VFO output to the transmitter. As this wire is made longer the amount of drive will substantially drop, even on a "small loss" frequency like 1·7 mc.

Link coupling, then, is the only answer where VFO and transmitter are remote from one another. Direct coupling, although much simpler to set up, should only be used where the VFO can be built into the transmitter and the lead from it to the CO grid can be kept to within a few *inches* long.

Power Supply

Of the various factors influencing stability in a VFO one of the most important is the "goodness" of the power pack employed—not necessarily its efficiency but rather its stability and freedom from hum.

When a VFO is keyed direct a chirpy note is all too easily produced if the power pack voltage rises unduly in the key-up position. This happens easily enough where, in order to allow for the voltage drop through the anode decoupling resistors R3 and R4 in Fig. 1, a 300- or 400-volt power pack is used, giving about 100 volts net at the anodes of V1 and V2. Chirp can be effectively avoided by keying a following stage, but this means leaving the oscillator running—not satisfactory for break-in (and everyone *should* be able to work complete break-in).

Two almost certain cures for "VFO chirp" can be adopted either singly or together—and they are simple and cheap. Their more widespread adoption would eliminate many of the too too obviously VFO notes that can be heard on the amateur bands to day.

The first is to arrange matters so that the power pack idling voltage with key up does not rise appreciably. This can be simply effected by tapping off the VFO HT from a potential divider. This can consist of a heavy-duty resistor of about 50,000 ohms connected right across the power supply output terminals, the VFO being tapped about one-third of the way down from the positive end. Another method of achieving the same end is to insert two resistors instead of the single resistor at R3 and R4, and to connect to the junction of the two resistors another resistor of like value connected to earth—in other words stabilizing the anode voltage of the valves just as one would the screen grid of a tetrode. A decoupling condenser can be usefully included at the same time. The values of these resistors suggested in the table are only approximate and will depend on the type of valve employed and power pack voltage available. Values should be such that the voltage at the anodes remains reasonably constant whether the key is up or down.

Now the second method of avoiding VFO chirp is to stabilize the power supply itself by means of a neon—or two neons in series, according to whether 130 volts or 260 volts stabilized potential is required. Since the output voltage of even the smallest power pack is likely to be of the order of 300 volts off-load two neons will generally be required. The two in series will hold the output voltage constant at about 260-280 volts. They will burn more brightly when the key is up.

Neons have a further advantage besides their stabilizing property ; as a means of reducing hum they are as good as another 8 μF across the power pack !

On the general question of filter ripple any economy in power pack smoothing is a false move where a VFO is concerned. The slightest AC hum in the oscillator will get right through to the carrier, with deleterious results to the character of the transmitted signal (and of the operator, too). The power pack should therefore be designed to give more than enough current, even if this means using two rectifiers in parallel. At the same time the chokes selected must be capable of passing the requisite current without saturation. A good and very simple test is to try the VFO power pack on your receiver. If it gives a completely hum-free background it is good enough for transmitting purposes.

Cases have been known where amateurs who built a Franklin-without-buffer found that hum was introduced when at a later date a buffer stage was added. This was solely because the power pack could deliver only enough current for the two valves ; it saturated when the buffer valve was added and the note not only became rough but was chirpy too.

Keying

Nearly all designs of Franklin so far published, including the writer's of July, 1946, advocate keying the cathode of one of the oscillator valves. While this is good practice, and quite chirpless if the precautions outlined under "Power Supply" are followed, even better results are possible with grid block keying. The current broken is much less than with

cathode keying and key clicks are more easily reduced.

Cathode Bias

Another feature generally overlooked is the need to provide automatic bias on certain types of valves. The Franklin will always work well with cathodes tied to earth, but where valve makers' characteristics specify a certain grid voltage as being desirable it is not a bad idea to insert a bias resistor with shunt condenser in each cathode lead. Its value is seldom critical; 500 ohms or so will reduce anode current measurably and output not at all with most valves.

Valves to Use

In past designs the ML4 or 6J5 has been widely advocated for use in the Franklin. In the original commercial design the ML6 was specified. Readers can now obtain this valve quite easily from Disposals Stores and from the R.A.F. T1154 transmitter, and they are recommended to use it where they can. It is fitted with the British 5-pin base.

Feedback Condensers

Constructors occasionally feel inclined to fit variable trimmer condensers in the C2, C3 positions. These are quite unnecessary, and the little 3 or 5 $\mu\mu$F fixed condensers now readily obtainable are preferable. It is good practice in a VFO to keep the number of variables to a minimum—at least, if any constancy of calibration is desired !

Calibration

Which brings up the question of calibration generally. If direct frequency reading is required a very open scale will be needed. Remember that to satisfy GPO requirements the scale must read to within 2 kc at 2 mc, unless a separate crystal resonator is to hand. Now, this degree of accuracy is quite easy to achieve, but what is not so easy to achieve simultaneously is complete band-spreading of the 160- or 80-metre band over a direct reading scale—though it *can* be done if a very large scale is used *plus* a long rigid pointer. Mechanical bandspreading, in other words; a small rotation of the tuning knob produces a large movement of the end of the pointer remote from it, permitting a change of one or two kilocycles to be read over a reasonable range of the scale. Most amateurs prefer something like this; they are compelled to log their operating frequency every time they change it and will rather do so by direct reading than by the longer process of beating a frequency meter against it on each change.

Where such niceties of calibration are sought no amateur will need to be told of the vital importance of building his Franklin oscillator so rigidly that no mechanical variation can affect it. If RF wiring vibrates even slightly and changes its capacity in relation to the items around it changes in calibration can occur.

In the writer's Franklin one of the wires to the coil was initially positioned too near the metal chassis. It was lifted half an inch, and the minimum distributed capacity was decreased enough to give another five degrees of bandspread on 160 metres.

Final Circuits

A circuit diagram embodying all the features covered in the foregoing notes is shown. It can be taken as just about the last word in Franklin oscillators—and of VFO's generally, for that matter. The derivative employing a twin-triode is not shown, since the minor changes it involves are quite obvious (effectively, V1 and V2 are combined in one envelope; otherwise connections are unaltered).

As will be seen, separate switched coils for 160 and 80 metres are advocated. Preferably, in accordance with accepted VFO practice, operation on higher frequencies should be *via* doublers from the Franklin on 80 metres—though a perfectly good note is obtainable with fundamental operation on 7 mc if all the precautions described earlier are observed.

Coil data given are only approximate and will obviously be governed by the type of valves used and the distributed capacities of individual designs. Separate coils are desirable for 160 and 80 metres. One does not recommend swinging the bandset condenser to obtain two bands on one coil; this practice requires the calibration on the bandspread condenser to be reset every time the bandsetter is moved.

With a little trimming of inductances it is possible to arrange that, say, 100 deg. corresponds to 1,715 kc in the 160-metre band and to 3,430 kc, or double the frequency, in the 80-metre band, while the 2,000 kc reading will correspond to 4,000 kc. Thus, if the 160-metre band is spread over the whole of a Muirhead type scale the 80-metre band will appear in the middle of it. No variation of the bandset condenser will then be needed to change bands; just switch the coil.

DX COMMENTARY

ON CALLS HEARD, WORKED & QSL'd

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

As one of our first duties to our public is to be honest, we feel bound to report a Pretty Poor Month. Yes, the DX is still there, but no one could possibly compare conditions favourably with those of the palmy days of 1946 and 1947. Sunspots, or the absence of them ; the progression of the long-term cycle ; and here we are, admitting that real DX work is not quite as easy as we have all been making out for the past two years !

The hardened searchers have been winkling out the choice pieces, almost as usual, but the " casual " DX which has hitherto been there for the picking is now lurking coyly under the blanket of European QRM and noise in general.

WAZ and All That

You will note from the list that a few more contestants have reached the select ranks of top-scorers. Those newly entitled to put up a score of "40" are ON4JW, G2AVP and G5GK. Nice work, all round ! You will also note, no doubt, that we have separated out the Post-War scores and the 1948 Marathon scores. This represents Democracy At Work, so to speak ; some of our correspondents have asked for it, and there it is. We now have two completely different sets of figures to get muddled up with, but we seem to have coped all right this month. But where are the GM's, GI's, GW's, GC's and GD's ? We know of several very high scorers in these countries, but the list remains 95 per cent. "G." Let's hear from some of you modest fellows next door !

One further note : To keep the two lists into a workable amount of space we have had to fix a starting figure of 30 for the Post-War scores and of 25 for the 1948 scores. This, unfortunately, has excluded a few who have sent in their reports, but we hope it will spur them on to greater efforts. And then we may have to raise the bottom figure again ! Never mind—press on.

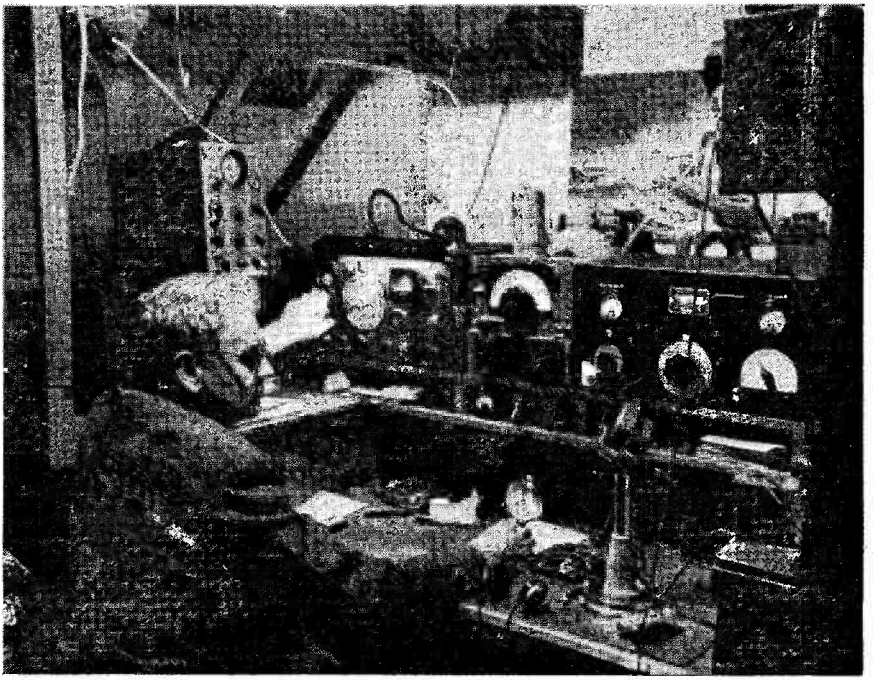
Hot-Under-Collar Section

We have had this little section written for us this month ; not that we have no grouses of our own . . . but let the hot ones speak for themselves. From G3DCC (London, N.8) : "It seems that 'spivery' is much worse on 7 mc these days than on 14. Screaming VFO's and T7 notes make the CW band unbearable at times. Why can't a person swing a VFO around without putting the whole Tx on the air ?" And echo answers "Why, indeed ?" From G8IP, writing on holiday in " GI-land" : "IP recently worked ZD2RGY, and makes the following remarks : 'He called CQ ; I parked just below him and called him. He came back to someone else. Throughout the ensuing QSO he was called by an LU, two W2's, a W3, a G5 and a G6. None of your G3XXX's, mark you, but old hands who supposedly know better.' " The happy ending was that G8IP's patience was eventually rewarded, but with constant QRM from Spivs. He concludes "This DX business is just like fly-fishing—you wait for a rise and then cast in the right spot. You don't just flog the stream and scare all your fish away."

Now a rather peculiar one from G3BZO (Scunthorpe). He went on 14 mc for the first time to see what he could raise, and, wanting a QSO with Italy, called an Italian. Back came the I, bursting with good will and sending : "RR—I am wondering who is giving you guys your licences—you don't even know what DX means—to me as to every real OM, CQ DX means at least another continent and not a local QSO—keep in mind for next time—I hope you don't feel hurt, but we all have to learn—AR VA." Of course G3BZO was technically in the wrong if he answered a CQ DX, but such a ticking-off from such a source doesn't go down very well—especially when you have been a POW out there for two years, as 'BZO was.

Event of the Month

Let's turn to pleasanter topics. Such as, for instance, the Great AC4 Flap. AC4AK has been worked by several G's. His QTH is said to be Yuohia (or Yuhoia, or Youhia, whichever way he chooses to spell it) ; his power is between 800 and 1,000 watts ; his PA alternates between



GC8OK. one of the real Old Timers, who was in on much of the early development of radio from 1,000 metres downwards, now lives in Guernsey and runs this nice outfit. His chief interest is still the LF bands, and for 80 metres GC8OK has a folded dipole with reflector, looking out over 3,500 miles of sea!

P/P 813's and P/P 803's; and he says "QSL *via* AR8AB," who isn't exactly accessible from Tibet!

G2AVP (Stradishall), one of those who worked the individual above, also raised AC4AE, but just as he was sending his QTH a D4, complete with BC610 and rhombic, called CQ for five minutes right on top of him. Exit AC4AE, unexplained. Can anyone help?

Will the lucky ones who have worked OQ5AS (we know G2WW and G5HH are among them) note that Ruanda Urundi apparently *is* a country separate from the Belgian Congo, and was so shown in certain pre-war lists. G5HH (Reading), passing on this information, suggests a method of killing off the Spivs; simply abolish all DX certificates, DXCC, WAC, WAZ and so on, and do away with QSL cards. This would reduce the QRM, says 'HH. In our own opinion it might clear the bands altogether! You can cure the very worst case of headache by amputating at the neck.

QSL's and QSO's

Our remark anent the difficulty in confirming all the countries that one claims to have worked has brought some responses from DX men who think the lists should be published only on the basis of Countries Confirmed. G2VD (Watford) says: "There must be numbers of fellows who contacted perhaps an XZ or an XE 'way back in early 1946, but who have never received a card and have never worked another one since. Is that a contact to be claimed, or should one write it off and go all out for another one, with confirmation?" And G8KU (Scarborough) remarks that the QSL "fully completes a QSO, gives sure proof (so many phoneys about nowadays) and helps to eliminate laziness in keeping records." But others take the opposite view and imply that nobody's honesty should be called in question.

We agree, all round; but many of the prominent DX workers just don't bother about cards unless the other chap sends one along or particularly asks for one.

1948 MARATHON

(Starting Figure: 25 Z)

Station	Z.	C.	Station	Z.	C.
'Phone and CW			'Phone and CW		
SV1RX	39	129	G5MR	30	41
G8KP	38	125	G2WW	29	92
G3DO	38	112	G2BJY	29	86
G6QB	38	105	G2HPF	29	48
G4CP	38	104			
G3AAE	38	100	G2AO	28	70
G2AVP	38	87			
G5GK	38	84	G4AR	27	75
			GM3CSM	27	64
G2EC	37	127	G2BXP	27	62
G2AJ	37	100			
G3BI	37	89	G6XX	26	52
G2VD	35	91	GM3AVO	25	55
G8IP	35	79			
			'Phone only		
G5FA	34	95			
G8KU	34	85	G3DO	34	93
G3DAH	33	91			
G3ATU	33	74	G3DAH	31	77
G3TK	32	81	G2BXP	27	61
G8PL	31	84	G6CB	25	37

So, for the moment, our lists stays as it is ; but if ever we have an overwhelming demand for basing it on confirmations only, we will do just that.

Our Pets' Corner

G3ATU (Sunderland), who once lamented that when he called an HP he got a WØ back, now tells us that he called "CQ Wyo" (he's been wanting Wyoming for WAS for a long time) and back came HP2X saying "I'm not Wyoming, OM, but thought you might like a QSO with Panama." We wouldn't have minded that one a bit ! But 'ATU quotes an absolute gem of an exchange between a UC2 (T6) and a UP2. The latter listened to the UC2, and then went back, repeating about a dozen times "Ur RST 599, FB OM, please repeat all, heavy QRM." (Arabackle, bring me a swing door—I want to slam it.)

QRP Work

After reading recent accounts of QRP, G2BBP (Hitchin) writes to say that he has been using 1½ watts on 7 mc, mostly at week-ends, and has worked GM, GC, GW, EI, ON, OK and SM, with an average strength of S5/6. Very nice work, and it certainly would keep the band clear if a few more would only take it up. (We have been using 10 watts on 7 and 3·5, but haven't got enough negative volts to get below that at present ; but please don't send batteries by post.)

Piracy Section

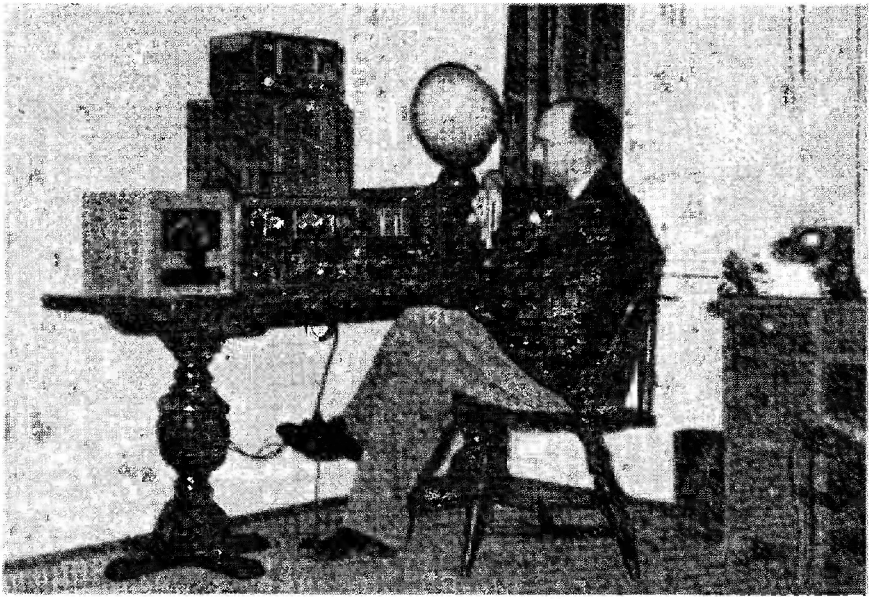
G3CU (London, S.E.24) has received lots of cards, mostly from OK and Russia, for 14 mc contacts ; he doesn't work the band . . . G2PV (Leicester) recently complained that his call was being pirated. GM3ZH has heard the phoney "G2PV" and says it is the foulest noise to which he has ever listened ; he was glad to see our note or he would have taken a Poor View of the genuine G2PV for ever after . . . G2VV (Hampton) heard someone signing GM2VV and called him, but didn't succeed in enticing him from his lair. 'VV says his Scotch Uncle has a T9 note, but the operating . . . ! Let's hope he has found a new call, or, better still, that the GPO has found *him*. G3CJC (Fareham) says that he has noticed many Army and RAF stations tuning on to the amateur bands—usually on 'phone and with deplorable quality—and butting into legitimate QSO's. As he rightly observes, they are just as much pirates as any other unauthorised transmitters, and liable to all sorts of dire penalties if logged by their own monitor organisations.

ZONES WORKED LISTING

POST-WAR

(Starting Figure: 30 Z.)

Station	Z.	C.	Station	Z.	C.
'Phone and CW			'Phone and CW		
G8KP	40	176	G2BXP	36	94
G6QB	40	164	G3ATU	36	84
G2WW	40	162			
G2AJ	40	162	G5FA	35	103
G3DO	40	158	G3BTU	35	79
ON4JW	40	154			
G4CP	40	142	G3DAH	33	93
G2AVP	40	128	GM3AVO	33	85
G5GK	40	128			
G3AAE	40	122	G5HH	32	88
SV1RX	39	153	G8PL	31	95
G2VD	39	139	G2BJY	31	93
G3TK	39	126	G2HPF	31	90
G3BI	39	117	G3ACC	31	90
G8IP	39	114			
G5MR	39	108			
G6PJ	39	77	'Phone only		
MD5AK	38	152			
G4AR	38	125	G3ZI	37	122
G8KU	38	109	G3DO	37	122
			G8QX	34	112
G2AO	37	112			
			G2BXP	32	80
G6XX	36	99			
G3BDQ	36	98	G3DAH	31	81



W5ALA, Dallas, Texas, runs 125 watts to an HT9, into a 3-element 10-metre beam, with a DB22A-SX28A receiving installation. W5ALA, a "10-metre 'phone only" man, has worked 74 G's but tells us he still wants cards from GD and GI

News from Overseas

Norman Joly of SV1RX, after reaching the fine 1948 total of 39Z, 129C, and thereby putting himself right at the top of the list, has had to QRT owing to the recent declaration of martial law in the Athens area. He has knocked the rig to pieces and pulled down the aerials, and hopes he will never hear AC4YN, or he will assuredly die of a broken heart. SVIRX is returning to England in July.

ZC6NU writes from Palestine, but expects to be on the air from Tripoli by now, together with ZC6NN, ZC6NR and others. G3CO (Plumstead) tells us that G6GK, formerly of Kidbrooke, is now on the air as ZD2GHK from Nigeria. At first he was held up for a receiver, but G8VR sent his own Rx out to him, thereby putting himself temporarily off the air. In these days of spivvery it is a pleasure to read again about the genuine old amateur spirit.

VK5BS, sending some news from Down Under, tells us that the VK's have now lost their 166-170 mc band and have been assigned 144-148 mc instead. They also are allowed to use "11"—27·185 to 27·455 mc. And he adds that a Scot by name of Olly Harrison, on the VK-ZL run, has the call-sign ZL1GE/MM and operates on the 7 and 3·5 mc bands. Worth looking for, we should think.

Ham Whyte (VE3BWY) is apparently putting out the old punch again, having worked 52 countries in his first six weeks on the air. We have worked him a few times with no trouble (contacts with G6FO and G6QB follow one another in his log !), but he confirms the fact that Asia really is difficult to QSO from North America. He has managed VU2BK and UA9CC, though.

VU2BX (Bengal) is shortly spending six months' leave in Northern Ireland, but remarks that AC3SS has just arrived out there and is getting ready to move on into AC4 *and* to come on the air. (Whoa, there, Arabackle—don't start calling him *yet*, you don't even know his call-sign !)

Lists of Calls Heard from David Mitchell (ex-GW6AA), *en route* for ZL, appear in our Calls Heard section. Anyone appearing therein will receive a special report card giving the fullest details if he will write to : D. S. Mitchell, c/o Bank of N.Z., Queen Street, Auckland. The receiver was a midget 1-V-1 with 1T4's.

ZC6WF is now QRT, and D. A. King,

DX QTH'S

EK1AZ	D. W. Crews, c/o RCA Communications, Riverhead, N.Y., U.S.A.
EQ2L	Ray Ball, American Embassy, Teheran, Iran.
HP1BR	Box 1098, Panama, R.P.
HP1LS	Stanley Lawrence, Box 1616, Panama, R.P.
HP2X	*Via* W4LVV.
K2UN	United Nations Amateur Radio Club, Lake Success, N.Y.
KV4AH	Box 120, St. Thomas, Virgin Islands, B.W.I.
KG6CB	Utility Sqdn. No. 9, Saipan, c/o FPO, San Francisco.
KZ5XJ	Box 1176, Aucon, Canal Zone.
LF2O	West Radio Factory, Floroe, Norway.
MD4JG	Maj. J. R. Farr, King's African Rifles, c/o PM, Mogadishu, Somalia, East Africa.
OA4BW	K. R. Wille, Box 681, Lima, Peru.
ST2AR	Peter Wilson, c/o BOAC, Malakal, Sudan.
TI2EXO	Box 1860, San Jose, Costa Rica.
VE8OY	Forth Smith, N.W.T.
VP8AM	Marguerite Bay, Antarctica.
VQ4DFF	Box 3015, Mombasa, Kenya Colony
VQ5PBD	Box 287, Kampala, Uganda.
VS9GT	RAF Station, Sharjah, British Forces in Iraq.
WØMCF/C1	Capt. Howard J. Olson, Box 10, Navy 3930, c/o FPO, San Francisco.
W6JIM/C3	APO 909, c/o PM, San Francisco.
ZC1AZ	RAF Amman, Transjordan
ZD2RGY	Nigeria Signal Squadron, Lagos, Nigeria.
ZD6AC	Fort Johnston, Nyasaland.
ZD9AA	Box 4887, Johannesburg (*Stn. on Tristan da Cunha*).

the operator, tells us that the station was on the top of Mount Carmel, but used only an 8-ft. rod as an aerial. He thinks all QSO's have been QSL'd, but if anyone was missed out they can contact him *via* BCM/QSL, London, W.C.1. VS2CH (ex-G2CQJ) reports, through G3JZ, that he has "burst his bonds" at last and has worked KA, ZS, VK, KH6, C6, AP, VU and KL7. All this with 2 watts ! He now operates on 14,036 kc, roughly 1230 to 1630 BST, and would love to get a G on his 2 watts. He says there are some beautiful 50-ft. bamboo poles in the jungle ; when they are dried you can lift them with one hand. (Yes, please !)

D2FV is another station now QRT. The ex-operator is in the position of having to send out loads of cards without even having a transmitter at present ! Anyone short of one from him should write to P. Mason, 90 Snakes Lane, Woodford Green, Essex. D2FV was always QRP, and worked to Portsmouth one Sunday through the 7 mc QRM with 1·1 watts. On another occasion he had a contact with G2OC, who was running 0·3 watts of 'phone !

G3CHN (Hull), whose Calls Heard lists from the s.s. *Francine Clore* appear elsewhere, tells us that his next trip will be to the Far East. He says it's a pity some of the boys don't sign more clearly on 'phone —a lot of them lost some nice DX reports that way.

VS9AL, operated by S/Ldr. E. A. Luckhurst, will shortly be on the air from Aden, where he is C.S.O. at HQ British Forces ; he is looking forward to many interesting G QSO's.

Commenting on our note here in the May issue about OK /1 calls, OK2EL (Brno) explains that the /1, /2 or /3 suffix simply means that the station is being operated away from home in either Bohemia, Moravia or Slovakia. OK2EL remarks that he got into trouble with his authorities, on the score of being " anti-democratic," for repeating over the air the warning we gave in the March issue of the *Magazine* about not sending cards to SV1 stations ; this note was, of course, inserted at the request of responsible people in Greece.

14 mc DX

And so to that stand-by of all the enthusiasts—the 14 mc band. ZD9AA has still been active on Tristan da Cunha, and giving, it seems, everyone except your Commentator a new country. G5GK (Burnley) has collected a lot of new countries (he hasn't long been on the band, having been an indomitable 7mc specialist for a very long time). As he says, the only things that are *really* DX now are those one hasn't worked.

Very early one morning recently, G3AGQ (Benson) was awaiting the arrival of a junior op. ; he decided to go on the air to keep himself from the traditional pacing up and down. So he put 6 watts on to a 7C5 and was amazed to work UA6, PY and some W's. As a sequel the J.O. arrived safely and was duly christened Howard Anthony Michael, or Ham for short. And Ham now has the spare corner in the caravan.

G8OJ (Manchester) has been working 14 mc CW and has collected UAØKFA, J3AAD, C1AN, PZ1FM, UH8AA,

ZD2RGY and some other choice pieces. GM3CSM (Glasgow) has heard the notorious AC4AK and also an AC4QA. 'CSM is rebuilding transmitter, receiver and aerials all at once, so hasn't worked very much DX. G8QX (Malvern) adds to his list with VO, Sardinia, CN, VQ2, M1A, KA1, C9, FA, FT4 and others; he is now well over the century on 'phone only.

G3AJP (Yarmouth) reports a fishy one in the guise of TA3FAS (QSL *via* ARRL) . . . G3BNE (Hampstead) has worked C7OK, CR7AG, VS7WN, UA1KEC, LX1PF—all new ones for him . . .

G3DO (Sutton Coldfield) still topping the 'Phone Only lists, has received his card from C8YR and hopes to get his WAZ Certificate shortly. Thirty-seven of his 40 cards were for 'phone operation. He has also claimed the new W.A.VE. Certificate, and turns out to be the first European to be awarded this one from Canada.

G2WW (Penzance) has been entirely on 14 mc with the exception of some frantic calls to MD4JG on 28. Best ones on 14 have been CT3MN ('phone), CP1AP, KZ5AK, UL7BS, ZD1AS, ZD2RGY, ZD3B and some VQ5's, VS6's and the like.

G2DFR (Newbury) writes for the first time and says he has had his first personal experience of Spivery. He raised VQ3HGE, who almost immediately became buried by W's calling him. 'DFR uses 24 watts to an 807 and is rock-bound on 14,090, but he has collected HP2X, C2KT, TA1C, CE3AG, VE8OM, FT4AN and a nice lot of others.

G8PL (London, N.W.3) has bagged UL7BS and UF6AB for two new post-war countries and is now busy looking for a UM8—and aren't we all? He also raised his "first-ever" VE6—VE6GD in Calgary.

G3BTU (Retford) sends in his first claim, and seems to have been doing himself proud. With 35 watts to an 807, on 'phone, he has worked HL1IB, PK4PQ, ZL4AO and fourteen VK's. He, too, has just received his card from C8YR—*and* it says 599! 'BTU tells us that HL1AB is "rockbound," with crystals every 5 kc throughout the band—which is one way of doing it.

G5FA (London, N.11) seems to have forsaken his old love, 7 mc, and is firmly established on 14. He has raised C6YZ, VE8OW, VO6X, VP9P and the usual W's, VK's and so on. He only wants Colorado and South Dakota for WAS. He uses a folded dipole 20 deg. E. of N., but has managed to raise South Americans nicely on it by altering the slope.

G2DZ (Daventry), whose letter arrived just too late for last month, has worked ZE2JN, ZD2RGY, C1AN, VS6AC, VS9GT, FE8AB. And he mentions a letter from C6HH saying that if anyone has not yet received his QSL, will they please write direct to P.O. Box 2, Nancheng, Shensi, China, and he will do his stuff—although the postage for foreign countries is 75,000 Chinese dollars!

G6QB (Bexhill) has put himself up a new aerial and worked a few new ones on it (yes, we're on the air sometimes!) They include VS9GT, LX1FR, UF6KAB, UJ8AE, KM6AH and several good morning QSO's with KH6IJ. A new UP was heard—to wit, UP2KBB; and a new phoney has just come up at the time of writing, signing CR1TPN. We don't know where or what he is, but he's *not* DX. Most of the time we're reading about other people's DX—or writing about it. One day we'll find that ZD9.

"Calls Heard by the XYL"

Miscellaneous Pieces

Speaking of ZD9AA—GW3ZV tells us that he looks for G's between 10 and 15 kc higher than his own frequency, which is 14,005. G8VB (Ealing) says that PI1L (PI one L) is the call of the Dutch Weather Ship *Cirrus*, outward bound from Holland to a position 47 deg. N., 17 deg. W. By now she will probably have been replaced by another ship. Some of the Dutch operators abroad will be using 7,200 kc

and 3,760 kc, with 'phone, and may work amateurs. QSL's *via* PAØMAS, B520, Oisterwyck, Holland. G8VB now has 41 States confirmed towards his 3·5 mc 'phone WAS—really very fine work. In his QSL collection for 80-metre operation, G8VB has six cards from W6 and a dozen from W7.

G2YL (Tadworth) kindly sent along the QTH of MD4JG in Somalia. He is Major J. R. Farr, ex-VU2JG, ex-G3CJG, ex-VQ4CJG, and at the time of writing was only active on 28 mc. The QTH appears in the list. 'YL says she always appreciates strictly honest reports, and so was delighted the other day when a helpful G told her " You sound as if you've got your head in a bucket and your mouth full of muffins ! " Is there an "M" code to cover that one ?

G3CLM (Lee-on-Solent) worked LF2Z and was told that his prefix indicated that it was issued to commercial undertakings for experimental work . . . G3AW (Oldham) is another of the legion who have received cards from UF6AA but have never worked him . . .

On the subject of Maritime Mobiles, we may have given the impression last month that the permission to transmit on amateur frequencies could be given by the Master of the Ship. G8AO, who is just such a person, says that the licensing of ship stations is controlled by the Telecommunications Department of the G.P.O., and that it is they who have to sanction amateur /MM operation. The Board of Trade interest on the radio side extends only to the safety of the ship and its personnel. G8AO himself has been trying to get permission to operate /MM, but, so far, with no satisfaction. As he says, had it been otherwise, he would have given himself permission years ago !

And just as we closed this, G3ACC (East Dulwich) comes up with a note to the effect that C6YZ now has his cards stamped "Zone 23" ! It's going to lead to trouble . . . !

Next Month

All scores, claims, complaints, news, suggestions and general observations for next month's Commentary should reach us by first post on July 15, please. Once more, it would be appreciated if you would send in your WAZ claims on a post-card and not buried in a letter—some of the latter are bound to be missed when making up the tables. So Good Hunting, and may the sunspots favour us. BCNU, and 73.

G CALLS HEARD OVERSEAS

14 mc

David Mitchell (ex-GW6AA) on board S.S. Athenic at positions stated.

Between Gibraltar and Canary Islands, and in the harbour of Las Palmas Canary Islands.

CW : EI4Q, G2AKM, 2AKQ, 2ATF, 2BLT, 2BWY, 2FNS, 2FVX, 2UK, 2WW, 3AKY, 3BAQ, 3BI, 3BIQ, 3BPP, 3BQR, 3BTU, 3CFK, 3CHY, 3CRF, 3CSE, 3DOK, 3QV, 3VO, 4NH, 5BB, 5JF, 5RZ, 6GD, 6GN, 6IC, 6NG, 6QN, 6UT, 8BB, 8GB, 8KP, 8RQ, GI3AXI, 4NU, 5UR, GM3COE, 3DHD, 3RL, 4JQ, GW3AAA. (*May* 31-*June* 2).

Between Canary Islands and position 100 miles South of Cape Verde Islands.

EI4B, 4Q, 5F, G2ASR, 2ATF, 2CXO, 2DPD, 2FDC, 3AKY, 3ATU, 3AWD, 3BDI, 3BAQ, 3BDQ, 3BIQ, 3BQR, 3BUU, 3BZB, 3CFK, 3CNK, 3CPM, 3CXD, 3CXJ, 3DAH, 3CDK, 3IQ, 3KF, 3MY, 3PR, 3VO, 4JZ, 5AQ, 5BS, 5JJ, 5GK, 5KG, 5OB, 6CO, 6DG, 6FO, 6IC, 6KU, 6KP, 6OY, 6QB, 6TY, 6UT, 6YQ, 8PP, 8QY, 8RQ, 8TK, 8UG, GI4NU, 5TK, 5UR, 6TK GM3AWW, 3DHD, GW3AAA, 3AHN. (*June* 3-5).

Near Ascension Island (South Atlantic)

EI9N, G2AAN, 2DK, 2FAW, 2FTS, 3AOG, 3AWD, 3BDS, 3BEK, 3BNE, 3GF, 3PR, 3RQ, 3SJ, 3YC, 4CM, 4JZ, 5VN, 6CL, 6HF, 6IC, 6KP, 6KS, 6XR, 6YQ, 8GB, 8UG, GC2FZC, GI6YM, GM2FHH, 3AHQ, 3ANO, 3WO, 5IR, GW3ALV, 5PH, 6OK. (*June* 8-9).

Between 500 and 1,500 miles S.S.E. of St. Helena (ZD7), South Atlantic.

EI3R, G2AJS, 2BAB, 2CCD, 2CNW, 2CUJ, 2DC, 2DOL, 2DTQ, 2DXJ, 2HBM, 2HFC, 2HFO, 2LK, 2OS, 2WW, 3AAE, 3ACC, 3AGF, 3AZL, 3BEK, 3BMM, 3BNE, 3BPT, 3BUN, 3CDK, 3CQX, 3CSU, 3DHR, 3DIV, 3FS, 3HZ, 3LM, 3MD, 3PR, 3PS, 3QQ, 3SM, 3SR, 3WL, 4AU, 4DH, 4GJ, 4HW, 4JZ, 4NB, 5AQ, 5BZ, 5CW, 5LY, 5RV, 5VN, 6CJ, 6DX, 6IC, 6KP, 6KS, 6KU, 6NM, 8FF, 8GB, 8KP, 8OA, 8OJ, 8PP, 8RQ, 8WF, GC2ASQ, GI2DHB, 5UR, 6YM, GM3AHQ, 3BJD, 3XB, 5SC, GW3AHN, 3ASW, 3CDH, 3ZV.

3·5 mc

G3CHN. S.S. Francine Clore.

Position : 48 North 37 West.

G2ABM, 2CG, 2FXK, 2JF, 2PC, 2SU, 3AXZ, 3BZK, 3CME/A, 3CZ/A, 3HBB, 3LM, 4KX, 5OH, 6BW, 8BB, GM2MP. (*May* 31).

7 mc

Position : 44 North 43 West.

G2HBQ, 2HIW, 3CUB, 3CYY, 3DOX, 3MN, 3NM, 4KP, 4RJ, 5CH, 8WK, 8WV, GC8MF, GI2BHB, 3CSK, 8GK, GM3RF. (*May* 30).

14 mc

Position approximately 150 miles north of Bermuda.

G2AMG, 2MF, 2PU, 3AUH, 3BFQ, 3GBX, 3CLN, 3DHU, 3DO, 3QV, 5JO, 5KO, 6BY, 6HP, 6ML, 8KZ, 8NY, GW4CZ. (*May* 26-27).

28 mc

G8AJ. (*May* 28).

7 mc

G3CDR in H.M.S. London, off south coast of Formosa.

D2IH, G2AO. (*June* 3, 1948).

"AT" or "Q" Code?

Comment by
C. EDINGTON SUTTON (G3ANQ)

Our contributor has had long experience as a commercial operator. His arguments will interest those who are taking sides in this particular matter.—Ed.

THE division of opinion on the AT Code is very significant; it expresses what one reads in these pages and hears on the air; that modern amateurs, many of whom are ex-Service, know little of the symbols or application of the Q Code.

They may also be unaware that the revised and shortened Allied procedure, introduced during the War, borrowed heavily from the best marine practice, for which the Q Code was originally devised.

So, when examining any new procedure, one must ask whether it is both original and essential. The AT Code, with one notable exception, discovers nothing new, though it does emphasise an important principle—that of shortening procedure to reduce interference.

But there is no need to create a fresh code for this purpose, of which 13 items are direct duplicates of existing Q signals, six of popular two-letter abbreviations, while all the rest, except ATE, can be and are done without.

On the other hand, there are no fewer than 50 Q signals, *plus* 24 two- and three-letter abbreviations framed to facilitate wireless working, which are of equal use to amateur and professional alike. Some are of direct use in experimental work, and many of the others, in these days of bad notes, fists, 'phone interference, VFO and netting, are of very pointed application on the amateur bands.

Their versatile use is one of the fine arts of operating, and when learnt at the key they stay in the mind as uncannily as they disappear when learnt otherwise. They can be abbreviated to *two*-letter symbols, if necessary, by signalling "SQC" for "Short Q Code", as one sends QSZ before sending double.

Analysing the Codes

The weaknesses of the AT Code, apart from redundancy, are its perpetuation of the oddities of amateur transmission, such as ATP, for which the signal "R" is the *exact* equivalent; its lack of provision for frequency change and other requirements of modern working; and its tendency to stereotype amateur traffic, which last is apparently sensed by its originator.

But the Q Code is also a language; it lives by its ancillaries, invented unofficially by operators through the years; they act as catalysts in its endless applications.

It is in this direction that G3XT has done Amateur Radio a valuable service, for his signal ATE institutes a means by which experimental work can be requested between stations, thus giving the real experimenter his right of way through DX and rag-chewing.

Signals, however, already exist for this purpose, RQ and BQ (often used at sea) one being a request and the other an assent; and, just as an "RQ on GBR" at sea is always courteously met by a "BQ" and the provision of press that has been missed, so an "RQE" from any amateur, in the sense that G3XT suggests, should draw "BQE" and friendly co-operation.

LIST OF "Q" SIGNALS & ABBREVIATIONS APPLICABLE TO AMATEUR WORKING

As listed in Air Ministry publication 1529, "The Q Code", price 1s., H.M. Stationery Office. See 1946 edition, reference MCAP. 1, (1st edition) which gives further useful "Q" signals.

Meanings are not shown here as they can easily be verified. Their amateur application is suggested alongside by the letters G for "General" and E for "Experimental."

QAP	DX	QRQ	G & E
QAR	DX	QRS	G
QAT	just the thing for the Spivs	QRT	G
		QRU	G
QBM	G	QRV	G
QBT	G	QRW	G
QCA	Net	QRX	G
QCB	Net	QRY	G & DX
QCM	E	QRZ	G & DX
QCP	E	QSA	G
QCT	G	QSB	G & E
QDH	G & Spivs	QSD	G
QDK	Net	QSK	G
QFX	E	QSL	G
QGD	E VHF	QSM	G
QGE	E VHF	QSO	G
QRA	G	QSP	G
QRB	G	QSU	G & Net
QRG	G & E	QSV	avoid (QRM)
QRH	G & E	QSW	G & Net
QRI	G & E	QSX	G DX Net
QRJ	G	QSY	G & Net
QRK	G	QSZ	avoid use
QRL	G	QTC	G Net
QRM	G	QTH	G
QRN	G	QTR	G
QRO	G	QTU	G club
QRP	G & E	QUA	G club

Also the abbreviations;

C, N, W, AA, AB, AL, BN, BQ, CL, CS, GA, MN, NW, OK, RO, TR, UA, WA, WB, CFM, NIL, REF, RPT, TFC.

Official UN Photograph

At the official opening of the United Nations Amateur Radio Club station K2UN. On right, George W. Bailey, W2KH, President of the International Amateur Radio Union and Executive Secretary of the American Institute of Radio Engineers, working the I who was the first DX operator to make contact with K2UN at the inaugural session on May 17

K2UN Comes on the Air

Brief Description of the United Nations Amateur Station, Lake Success

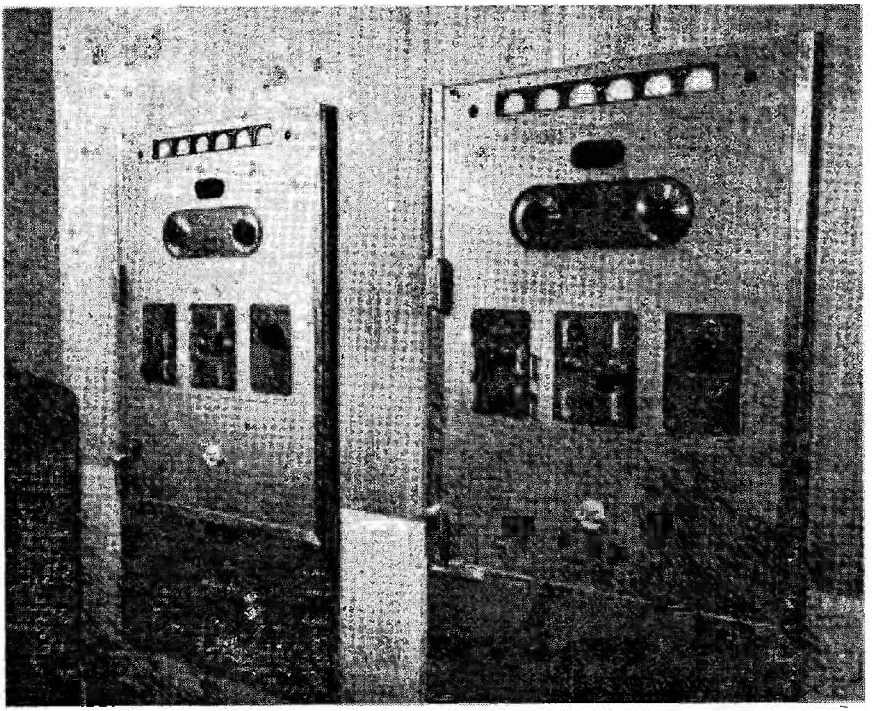
From Notes and Photographs by Our American Correspondent

PETER LOVELOCK (ex-G2AIS)

K2UN, the call letters of the new United Nations Amateur Radio Club's station, stand for "Come to the United Nations"—symbolic of the Club's aims, which are :

"—to preserve and foster the spirit of fellowship among the radio amateurs of the world—to promote international interest in the UN's role of building a better world, and to build prestige for the United Nations through friendly co-operation with radio amateurs everywhere—"

Already the club has enlisted some 50 Secretariat workers as keen and active members. They devote much of their spare time to operating the station under the supervision of a licensed amateur, and K2UN is on the air every evening.



Official United Nations Photograph

The exceptionally fine transmitting equipment at K2UN. At left, the 14- and 28-mc unit ; on right, the Tx for the 3·5 and 7 mc bands

Equipment

K2UN has been provided with two transmitters, each running the full 1,000 watts. One, operating on the 80- and 40-metre bands, and using doublet aerials, covers a large part of the United States from the transmission point at Lake Success. The other transmitter, with a rotary beam array and working on the 20- and 10-metre bands, is capable of putting a signal all over the world.

The large operating console is the last word in Amateur Radio technique, and is equipped with a panoramic adaptor, a great boon to an operator looking for as many QSO's as possible. It gives an indication of how many stations are on the air, and how strong they are, also an idea of the degree of local interference—all of which helps to locate other amateur stations wanting to work Lake Success.

Scope of Activities

K2UN follows strictly the traditions of Amateur Radio: contacts on an individual basis, man-to-man, station-to-station. *No propaganda transmissions are made*, but it is planned to answer individual questions on the United Nations. Another project is to arrange occasional talks between experts in various divisions of the UN Secretariat and radio amateurs who, in their daily lives, practice in similar fields. For instance, an expert from the Legal Department might talk to operators who are themselves lawyers ; a Food and Agriculture Organisation official may address farmers in New Zealand and Canada, and a World Health organisation specialist talk to doctors in Bombay or Brussels.

The United Nations amateurs have received every assistance from the International Amateur Radio Union, and K2UN is now well on the way to forging a new link between Lake Success and the wide world.

Exciter-Transmitter for 144 mc

Practical Design for Two Metres

By **M. D. MASON (G6VX)**

(This article will be of immense interest to those preparing for further excursions into the VHF regions. Designed by one of our foremost VHF technicians and himself a well-known 58 mc operator, his 2-metre transmitter is a very good example of modern amateur practice. It is economical to build and gives ample RF output either as a QRP transmitter or a driver for a higher power final amplifier. An article describing a suitable 144 mc PA, using an 829B, is in preparation.—Ed.)

THIS transmitter has been designed for several possible uses. First, as a portable unit of economical power consumption but a useful output, capable of working under 100 per cent. modulation conditions without the slightest fear of over-running the miniature valves. Secondly, it will make a very useful driver for a higher power stage such as the 829B. Thirdly, there is enough power available to drive a suitable tripler stage to give crystal control working in the 420-460 mc band.

The type EL91 pentode is a useful valve for the multiplier stages from 6, 8, 9 or 12 mc crystals to 144 mc. The output from the last EL91 as a doubler or tripler is of the order of two watts. This is ample to drive a pair of 6C4's in push-pull under Class-C conditions, operating with an input of 15 watts.

Two EL91's as a P/P amplifier will give the same output as the 6C4's, but they still need screening and neutralising which makes them difficult to handle. It seemed better design to stabilise the transmitter as a whole by splitting the pentode stages by a neutralised triode section, as a line of pentodes all on the same frequency might lead to overall instability, particularly under modulation conditions.

The oscillator circuit selected has been used very many times in the past and is suitable for HF crystals where it is desired to take out harmonics, up to the fourth. The only precautions to observe are short leads around the crystal socket and cathode wiring. Regeneration is controlled by C2, which should be increased if the circuit tends to oscillate without a crystal.

Should the RF excitation fail, the doubler and tripler stages have sufficient cathode bias to limit the plate current to the same value as when these valves are working as normal Class-A amplifiers. If desired, the 6C4's could also be protected by giving them some cathode bias by means of a 200-ohm 1-watt resistor. The bias resistor R10 should be reduced to 1,000 ohms if cathode or battery bias is used.

Circuit Considerations

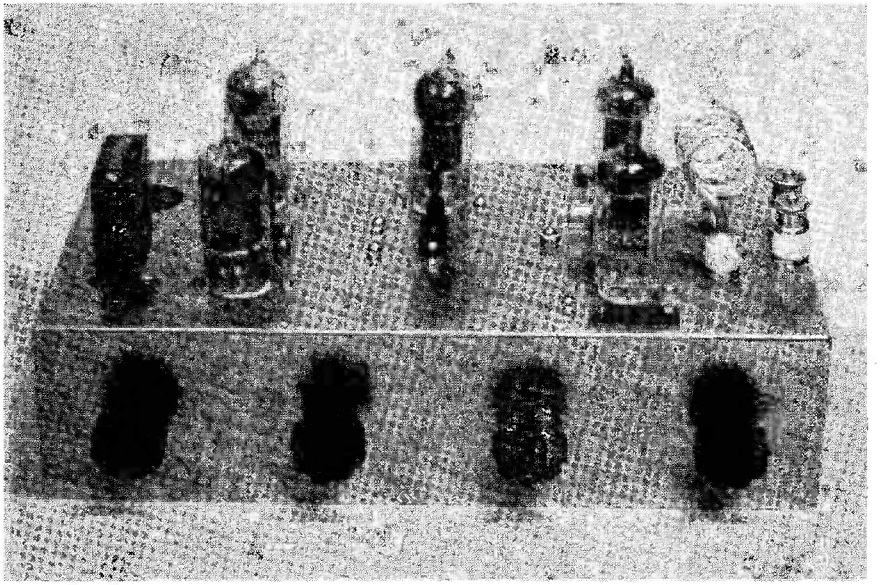
At no time does the transmitter touch the 48 mc band during multiplication from the crystal frequency to 144 mc. The combinations used are as follows :—

6 mc Xtal.	Osc. tank tuned to 24 mc. First multiplier tank tuned to 72 mc. Second multiplier tank tuned to 144 mc.
8 mc Xtal.	Osc. tank tuned to 24 mc. 2nd tank tuned to 72 mc. 3rd tank tuned to 144 mc.
9 mc Xtal.	Osc. tank tuned to 36 mc. 2nd tank tuned to 72 mc. 3rd tank tuned to 144 mc.
12 mc Xtal.	Osc. tuned to 24 or 36 mc. 2nd tank tuned to 72 mc. 3rd tank tuned to 144 mc.

The 6 mc crystal must be as good as the higher frequency ones.

The oscillator coil has been tapped down so that the 30-$\mu\mu$F condenser would cover 24 and 36 mc with the one coil. The second stage is also tapped to provide some additional selectivity against the 48 mc component which will be present in the oscillator stage and passed on *via* C7.

The last EL91 uses the well-tried series-tuned anode circuit to give a respectable sized coil at 144 mc, and to provide a convenient means of feeding a perfectly-balanced voltage to the grids of the push-pull final output stage. L3 has, in practice, more inductance than L2. This system gives a very good transfer of power from the EL91 anode to the push-pull 6C4 grids. L4 and L5 were purposely split so that the coupling to each grid could be varied for equal drive.



G6VX's driver unit for the 2-metre transmitter. The valve sequence is EL91-EL91-EL91-P/P 6C4's and either 6, 8, 9 or 12 mc crystals can be used. There is ample drive at 144 mc for an 829 PA.

The balance of L3 may be checked by comparing the brilliance of a small neon when first the anode of V3 and then the stator plates of C15 are touched. The centre of the coil should be absolutely dead at RF. The correct setting of C15 is when it equals the anode *plus* wiring capacity of V3. Another check for equal drive is, of course, to open up each cathode of the 6C4's and read the separate grid currents.

Several different types of output tank coils were tested, including lines, but the difference in efficiency was so small between the best tried, that the present one was chosen because of the convenient physical layout. This output coil passes through the chassis *via* frequentite bushes.

The aerial coupling will depend upon the type of feeder on hand. One turn is sufficient to couple *via* a piece of 80-ohm cable to the grid of the 829 amplifier.

Incidentally, the output from the EL91 on 144 mc will very easily over-drive an 832 operating as a straight amplifier. This information is offered for those who would like to build up a very useful transmitter on 144 mc using an 832 as the final amplifier.

Coil Construction

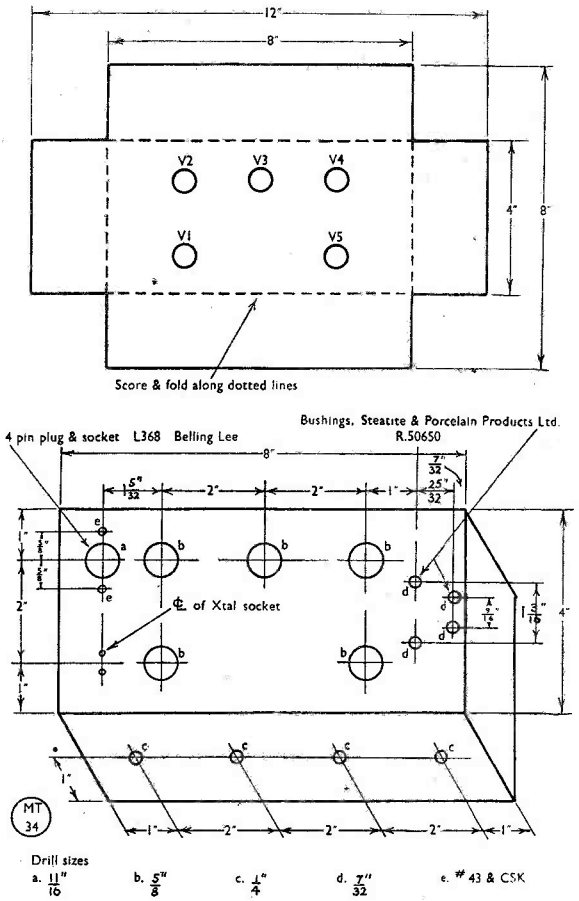
All coils are self-supporting and are soldered directly on to their respective condensers. The diameters are fixed by winding all coils on $\frac{1}{2}$-in. O/D former, which, of course, is removed.

L1	9 Turns 16-gauge enamel, close-wound except for the three last turns from the anode end. This spacing affords easy tapping at the 2nd turn. Coil length $\frac{2}{4}$ in.
L2	6 Turns 16-gauge enamel, spacing between turns equal to wire size. Tapped at two turns from anode end. Coil length $\frac{3}{4}$ in.
L3	6 Turns 16-gauge enamel, close wound. Centre-tapped by soldering on a short length of 26-gauge wire. Coil length $\frac{1}{4}$ in.
L4/L5	Two separate coils, but wound from one piece of 16-gauge enamel wire. Each section has three turns close-wound and the inside edge of each coil is separated by $\frac{7}{8}$ in.
L6	4 Turns of in. silver plated copper tubing. $\frac{1}{8}$ in. spacing between turns.

Adjustments

Provided the specified inductance and capacity values are adhered to fairly closely, there should be no trouble in selecting the right harmonics. Metering points are provided for the oscillator and multipliers, but these are not used once the job has been checked for correct operation. The only ones used are the grid and plate meters for the 6C4's. The multipliers are tuned for maximum grid drive to the

P/P stage. With 300 volts, the grid drive will be between 15 and 20 mA, and the 6C4 will draw 150 mA plate current off-tune and dip to around 20 mA unloaded. For Class-C operation of the 6C4's, 10 mA of grid current is sufficient. This may be adjusted by reducing the HT supply to the multipliers and oscillator. The final stage should not be run at over 300 volts HT and 50 mA plate current. This condition will give an output of 8 watts. With an HT supply of 250 volts and the 6C4's drawing 40 mA, an 829 can be driven to 20 mA of grid current through a 3,500 ohm bias resistor.



Detail of chassis for the 144 mc transmitter; some useful hints on chassis construction generally are given in the text.

Components

All condensers should be as small as possible consistent with working voltages required. The bypass condensers are mica, and all tuning condensers have ceramic insulation.

C6 is a Cyldon Type 184/30.

C11 is the same as C6 but double-spaced. Four rotors and four stators.

C15 is the same as C11.

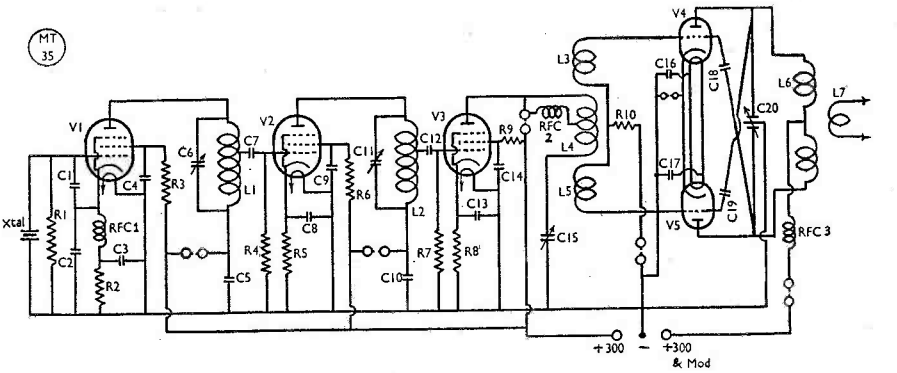
C20 was made from two C6 type condensers joined back to back, but only four rotors and three stators were used in each section. All the condensers have had a piece of brass tubing sweated on the adjustment end so that a flexible insulated coupling, or insulating shaft, can be fitted.

These condensers were chosen because of their small dimensions and low inductance, but there are several types on the surplus market that would do equally well. As a matter of fact, all the driver stages could be tuned with midget Mullard 3-30 $\mu\mu$F trimmers, because it is not anticipated that there will be much dodging around in frequency on 144 mc.

The neutralising condensers can be any small trimmer with a minimum capacity of 2 $\mu\mu$F or less. Two round plates three-quarters of an inch diameter and separated by three thirty-seconds of an inch were used in this transmitter. A quarter-inch hole was drilled through the centre so that the plates could be mounted on a quarter-inch ceramic rod, and the whole assembly supported by its own wiring. The neutralising condenser plates are finally set at their correct value by applying a small amount of Denfix.

Chassis Construction

A suitable chassis can be constructed from aluminium, copper, or brass. Copper or brass is preferred when a limited number of tools are available, such as a pair of tin-



Circuit of the 144 mc Exciter-Transmitter for 144 mc, designed by G6VX. The grids of the output valves are inductively coupled to the preceding drive stage. Either EL91's or 6C4's neutralised can be used in the final position. Bridged terminals are metering points.

Operating Voltages and Currents

EL 91 Oscillator with 8 mc Xtal.

RF Xtal	15 mA
Anode	12 mA
HT volts	300
G2 volts	200

2nd EL91 Doubler

Grid	2·4 mA
Anode	22 mA
HT volts	300
G2 volts	180

1st EL91 Tripler or Doubler

Grid	2·4 mA
Anode	19 mA
HT volts	300
G2 volts	175

6C4's (Both Valves)

HT volts	300
Loaded	50 mA
Grid	10 to 15 mA
Output	8 watts

Total LT drain 6 volts at ·9 amps. HT 300 volts at 120 mA Loaded.

Table of Values

Exciter-Driver for 144 mc

C1	= 30 $\mu\mu$F
C2	= 40 $\mu\mu$F
C3, C8	= ·01 μF
C4, C5, C9, C10, C13, C14	= ·001 μF
C7, C12, C16, C17	= 100 $\mu\mu$F
C6	= 5-30 $\mu\mu$F
C11, C15	= 2-8 $\mu\mu$F
C18, C19	= 1-3 $\mu\mu$F
C20	= 2-8 $\mu\mu$F per section
R1, R4, R7	= 50,000 ohms, ½-watt
R2	= 180 ohms, ½-watt
R3, R6, R9	= 30,000 ohms, 1-watt
R5, R8	= 700 ohms, ½-watt
R10	= 3,300 ohms 1-watt
RFC1	= 1·5 mH
RFC2	= 80 turns, 38 SWG SC, ¼-in. diam rod former
RFC3	= 40 turns, 26 SWG SC, ¼-in. diam rod former
V1, V2, V3	= EL91, B7G base
V4, V5	= 6C4, B7G base

Valve Connections : 6C4. Pin 1, plate ; 2, connected internally ; 3, 4, heater ; 5, plate ; 6, grid ; 7, cathode. EL91. 1, grid ; 2, cathode and G3 ; 3, 4, heater ; 5, plate ; 6, blank ; 7, screen grid. *Note* : On 6C4, strap pins 1 and 5 and ground pin 2.

smith's shears, a square and a large soldering iron. Brass or copper chassis may be silver-plated for good appearance by a simple home method.

The chassis size is 8 in. × 4 in. × 2 in. deep ; 22-gauge brass was used, and finished with a scratch brush before plating.

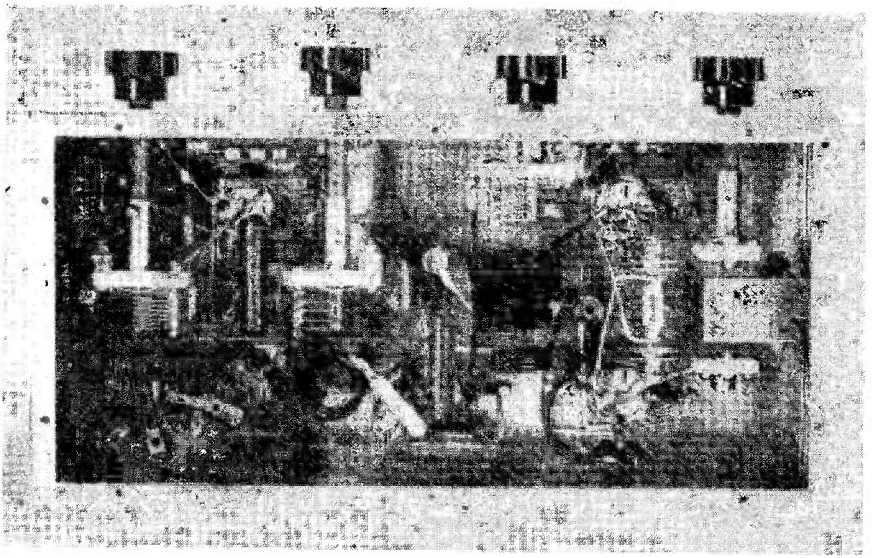
The metal can easily be folded by scouring along the marking-out lines with some sharp instrument. A three-cornered file that has had the end ground flat is very convenient for this job. The metal is scoured about half-way through so that when it is folded it will follow the line and give a nice sharp fold. The ends can be butt jointed and a very neat joint made by first of all cutting a piece of 16-gauge wire and laying it on the inside of the joint. The whole lot is then sweated together on the inside so that the corner is filled with solder and the surplus cleaned off the outside edge.

A piece of ¼ × ¼-in. angle may be sweated along the inside bottom edge to give stiffness to the chassis and a fixing for a cover plate if required.

Silvering Solution

This method of silver-plating works well on copper or brass, particularly if the metal has a highly polished finish.

The best way to get the solution is to



Under the 144 mc exciter unit ; the chassis size is 8 in. × 4 in. × 2 in. Note the coupling into the grids of the output end.

have it made up by your local chemist from the following prescription :

Solution (Rubbing Process) :

2 oz. Silver Nitrate in 10 oz. water.
When dissolved add Sodium Chloride to precipitate
Wash precipitate well.
Dissolve precipitate in 2 oz. Potassium Cyanide and 20 oz. water.
Add 2 oz. pure whiting.
Shake well before use.

Application :

The metal must be thoroughly free from grease and untarnished. Apply a little of the solution on a soft rag and rub the metal all over, adding solution as required to give an even finish. The coating is very thin and will not stand a lot of wear, but it can be protected by a coating of clear lacquer and will last for years, keeping its bright appearance.

The same solution can be used for electro-plating. Connect the job to the negative and a piece of silver to the positive ; 1-2 volts is sufficient.

Precaution. Handle the solution with care as it is poisonous and can make the hands very sore if one has any cuts on a tender skin. It is advisable to wear a pair of rubber gloves if a large amount of silvering is being done. Use plenty of water to wash off all trace of solution from finished job and wipe up any spilt liquid. Burn the rag when finished. Hot soapy water seems the best for cleaning off.

Note : Should it be necessary to solder to a silvered coil the heat of the iron will burn off the silver around a small area, but this can quite easily be re-silvered by a small application to the affected part.

Keying

Several methods of keying might be used, with different advantages for each.

For portable working it would be most economical to key the total HT feed line to all stages of the transmitter. Keying in the HT line of the PA is adaptable or blocked grid keying is possible. The method used in the first place was in the cathodes of the 6C4's, in conjunction with a key-click filter. However, this method requires a separate 6-volt heater supply for the 6C4's as it is a bad practice to place a large voltage between heater and cathode in these miniature valves.

A suitable key-click filter can be made from a one-henry LF choke in series with the key and the cathodes of the 6C4's. The key contacts should be by-passed with 600 ohms in series with a 1 μF condenser. 1,000 turns of 38-SWG enamel wire wound on a midget speaker transformer core will be about right. Core size should not be smaller than $\frac{1}{2}$ in. by $\frac{1}{2}$-in. cross sectional area.

The meter check positions were made by cutting up an old octal valve base in such a way that two of the pins were always left joined together. This made the plugs. The female section had to be constructed from the small resilient clips removed from a Clix ceramic valve socket. These clips were re-mounted on a piece of $\frac{1}{16}$-in. paxolin 1 in. long by $\frac{3}{8}$ in. wide.

2,300 Megacycles —First Results

G8IH/G3CBN Communicate on 13-cm 'Phone

By L. GRIMSHAW (G3CBN)

Working in the W5 district of London, G3CBN and G8IH effected two-way contact on 13 cm (2,300 mc band) on June 6 over a distance of two miles. So far as we are aware, this is the first amateur QSO on our highest-frequency band, and readers will join us in wishing these two intrepid explorers good fortune in their further investigations at these frequencies.—Ed.

EXPERIMENTS were undertaken towards the end of June, 1947, mainly directed at evolving a suitable oscillator for working on the band 2,300-2,450 mc. After much machine work and "plumbing" a co-axial cavity oscillator, using a type CV90 disc-seal triode, was found to give the best results; this valve provided a good, usable RF output with quite low heater and HT consumption—a very important point, as it was realised that at least one station should be easily portable in order that range tests could be made from whatever tall buildings to which we could gain access.

The first receiver used was a superhet with 800 mc local oscillator and crystal mixer. But this was found to be too cumbersome and had a very poor signal-to-noise ratio due to the difficulty of obtaining sufficient third harmonic output from the RL18 oscillator, and therefore very low crystal current. This receiver was scrapped in favour of a super-regenerative type, which proved to be far more sensitive and much less complicated; the possibility of interference being caused by quench radiation is very remote, since the 2,300 mc band is not very densely populated as yet!

Transceiver Used

The present CV90 oscillator is built round the rhumbatron of a surplus 10 cm reflex klystron (Sutton tube) which provides a ready-made cavity of nearly correct dimensions together with the convenience of the tuning plugs already fitted. Brass end-plates were provided to carry the grid-cathode/cathode-heater concentric lecher tubes. The 10-cm cavity works on 13 cm by virtue of the extra capacity loading imposed by the very close-spaced electrode structure of the CV90 and similar triodes.

We have found, experimentally, that with this valve oscillation up to 3,500 mc could be produced without much difficulty, and this seems to indicate that the CV90 should give no trouble running at 2,400 mc, provided that the maker's recommended input of 10 watts is not exceeded.

Working at this input (10 watts) an output of 400 to 500 milliwatts RF can be expected.

Construction of the two transceivers used in the recent 2-mile QSO was greatly facilitated by the purchase of two ex-R.A.F. Test Sets Type 216, which very conveniently house the transceiver and provide a parabolic reflector which gives much better gain than the old bowl fires and bent sheets of metal previously employed!

Setting up G8IH/P on 2350 mc at Hamwell for the first two-way contact on that band. G3CBN was at the other end.

DATA ON SERVICE EQUIPMENT

For those obtaining ex-RAF apparatus for which no details are available, it is always worth writing to the Air Publications & Forms Store, R.A.F. Kidbrooke, London, S.E.3, to enquire whether the relevant Service publication is still in print. A charge is made for all such manuals supplied to the public.

The demand for data on some of the more popular items has been so great, however, that you may be disappointed.

THE VHF BANDS

By **E. J. Williams, B.Sc. (G2XC)**

New GDX Record, G3BLP/GM3OL, 296 miles— Excellent Spor-E Conditions— Individual Reports— European Activity Summary—

A COMBINATION of excellent tropospheric and sporadic-E conditions as well as a high level of activity has produced the most exciting month yet. Undoubtedly, the outstanding event has been the establishing of a new GDX record. On June 13, G3BLP (Selsdon) and GM3OL (Dumfries) made contact at 2125 GMT. The distance is 296·41 miles. Following this, GM3OL worked G6VX (Hayes, Kent) which created a pretty problem as the distances are so nearly the same. We should have had to call it a tie if it had been left to us, but G6VX procured some large-scale maps and working to a high degree of accuracy, with the assistance of G6HX has decided to his own and to our satisfaction that G3BLP has the record by 155·7 *yards!*

The method they used is described elsewhere in this issue of the *Magazine*, in an article by G6HX entitled "Calculating GDX Distances." For the future this method will be adopted as our standard for determining all GDX distances; so we would be glad if those who are interested in working GDX would let us have their own National Grid reference when next writing in. This can be obtained from the Ordnance Survey sheet for the locality —ask for the One-Inch New Popular Edition.

The story of these splendid contacts is worth telling. It began on June 9 when G3BLP worked G3BW (Whitehaven) for the first time. After another QSO on June 11 both G3BLP and G6VX heard GM3OL. This news was passed to G3BW who telephoned Dumfries and arranged a schedule for the Sunday between G6VX and GM3OL. GM3OL broke through, as hoped, but G6VX was unable to call him due to TVI. He accordingly telephoned G3BLP who came up straight away and heard GM3OL working G5BM and then G2BTX; G3BLP finally raised GM3OL at 2125 GMT; G6VX followed. Signals were RST569 with occasional short bursts, probably due to meteors, to S8/9.

The congratulations of us all go to both GM3OL and G3BLP, and at the same time the fine sporting action of G3BW and G6VX should be mentioned in helping to make this record possible. Theirs is the real spirit of Amateur Radio, and we are glad to pay public tribute to their fine example, in these days when so many regrettable things happen on our bands.

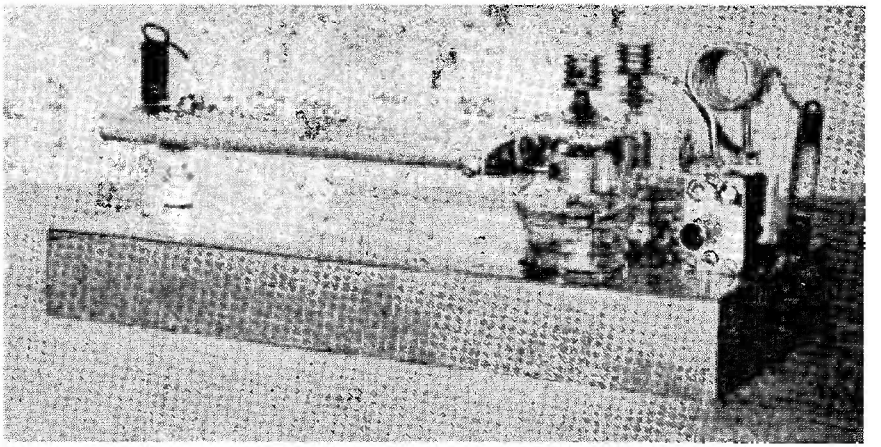
For the benefit of newcomers to five metres it should be mentioned that the previous GDX record of 285 miles was set up between G5BY (Bolt Tail) and G5GX (North Ferriby) on June 1, 1947, at 2120 GMT.

While on the subject of records, may we put forward a little claim for G2XC? Although obviously not GDX, G2XC may have achieved a tropospheric record by working PAØWL in Hoogezand, North Holland, on June 9 at 2225 GMT. The distance is 370 miles, and we are sure it was not a spor-E contact. Signals were audible

Tropospheric DX Contacts

Over 200 Miles Only

CONTACT	DISTANCE
June 9	
G5MR/PAØUHF	255
G5MR/PAØOKK	250
G5MR/PAØZQ	250
G4AP/PAØZQ	270
G2XC/PAØWL	370
G3BW/G3BLP	265
(*Repeated on June* 11, 12 *and* 13).	
June 13	
G5BM/GM3OL	225
G3BLP/GM3OL	296
G6VX/GM3OL	296
G2ADR/G2XC	215
G3ALD/G2XC	205
G6OS/G2XC	205
G5MA/G3BW	260
The following are undated:	
G2AJ/G3BW	245
G2AOK/A/GM3OL	225
G5WP/G3BW	250



A tripler stage for getting from 144 to 440 mc. Designed by G6VX, Hayes, Kent, the unit employs 15E's run at 600 volts on the plate and an input of 40 watts. The plate lines are ¼-wave, using ⅝-in. tubing spaced ⅞-in. The split stator grid condenser is 6 $\mu\mu$F per section, across a 6-turn coil ½-in. in diameter. Esimated RF output at 440 mc is 10-15 watts.

at that time from all parts of PA and ON and were remarkably consistent throughout the evening. At the same time GDX conditions were excellent. It was on this occasion that G3BLP first worked G3BW. Hence all the evidence is for tropospheric propagation. Presumably, an extra large and extensive duct formed over the North Sea. Signals were 599 on CW and S8 'phone throughout a 30-minute contact.

These and other tropospheric QSO's exceeding 200 miles we have listed in these pages. As it is proposed to do the same thing in coming months we would be glad if readers would let us have details of all such contacts.

Spor-E

While the GDX was providing its thrills spor-E also had a look in, the peak dates being June 4 and 5. On the former date, openings appear to have existed most of the day and signals were heard from F, FA, I, HB, LA, OK, OZ and SM. There are indications that the evening opening was separate from that earlier in the day and the experience of G5BY, which checks with other logs received, is worthy of particular note.

G5BY points out: "With so many European stations regularly active on the 58 mc band, it becomes possible to check the behaviour of the Sporadic-E clouds of high ionization, which are responsible for the return of these VHF frequencies to earth.

Results on June 4, 1948, provided the most perfect example of the formation and movement of a mass of this kind across Europe which has occurred to date. Starting at 1800 BST with strong Swedish signals (after several hours' build-up resulting in numerous Danish signals on 28 mc), increase in the density of ionization soon brought in Danish stations. By about 1850 BST Czechoslovakians were coming in best from a N.E. direction—well off the great circle path. At 1930 BST Scandinavian signals weakened and dropped out and by 1945 BST the Czechs were arriving by the correct route. This at once brought in Swiss stations followed at about 2010 BST by the Italians. F8YZ was then heard and best signals were obtained from the Czech direction—well off the route. From 2040 BST onwards, French stations started coming in from the correct direction, Czech signals vanished and by 2115 BST only the French stations were audible. F3JB continued to come in—the sole signal on the band—until about 2300 BST.

June 10 saw this North-South cycle repeated on a lesser scale. Czech stations came in first at about 2015 BST, followed at 2030 BST by Italian, Swiss and French stations. This time the tendency was for both Czech and Italian signals to beam more south than normal, indicating that the ionized mass was south of the direct route. From 2100 to 2130 BST FA8IH put through an excellent steady signal, in con-

SUMMARY OF EUROPEAN ACTIVITY AND RESULTS

May 20-June 15

All times given are GMT. All stations on 58·5-60 mc unless otherwise stated

May 20

G2ADZ heard F9BG, OK2MV, ON4AK (2230-2300). G5BD heard I1XW, F9AQ, 9BG.

May 25

G2CIW heard F3JB, 9AQ, 9BG, I1DB, 1XW (1145-1230). G2XC worked I1SS, 1XW (1900-1930). G2ADZ heard I1RN, and F9AQ (1930-2015). G4RO heard F and I (1920-2315). G8GX worked F9AQ and heard I (1900-2100). G2ADR worked I1DA, 1XW and heard F (1913-2042). G5YV worked F3JB and I1DA. G5BD heard F8MG and FA8IH on 50 mc.

May 26

G5BD heard FA8BG and 8IH on 50 mc.

June 3

G2ADZ and G4LX worked, and G4RO heard, F9BG (1800-1830). G2ADR worked I1XW. G5YV worked F9BG and I1XW. G3KX/A heard I1JG.

June 4

Spor-E opening which appears to have been in existence most, if not all, of the day. G5BD found band open at 0645 and worked I1UE, F3JB at 1100. G2CIW worked F3JB, HB9BZ, I1UE (1140-1230). G4RO worked F3JB, 9BN (1156-1233). G3KX/A worked F9BN and heard I (1300-1450). G2ADR worked F9BN, I1ANJ, 1DA, 1FA (1355-1500). G5BD heard over 50 signals from F, FA, HB, I, OK (1700-2100). G5BY worked SM5VL, OZ7G, SM5SI, SM5MN, OZ3EP, OK1FF, OK3ID, HB9HO, F8YZ, HB9BZ, I1ARD, HB9AT, I1AV, F9BQ in that order (1700-2030) and heard many others. G3BLP heard 4 SM, 4 OK, 1 HB and 16 I stations. G4RO worked OK2MV, 3ID and heard SM (1720-1900), and heard I (2000-2030). G2ADR worked OK2MV, I1XJ, F9BQ, I1ARD (1749-2108). G2ADZ worked I1AAW, 1XW, OK1FF, 2MV, 3ID, and heard LA1F and F, HB, OK, PA, SM (1720-2130). G2HDY heard F, I, OK, PA, SM (1915-2145). GM3OL worked F9BQ, HB9AT, I1ANJ, 1ANK, IXD (2000-2100). G3ABA worked F9BQ, I1FA, 1RN, 1XW, OK1FF. G5YV worked F3JB, 3DN, OK1FF, 2MV, 3ID, I1ALH, 1FA, 1PD, HB9BW and heard FA8IH and others. G4LU worked I (2030). G4LX heard F, I, LA, SM, OK, HB (1220-2205). G8GX worked I1ABR, 1SS. G3PZ worked OK2MV and I1SS.

June 5

G8KL worked I, F (0700-0800), G4RO worked I1DA (0818). G2ADZ worked F3JB, 9AQ, I1ANJ, 1DA (1030-1100 and 1815-2030). G3AAT/A worked SM5VL (1100). GM3OL worked F9BQ, I1DA, G5GX worked I1GY. G5MR worked F9BQ. G3BUR/A heard FA, F. G5MA worked F, I. G2ADR worked FA8IH, F9BQ (1623-1905). G5YV worked F9BN, 9BQ, I1ANJ, 1FA, OK3ID.

June 6

G2XC worked SM5SI, 5VL (0745-0845). and OK3ID (1215). G5YV heard I1DA.

June 7

FA8BG and/or FA8IH worked by G3APY, 5BD, 6YU and heard by G2ADR, 2ADZ, 2CIW, 3PZ, 4LU, 5MR, 5YV and 6DT (1915-2000).

June 8

G5BD worked FA8IH.

June 9

G5BM heard F3JB, 9BQ, HB9HO, I1ANJ, I1SS. G3APY worked F8CT, I1FA. Excellent tropospheric conditions to PA. G5MR worked PAØUHF, ZQ, OKK (1930-2130). G4RO worked PAØAD and heard PAØJW, OKK, WL, WO, ZQ, ON5G (1830-2300). G8TS worked PAØWO. G2XC worked PAØWL (373 miles, 2225-2300) and heard PAØPAX. G2CIW worked PAØOKK.

June 10

G4RO heard ON5G (0700). G5MR worked OK2MV (1918). G5YV heard F, FA. G3ABA heard F, I. G2ADZ worked F8CT, 9BQ and heard other F, I signals (2000-2130). G3KX/A worked F9BN, 9BQ and heard I. G5BY worked OK1FF, HB9CJ, FA8IH, F3DN, 8KS and heard others (1930-2115). GM3OL worked F3JB, 8CT, 8DI, 8KS, 8QE, 9EX, 9QE, I1DA. G4LU worked F9BQ.

June 11

G5YV heard FA8IH.

June 12

G5BY found band open to I from 2150 to 2300 but no amateurs. G4LU and 5BD heard ON4AP. G5YV worked FA3JY.

June 13

G5BD worked FA3JY, 8IH (1030). G2ADR, 3DA and 3KX/A heard FA8IH (1100-1130). G4LX heard F (1910). G5MR and 8JB heard I1GY (1700).

June 15

G5YV heard F9BG, I1AAW, 1XW.

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trast to the extremely unstable character of the others. By now the Czech signals had gone, and by 2200 BST most of the Italians had followed suit, leaving F8KS and F3DN the only readable signals for the last fifteen minutes, before the band finally closed. It will be most interesting to observe if future openings conform to this pattern, which was also noticed at G5BY during many of the 1946 and 1947 sessions but was much harder to plot, due to the lack of 58 mc transmissions from the Continent."

We can corroborate all G5BY's observations, as similar occurrences have been noticed in the past on both 28 and 58 mc.

UHF

Other news this month includes the first report of a contact on 2350 mc. Briefly, this was made between G8IH and G3CBN (Ealing) on June 6, using transceivers, consisting of a home-built disc-seal triode oscillator and a 6V6 quench osc/mod. The aerial was ½-wave radiator with parabolic reflector. Reports exchanged

were R5, S8. Further details of this outstanding achievement are given elsewhere in these pages, but we should be glad if anyone with a prior claim would let us have it. A few operators are known to have equipment for 13 cms but this is the first actual contact reported to us.

144 and 420 mc

Many letters are received asking for more details of 144 mc and 420 mc gear. With the space at its disposal the *Magazine* is endeavouring to provide such information (*see* this issue) and several constructional articles have already appeared, while others are on the way. This column is itself essentially a *news* feature and so we can only give you items for the new bands as we receive them from readers—so do please send along your ideas for 2-metre and 70-cm equipment.

G3BBA (Towcester) has been doing considerable experimenting. On 144 he has tried FM or CW drive from the station exciter to a strapped and cathode-driven RK34, to a similar RK34 in the final, using series-tuning for the anode tank; but a difficulty was encountered in finding a sufficiently "cold" point in the tank to prevent excessive capacity transfer of RF to the feeder pick-up coil. This resulted in unbalance. So he has decided to use an 832 instead, possibly with lines instead of coils.

The 144 Rx is at present 2-EC52 GGT RF-EC52, FC-EC52 variable osc. link-coupled to grid of FC. The output feeds into a 3·2 mc CC amplifier. A future modification will be to raise the IF to 10 or 15 mc.

On 420 mc, G3BBA has 2 S.T.C. disc-seal triodes in a GGT P/P self-excited oscillator. These valves will take 15 watts per pair quite easily, giving 3 or 4 watts of RF, but it is hoped to drive this stage from the station exciter through doublers and treblers, although neutralizing difficulties are anticipated.

Others ready or preparing for 144 mc include G2HDY—832 PA and 4 ele. beam; G2DBF, Tx ready using 815; G8GX, concentric line convertor; G8SM, straight superhet, 6AK5 mixer, 954 oscillator on 2nd harmonic, into 5 mc IF using EF54.

Comment

Several readers have recently bemoaned the very poor quality notes emanating from certain stations. Some of these have been on the band for a long time and their owners must be well aware of their T6/7 characteristic. It is also rather regrettable that in more than one case the operator is well known for his VHF activities and should realise that good T9 notes are obtainable! At the same time, many of the ex-RAF convertors make *all* notes at least T7 and as a result the operator tends to give everyone T9 just in case!

VHF CENTURY CLUB

NEW FULL MEMBERS

G5RP	E. Wake (Abingdon)
G2NH	E. Dedman (New Malden)
G2MV	S. Martingell (Kenley)
G3BLP	J. Haydon (Selsdon)
G4IG	R. Brett (London, S.E.26.)

ADDITIONAL ASSOCIATE MEMBERS

(Pending receipt of 100 QSL cards)

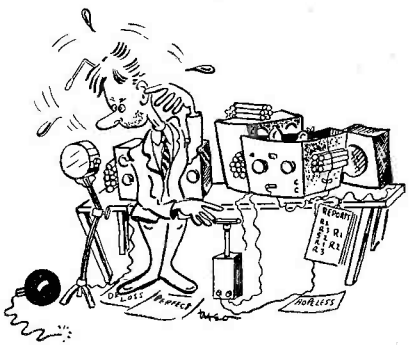
G5YV	H. Beaumont (Leeds)
G6MN	E. Martin (Worksop)
G3ABA	L. J. Kennard (Coventry)
G6HD	T. L. Herdman (Beckenham)
G5UM	J. Hum (Knebworth)
G3IS	N. W. White (Rugby)

Station News In Brief

This month's mail has been colossal and by far the heaviest yet received. So we can only give very brief individual station reports.

The G Two's

G2ADR (York) has a 4-ele. w.s.r.b. His Rx is 6J6 cathode-coupled pre-amp to a much modified RF 27 to ECR. He found MAWE 4 enjoyable and enters the



"... Will now carry out my final test, OM..."

Counties table. G2AOK/A (Stow-on-the-Wold) using a Type 27 into BC-312, battery operated, has worked GM3OL. G2AUA (Wellingborough) has a 4-ele. c.s. ready for test and hopes it will work north. G2BRR (Woodford) uses an RF 26 and has a Tx with VFO and 807 PA feeding a long-wire Windom. G2CIW (Brentwood), still another to install a 4-ele., has heard G3BW and found MAWE 4 excellent, particularly during daylight. G2DBF, Bournemouth (whom we really must work one day !), is using an 815 PA in place of the original HK24. G2HDY (Roehampton) enquires whether anyone else has worked 14C or 100 stations off an indoor dipole ? G2OI (Eccles), reported heard in Devon, awaits a QSO with that county. He beams south nightly from 2230. G2XS (Kings Lynn) says his vertical J at 65 ft. gives superior results to his beam, despite polarization.

FIVE-METRE
COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH only

Worked	Stations
34	G3APY (166), G5BD (171), G6VX
33	G3BLP, G5GX (147), G6OS (150)
32	G2RI (132), G5MA, G5WP
31	G2MR, G3BXE (126), G5BM, G5BY, G6XM (211)
30	G2ADZ, G2AJ (204), G2CIW (155), G2NH (251)
29	G2OI (106), G2XC (277), G3IS (122), G5JU (144), G5PP (101), G5RP (124), G6MN/A (115), G8UZ, G8WV
28	G3PZ, G4LU, G5MQ, G6LK (225)
27	G5PY (207), G5YU (119), G6OH (183)
26	G6YU (126), G8SM (157), G8KL, G3ABA
25	G4AP, G4RX
24	G3WW
23	G3DA (104), G4IG (163)
22	G2ATK, G4RO (136), G5IG, G6HD
21	G2AOK/A, G2KF (121), G6KB (109), G8KZ
20	G2BMZ, G2YL, G8AL, G8PX
19	G2NM, G3BUR/A, G6NF (116), G6ZQ
18	G3BK, G3BW, G5HN, G5LQ (156), G5MR, G6VC
17	G2ADR, G3WS
16	G2HDY (108), G2HLF, G3CUA, G3DCV
15	G2AUA, G3BOB, G3CWW, G6VD, G8UR, G8VN
14	G3CGQ, G5BJ, G5UM (100), G6UW

Note : *Figures in brackets after call are number of different stations worked. Starting figure,* 100.

G Three's

G3AHB (Slough) who began 58 mc operations at the end of May with 20 watts to an 807 into folded dipole, now has a beam and with a noise limiter added to the Rx hopes to do well.

G3APY (Kirkby) has worked the Newcastle area several times and has had his taste of EDX, but still wants Wilts for a new county.

G3BBA (Towcester) has been working on a rotary in an effort to make it push out a signal as well as hold up the feeder ! He now has 3-ele. with folded dipole feed (3:1 ratio) to 450-ohm cable and ·2λ spacing. It gives 7·5 dB gain over a comparison dipole and has beam width of 60 deg. for 3 dB down, and a front-to-back ratio of 40 dB.

G3BLY (Fowey) is active on 58·9 and may provide us with that much-sought-after Cornish contact. He is 800-ft. a.s.l., with a clear view for 30 miles in all directions. So what are we waiting for ?

G3BUR/A (Lincoln) will be returning to his home QTH (Birmingham). G3BW (Whitehaven) has been much in the limelight and enters the Counties and Country tables. He is looking for G5BY, and for other new stations, every night. G3CGQ (Luton) claims he was the first station to work on 5 metres from Beds., as his first QSO after receiving his licence last year was on five. However, he congratulates G2AJ/P for really putting his county on the map. G3CGQ is convinced he is the only operator who QSL's 100 per cent. ! G3COJ (Hull), listening in Cambridge, heard 60 stations in 4 hours. He now has a new 4-ele. w.s. beam at his home QTH. G3CUA (Cambridge) has entered the Counties table, but is now QRT and will be returning to VK in the near future. Best of luck, OM, and hope you find plenty of VHF activity back home. G3DA (Handforth), like many others, comments on the telephony signal which is frequently heard at the extreme LF end of the band. It comes from about due south and sounds very like the Transatlantic telephone. Anyone with information ? G3KX/A (Banwell) considers his high spot of

MAWE 4 was a QSO with FA8IH on Sunday at *mid-day*. G3PZ (Gloucester) suffers from main-road QRM and finds it difficult to tune over more than 500 kc between sessions of car noise. So please give him long calls ! G3WW (Wimblington) comments favourably on the earlier evening activity in London and Midland areas.

FIVE-METRE COUNTRIES WORKED LIST
Starting Figure, 3

Worked	Station
12	G5BY (F, FA, G, GW, HB, I, OK, OZ, PA, SM, ZB1, ZB2)
11	G2XC (F, FA, G, HB, I, ON, OK, PA, SM, ZB1, ZB2) G6LK (F, FA, G, GW, HB, I, OK, ON, PA, SM, ZB1) G6XM (F, FA, G, GW, I, OK, ON, PA, SM, ZB2)
10	G5BD (F, FA, G, GW, HB, I, OK, ON, PA, SM, ZB2) G5GX (*No prefixes given*)
9	G2NH (F, FA, G, GW, HB, OK, ON, PA, ZB1) G5MA (F, FA, G, GW, HB, I, OK, ON, PA)
8	G2MR (F, FA, G, GW, I, ON, PA, SM) G3BW (F, G, GM, GW, HB, I, OK, PA) G3YH (F, G, GW, HB, I, OK, OZ, ZB2) G5MQ (F, FA, G, GM, GW, HB, I, OK) G5YV (F, FA, G, GM, HB, I, OK, PA) G6DH (F, FA, G, I, OK, ON, PA, SM)
7	G3DA (F, FA, G, GM, GW, HB, I) G8GX (F, FA, G, I, ON, PA, ZB1) G8SM (*No prefixes given*)
6	G3IS (F, FA, G, I, ON, PA) G4AP (F, G, GW, HB, I, PA) G4RO (F, G, I, OK, ON, PA) G5BM (FA, G, GM, GW, I, SM)
5	G2CIW (F, G, HB, I, PA) G2ADR (F, FA, G, I, OK) G2KF (F, FA, G, ON, PA) G3APY (F, FA, G, GM, I) G3BXE (F, G, GW, ON, PA) G5IG (F, FA, G, ON, PA) G8UR (F, G, GM, HB, I) G8WV (F, G, I, PA, SM)
4	G2ADZ (F, G, I, OK) G2AOK/A (G, GM, HB, I) GM3OL (F, G, GM, I) G4IG (F, G, ON, PA) G4LU (F, G, HB, OK) G5MR (F, G, OK, PA) G5VB (FA, G, I, OK) G6MN (F, G, HB, I) G6TF (F, G, GM, I) G8UZ (G, HB, I, ZB2)
3	G3KX/A (FA, G, I) G8KL (G, F, I)

G Four's

G4AP (Swindon) finds his outdoor beam pays dividends. G4LU (Oswestry) thinks he heard an EI on 59·1 mc and enquires if there is any known activity in that country. His early morning signals have been heard in Devon ; he asks for some activity before breakfast. G4LX (Newcastle) has heard G6XM and G6VX and tells us G2BDQ (Stocksfield) is working GM3BDA (Airdrie) regularly. G4RO (Welwyn Garden City) would like reports from the northern counties, and asks for the frequencies of some of the northern DX. We believe these to be correct :—

G2BS	58880	G4LX	58880
G3CYY	58750	GM3OL	59200
G5UD	58820	G3BW	58872

while G4RO is on 58·82 himself.

G Five's

G5GX (Hull) has a junior op. and says that it means QRT for six months. His record of 33 counties, 147 stations, 10 countries is a very fine one on which to rest for a bit. Perhaps our next QSO with him will be on 2 metres ! G5JU (Birmingham) listened to both sides of the GM3OL/G3BLP QSO, but cannot hear anything further north. G5VB (Ewell) uses a Franklin oscillator on 1·8, a chain of doublers, ending in an 807. Rx is a converter using EF91's into an HRO on 1·8 mc ; a 3-ele. c.s. beam is Y-matched from 450-ohm line. G5WP (Woking) has raised his beam to 38 ft. to try and hear GM3OL, after a 2-hour unsuccessful session at a lower height. G5YV (Leeds) has worked 119 stations in exactly five weeks and has lost interest in the LF bands. On June 4 he thought he had tuned to 7 mc when he switched on, but it was just that spor-E.

G Six's

G6NF (Shirley) sends his first report (nice to hear from you, OM) although he has been active for a year. He is using a modified RF 27 or an acorn (2RF) convertor into an HRO for Rx, while the Tx is an 832 (or 815) driven by a Type 37 oscillator. Aerial is delta-matched dipole. G6PJ (Sheffield) is a newcomer to the band and is using an RF 27 into a Trophy 6, with an indoor ½-wave doublet, beamed N.E. and S.W. G6TF (Sheffield) has 4-element beam and a much modified RF 27 on which the 5-metre band is spread over 120 deg. We hope space may permit us to give a fuller description of this next

month. In the meantime G6TF will be pleased to supply details on request (*We suggest an S.A.E.*). G6VC (Northfleet) has been having his share of the GDX fun, the best being a contact with G5YV—all off an indoor beam. G6YU (Coventry) with a new 4-ele. beam and an improved convertor has been in on the EDX and has worked some new counties.

Amongst the Calls Heard listing is an interesting one from G8AO, who is Captain of the s.s. *Wandle* engaged in the East Coast trade. G8AO has a five-metre Rx on board, and spends his spare time tuning the band. Few G's other than east coast stations are heard, but G8AO was there to enjoy the thrills of June 4. G8GX (Northwood Hills) has joined the 4-element brigade with a delta match from 300-ohm line. G8SM (Molesey) is active and has persuaded nearby G5LC to come on the band. G8UR (Wolverhampton) a newcomer to five, has installed a 3-element c.s. beam, and we were glad to give him his first GDX with it. Since then he has worked GM3OL and enters the Counties and Countries tables. He appeals for the GW's to listen for him. (G2XC would also like a GW !) G8VN (Rugby) complains of QRM—a most unusual occurrence on five in the Midlands ! G8WC (Portsmouth) is getting out well from a poor location, using an 832.

GC and GI

GC2AWT (Jersey) is active on five and reports hearing G's from time to time. Most unfortunately, he gives no list of calls. His times of transmission are 1000 to 1700 daily. GC5OU is also on, and the first inter-GC 58 mc contact took place on June 19 ; they are both after the G's. From Northern Ireland, GI2BZV (Carnmoney) has heard G3BW, using a 4-ele. beam. He will have Tx shortly. GW3DVG (Haverfordwest) also hopes to be active before very long.

Counties, Countries and Calls Heard

The Counties and Countries panels have had to be considerably adjusted this month and we hope we have all the amendments in correctly. Calls of stations no longer active on the band are being dropped in order to save valuable space. Similarly, to save space we suggest that in future only GDX or EDX data be included in the Calls Heard lists. In any case, please omit all calls at less than 50 miles. We did this in one or two of this month's lists, and are sorry they had to be cut.

The Clubs

With our quota of pages already exceeded we cannot cover Club news in detail this time. However, a circular letter on matters of current interest is shortly being sent to all members.

THE FIVE BAND CLUB

Secretary : E. J. WILLIAMS, B.Sc., G2XC

THIRD LIST OF MEMBERS

G2ADR	E. Parvin (York)
G2AUA	W. Bigley (Wellingborough)
G3BW	W. H. Hodgson (Whitehaven)
G3BUR	T. F. Collett (Birmingham)
G3CGQ	F. W. Tyler (Luton)
G4LX	L. G. Spencer (Newcastle)
G5PP	R. Palmer (Coventry)
G5YV	H. Beaumont (Leeds)
G6HD	T. L. Herdman (Beckenham)
G6JK	H. J. Sherry (High Wycombe)
G6MN	E. Martin (Worksop)
G6TF	A. A. Jones (Sheffield)
G6VC	V. H. Curling (Northfleet)
G8GX	G. A. Dodd (Northwood Hills)
G8KL	W. Sturmey (Wolverhampton)
G4AP	J. G. Rooke (Swindon)

Total : 58 Members

Late Notes

OK1FF (Prague) reports that the band was open June 3-6, and 9, with the 4th as the best day—as it was over here with us. He remarks " Band full of CW and 'phone stations, all mutually QRM like 7 or 14 mc when is short skip"! OK1FF worked G2ADZ, G2JU, G3ABA, G3BW, G3YH, G5BY, G5CP, G5GX, G5VB, G5YH, G6OS and a number of F's, including FA8IH. A very interesting station he reports hearing is EI2L ; G's received were G2BMZ, G3GB, G5BD, G5PC, G6DH and G6UH.

Between June 3 and 14, HB9BZ (Ulster) heard or worked a number of F, FA, G, GM, OZ and SM stations ; he is regularly active and unfortunately an interesting letter from him was too late to be covered in detail.

By the way, if you hear OK's signing /1 calls, it is quite all right ; they use /1, /2 or /3 when working away from home in the districts of Bohemia, Moravia and Slovakia respectively.

G6DH (Clacton) sends a very full report covering day-to-day observations over the period May 16-June 15, but sad to say it came in too late to be included in the Summary. He notes that on several occasions when the band was open there was no activity to take advantage of it.

On June 9, under tropospheric conditions, he heard PAØZQ calling G2BMZ at a distance of over 400 miles—a remarkable occurrence under such conditions.

In Conclusion

Very many thanks for the magnificent mail this month, and even if it has not been possible to squeeze it all in we have nevertheless enjoyed reading every word of it. Next month's deadline is July 16 latest, and here is a special request: Please set out your EDX and GDX results under date headings, and County and Country claims on separate slips; Calls Heard comment as before! And we must apologise for having had to drop them this month due to the space problem.

Don't forget M.A.W.E. No. 5 is July 10-11; we hope it will be another good one.

The address for all your VHF news and views is E. J. Williams, G2XC, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. Thanks again, and CU on August 4.

Calculating GDX Distances

Using Ordnance Survey Maps and the National Grid

By **H. C. KENWORTHY, O.B.E. (G6HX)**

Maps have a fascination of their own. Many readers interested in them will already have appreciated the value of the National Grid Reference system for locating station positions to within a few yards, thereby enabling inter-G distances to be calculated easily and with a high degree of accuracy. This article explains how it is done. It only remains for all operators, particularly on the VHF bands, always to quote their own National Grid reference on their QSL cards.—Ed.

THE purpose of this article is to show how easy it is to determine the exact location of a point in the British Isles, and having found that point to calculate the distance between it and another.

For many years, the Ordnance Survey maps commonly available have had a grid superimposed on them. About fifteen years ago an edition of the 1-inch series was published, called 5th Edition Relief. This had a grid the unit of which was in yards—the maps being divided into squares of 1,000-yard sides.

During the war years a kilometre-grid was substituted. Now the Director-General of the Ordnance Survey Office has commenced issuing a revised series of maps with a km grid—differing in point of origin from the War Edition—and called the National Grid. A complete edition of ½-inch maps has already been issued, whilst a new set scaled 1 inch to the mile and entitled the "New Popular Edition" has been published for England and Wales. Scotland is still covered by the Popular Edition, although it is under revision.

Further to these excellent maps the Ordnance Survey Department is gradually issuing a series scaled 2½ inch to the mile (1/25,000). The eventual 6-inch maps on square National Grid sheet lines will be country-wide, but the Provisional Edition sheets now appearing (with the National Grid embodied) will never number more than about 3,100, because only sheets for which revision material is available will be so treated.

With the aid of either the 6-inch or the 2½-inch map it is possible to locate, say, one's own station, to within 10 metres. With the 1-inch series it is possible to be within 25 metres. The 1-inch and 6-inch series also enable latitude and longitude to be plotted (to the nearest 1/10th of a second on the 6-inch).

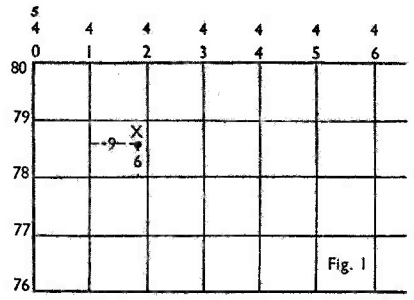
Before showing how this information can be used, attention is drawn to Ordnance Survey publications which explain the detail of the various editions of maps and in particular to two handbooks:

Description of Ordnance Survey Medium Scale Maps .. .. 1s. 6d.

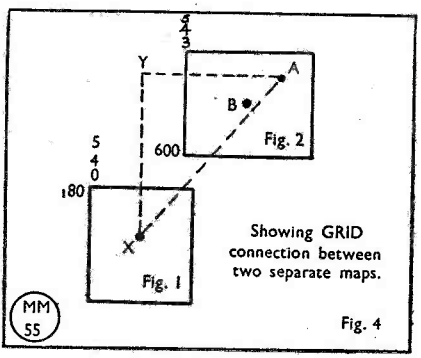
Description of Ordnance Survey Large Scale Maps .. .. 1s. 6d.

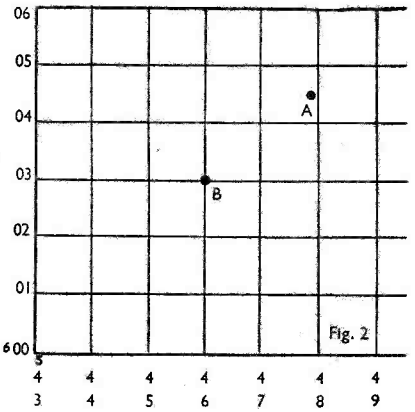
When purchasing maps for the purpose of locating positions it is advisable to buy paper flat editions and to be careful not to fold them.

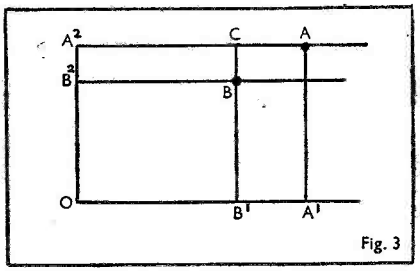
The manuals mentioned above explain how the grid is used and the method of reference. Full explanatory notes on the location of a point are also given on each map sheet—though an explanation here seems tedious and complicated, a position



X=REF 419786 FULL REF 541900 metres EAST
178600 Metres NORTH







can actually be found in a matter of seconds once the structure of the National Grid system is grasped.

It will be found that the maps are drawn from a triangulation commencing at 49° N 2° W and that the grid is superimposed West and East of 2° W. In order to ensure that all points of reference are East and North, the grid is extended to the West of Longitude 2° W to a point slightly S.W. of the Scilly Isles. Incidentally, 2° W bears the 400,000 metre grid exactly over it and is the only grid line which is exactly True North.

Method of Computation

Normally, it is only necessary to refer to a point by a small number of figures, as by quoting the map number or section there cannot be any mistake as to the location.

Fig. 1 shows this system, where the point X is referred to as 419786. But it will be noticed that there appear small numbers in front of the major reference lines and these numbers allow the *complete* reference to be given from the point of grid reference. Thus, position X is 541900 metres East and 178600 metres North of the point of grid reference.

Fig. 2 gives a step further. Here two points have been shown

Point A 547900 E 604500 N

Point B 546000 E 603000 N

Now refer to Fig. 3 for a moment. Here is shown a rectangle with O at the bottom left-hand corner. The points A and B are also shown. Now, OA^1 East OA^2 North and OB^1 East and OB^2 North are the full grid reference points for Points A and B. Hence

$$OA^1 - OB^1 = AC$$
$$OA^2 - OB^2 = BC$$

from which the distance AB can be found from

$$AB = \sqrt{(AC)^2 + (BC)^2}$$

Refer to Fig. 1 and Fig. 2 which represent different map sheets. The grid is, however, constant and therefore the distance AX can be calculated by subtracting the reference points East and North of X from those of A, thus giving

the sides of the right-angled triangle XY and YA, and therefore the distance XA $= \sqrt{(XY)^2 + (YA)^2}$

There are other methods of finding distances between points on the Earth's surface, using complicated trigonometrical formulæ which give close values for distance and bearing. How complicated these are can only be realised by comparing the work involved in computing distances calculated by the grid method just explained and by a geographical method used in spherical trigonometry. It is usual to take average lengths for converting degrees to miles. When this method was used to calculate the distance between Golspie Church in Sutherlandshire and a point in the Scilly Isles the result was 564·66 miles. The National Grid computation, worked out in a fraction of the time by the method explained here, was 565·46 miles. Referring to Inman's book of tables, *Figure of the Earth*, and taking an average of the distances by which geographical miles vary with latitude, the geographical calculation gave 565·47 miles.

It is hoped that this article will encourage amateurs to locate themselves correctly on the map and therefore make it possible to calculate distances worked between points in the British Isles with a high degree of accuracy and with a minimum of labour. It should make VHF contests, where the distance covered is a factor, more interesting, particularly when activity commences on the promised band of 144-146 mc.

(EDITORIAL NOTE: Ordnance Survey Sheets in the series scaled One Inch to the Mile are now readily available at most booksellers, price 3s. each cloth-backed and folded, or 2s. flat paper. These maps, with the manuals mentioned in the article above, are published by the Ordnance Survey Office, Southampton. Further information about the National Grid may be obtained from the Director-General, Ordnance Survey, Chessington, Surrey, whose own National Grid reference is 51/176628.)

Parasitic Oscillation

Some Notes on Prevention

By K. E. MARCUS

PARASITIC oscillations are a nuisance, to say the least, as it sometimes takes weeks of patient investigation to cure them. As with so many other ailments prevention is far better than cure, but so far we know much too little about oscillations altogether to take prophylactic measures. So here are a few hints where they originate and what can be done to stop them.

If the IF amplifier goes unstable, *i.e.*, if there is positive feedback from a stage further on to a point nearer to the aerial, that is feedback-instability, not parasitic oscillation. Or, if our receiver working into a 465 kc IF merrily howls at 1,395 kc, we call that harmonic instability, as apparatus should not get ticklish at the 3rd harmonic of IF, but again there are no parasitics.

But if our apparatus starts oscillating at a frequency not used, and rather without provocation, then "we got it." Often it is an oscillation quite outside the spectrum of frequencies normally encountered, and therefore the best method is to find what oscillates and at what frequency. For this a wavemeter with probe is a very great help, but unfortunately sometimes the frequency of parasitics is very high indeed.

VHF Parasitics

For example, oscillations in the region of 300 mc can often be traced to wrong operating conditions in pentodes. One particular instance will show what is meant. Certain HF pentodes are worked with screen voltages of about the same magnitude as the anode voltage. Round such a pentode something had gone wrong in such a way that electrons, after passing through the screen grid, were slowed down by the suppressor grid and found themselves opposite a low potential anode, became disgusted and turned back to the screen. This electronic odyssey showed itself in violent oscillation at about 300 mc, and closely corresponded with the time taken to pass the screen, roam about in the field between screen and anode and finally settle on the wrong twig.

An involuntary magnetron of this kind is a good example of what can be expected and it can be seen that decoupling, the mainstay against feedback and instability, will help precious little. On the contrary, decoupling elements very often are the *source* of parasitics. To show what can

happen, here again is a case out of practice. In a transmitter-receiver there was an instability at one particular frequency and that frequency only. It was quite independent of the setting of the tuning, and showed only on the receive position. It was finally traced down to a resistor-condenser combination oscillating at its time-constant and driving the (theoretically) immobilised PA valve.

Fortunately, in commercial gear there is little likehood of encountering parasitic oscillation as extensive laboratory tests prevent sets with faults like that to come into production. But in amateur built gear things are sometimes sticky. The first step, of course, is to make sure that we are dealing with parasitic oscillations, by applying additional de-coupling and screening. If that stops the trouble all the better, if not we should try and find out, even roughly, at which frequency the parasitics swing.

Now, if it is a very high frequency (from 100 mc up) it will be valves, and the writer has encountered innocent looking HF diodes doing Indian war dances at about 400 mc. So do not take anything for granted in this field.

Grid Stoppers

By far the best approach is first to exchange valves. If that does not help, fit grid stoppers temporarily to each suspected valve in turn. Where the grid stopper does the trick it should be permanently fitted, but of course, there is no point in stopping all grids indiscriminately. Failing that, the anodes should be stopped, and if no special suspicion indicates another valve, the output pentode or tetrode should be carefully "screened" (in the Military Intelligence sense !). It is amazing to see what these valves can do. Failing again, try the screen grids.

About the value of stopper resistors : Considering the frequencies involved and their time-constants the maximum should be around 200 ohms, but in most cases 50 ohms will prove a useful value.

If parasitics are generated at a lower frequency than 100 mc, one can rely on it that some resistor-condenser combination is the cause of the trouble by making a valve—in addition to its proper function —work as a relaxation oscillator.

Calculating Time Constant

The safest approach then is by calculation. "5 megacycles per second" means 5 million oscillations per second, which, obviously, means that each oscillation lasts 0·2 microseconds. Each frequency has, besides its wavelength, its "time-constant." It might be as well to memorise :

(Frequency)	(Wavelength)	(Time-Constant)
5 mc	= 60 metres =	0·2 μsec/c

Now, any resistor-condenser combination giving the time-constant corresponding to the frequency of parasitic oscillation should be suspected. It will generally be found that very few components satisfy the formula

R (in ohms) × C (in microfarad) = Time-constant (in microseconds)

When such a combination is found simply exchange the resistor. That will do the trick in most cases ; if not, exchange the condenser. Many explanations have been put forward for this effect, but all we can say at the present juncture is that probably the crystalline structure of the resistor graphite behaves as a quartz crystal.

For a parasitic at 5 mc we should therefore suspect combinations like

·02 μF and 100 ohms
·01 μF and 200 ohms
·005 μF and 400 ohms

and so on, which all have a time-constant of 0·2 μsec.

XTAL XCHANGE

Insertions in this section are free, and cover exchanges only ; buy-or-sell notices cannot be accepted for this space. Negotiations should be conducted direct, and requests for publication set out in the form given below, on a separate slip headed "Xtal Xchange—Free Insertion." Here are the month's offers :

G3BDS, 34 Tybridge Street, Worcester.

Has 1859 kc crystal, mounted. Wants a frequency between 7000-7010 or 7030-7080 kc.

G3DJD, 2 Canfield Road, Brighton, Sussex.

Has National 465 kc IF crystal, ¾-in. spacing holder ; wants frequency 1800-1850 kc, but not 1815 kc. Also has 460 and 2850 kc crystals, same spacing ; wants crystal for grinding into 1·7 mc band.

G3DRR, 65 Woodstock Gardens, Blackpool, Lancs.

Has 7970, 8250, 8261·25 and 8284·62 kc crystals, mounted. Wants frequency between 14000-14100 kc.

G8DU, 44 Sollershott East, Letchworth, Herts.

Has Bliley and QCC type crystals 3598, 7058, 7061, 7105, 7133 kc. Wants 3550 and 7020 kc, or near.

G8VJ, 220 Station Road, Lower Stondon, Henlow, Beds.

Has 3360 kc crystal in standard holder ; also HRO crystal, holdered.
Wants 100, 500, 1000, and 1850 kc, or near.

Here and There

Mullard-Hallicrafter Agreement

Readers will be as interested as we were to hear about the new arrangement by which Mullard Electronic Products, Ltd., have the right to manufacture to all the communications equipment designs of the famous American firm of Hallicrafters, Inc., of Chicago. Mullards will also undertake Hallicrafters' representation in the United Kingdom, Eire and Australasia; amateur distribution in this country will be effected through the McElroy-Adams Group, Ltd.

One of the first Hallicrafters' models to be released under the new scheme will be the SX-42, a communications receiver covering 500 kc-110 mc, and FM reception in the range 50-110 mc.

We wish Mullards good fortune in what, from the amateur point of view alone, is a most important venture, and feel sure their products will find a ready market in this country and the Empire.

All enquiries should be addressed to the Communications Division, Mullard Electronic Products, Ltd., Century House, Shaftesbury Street, London, W.C.2.

Small Advertisement Note

We have been sorely bothered recently by the difficulty of decoding exactly what some of our small advertisers do want us to print—either by reason of illegibility or the lack of punctuation. The necessity to write clearly is obvious—we would suggest that if you cannot type it, you print it in block letters; but *please* don't scribble it as you would a letter!

As to punctuation, it is seldom realised that words—and therefore your cost and our space—can be saved by careful punctuating. It would also help us a lot if the *Magazine* signs and conventions were always used when drafting the copy, *e.g.*, mA, mc, DC, PA, amp., modr., VFO and so on, instead of . . . . well, the other kind.

Incidentally, we must mention here the reader who, in this month's Small Advertising, is offering an Austin 7 in exchange for an AR88!

Swiss QSL Bureau

Will all concerned please note that the address is now U.S.K.A. QSL Service, Postbox 1203, St. Gallen, Switzerland.

Maps and Manuals

Our new *DX Operating Manual* is being much admired by those who have had a copy. It is the first such British publication, covers the whole ground so far as words can on such a subject as DX, and as far as we know is the only publication giving an up-to-date prefix list by zones and countries both ways, *i.e.*, Countries, Prefixes and Zones; and Prefixes, Countries and Zones.

The cost is 2s. 6d. (2s. 8d. post free) and the size is 40 pp., with colour cover and plenty of illustration.

Our full-colour wall-mounting Zone Map is also available, at 6s. The projection is great circle centred on the U.K., and it gives all the information on the Zones that a DX operator could require. In fact, armed with the *DX Operating Manual* and the Zone Map, you have the most authoritative sources of information now extant on working DX for a total outlay of but 8s. 8d., and the delivery is immediate. Write the Circulation Manager, Short Wave Magazine, Ltd., 49 Victoria Street, London, S.W.1.

Civic Affairs

Denis Heightman, G6DH, managing director of the well-known concern of Denco, Ltd., has recently been elected to the Clacton Town Council and is also serving on the local Industrial Development Committee. G6DH has for years been very active on the bands from 28 mc up and has made a number of valuable contributions on the propagation problem at these frequencies. Denco, Ltd., produce a wide range of equipment for the amateur and also have some interesting new developments in the prototype stage.

NEW QTH's

This space is available for the publication of the addresses of all holders of new callsigns, or changes of address of transmitters already licensed. All addresses published here are automatically included in the quarterly issue of the Call Book in preparation. QTH's are inserted as they are received, up to the limit of the space allowance. Please *write clearly* and address on a separate slip to QTH Section.

D2JO F/O N. Kay, RAF Wahn, BAFO, BAOR 19.

EI4U J. E. Mills (*EI8P*), Millfield, Wilmont Avenue, Sandycove, Co. Dublin, Eire.

G2AON W. A. Allwright, 214 Latimer Road, Eastbourne, Sussex.

G2BRQ C. J. Lamb, 10 Morgan Road, Bromley, Kent.

G2CQB R. J. Gilbert, Home View, St. Erth, Hayle, Cornwall.

G2DFR F. N. Shelley, 23 Charter Road, Newbury, Berks.

G2DPP J. A. G. Bowhay, 96 Above Town, Dartmouth, Devon.

G2DXS D. L. C. Creedy, 22 Scotland Street, Ellesmere, Salop.

G2FFX F. J. Ireland, 7 Willow Crescent, Ribbleton, Preston, Lancs.

G3AEJ S. Stobbs, 20 Strathallan Drive, Baildon, Yorks.

G3AGU C. Edmonds, 12 Ewanrigg Road, Grasslot, Maryport, Cumberland.

G3AIO S. Fenwick, 53 Findon Road, Sheffield 6.

G3AKL Rutherford College of Technology, Newcastle-on-Tyne 4.

G3AOL F. W. Ellis, 195 Sutton Road, Hull.

G3BII A. R. Clark, Harrias Cottage, Beaconsfield, Bucks.

G3BIQ A. W. Burgoyne, 10 Arlington Road, London, W.13.

G3BNC P. D. Crisp, 22 Rochester Road, Portsmouth.

G3BQG J. Bowes-Taylor, 20 Ingestre Road, Hall Green, Birmingham.

G3BSN C. G. Forrester, 10 Beechey Road, Bournemouth, Hants.

GM3BUX M. Faraday, c/o Barclays Bank, High Street, Rhyl, N. Wales.

G3BYP P. W. Arnold, Manor House, Barns Fold, Hawk Green, Marple, Cheshire.

G3CAA J. R. Simpson, 146 Sileby Road, Barrow-upon-Soar, Leics.

G3CCN W/O Goodwill, Married Quarter No. 17, RAF Woodvale, Formby, Lancs.

G3CCS T. A. Moore, 10a Old Church Road, Clevedon, Somerset.

G3COF L. Sutton, 8 Cogan Avenue, London, E.17.

G3CPB A. Cuff, 2 High Street, Wimbourne, Dorset.

G3CSX A. E. Rhodes, The Gables, Bure Lane, Christchurch, Hants.

G3CUM D. Blakey, 22 Station Road, Baildon, Yorks.

G3CUZ L. Keates, 14 Nab Hill Avenue, Leek, Staffs.

G3CVB J. P. Hannifan, Citizen's Club, 62 St. Mary's Street, Bridgnorth, Salop.

G3CVB/A J. P. Hannifan, 86 Blackburn Avenue, Claregate, Wolverhampton, Staffs.

G3CVV H. Holder, 115 Replingham Road, London, S.W.18.

G3CWV C. Wallis, 35 Doris Road, Sparkhill, Birmingham.

G3DCN F. A. Barrell, 41 Dorchester Avenue, West Harrow, Middx.

G3DCT P. H. Green (*ex-VU2BQ*), 38 Costead Manor Road, Brentwood, Essex.

G3DCX R. Tucker, 22 Rochester Road, Portsmouth.

G3DDA K. W. Dyson, 25 Portland Avenue, Southend-on-Sea, Essex.

G3DDB G. R. Stephenson, 9 Croft Street, Horncastle, Lincs.

G3DDH A. Townend, 266 Hopewell Road, Hull.

GW3DDY J. E. Sketch, Glenside, Maesycwmmer, Hengoed, Glam.

G3DHF R. H. T. Rylands, 1 Waldringfield Court, Felsted, Essex.

G3DIA S. Howlett, 104 Westway, London, W.12.

G3DKS C. K. Street, 115 Norwood Road, London, S.E.24.

G3DKT 88 Bowring Park Avenue, Liverpool 16.

G3DLD A. E. Lawson, 37 Pool Road, Otley, Nr. Leeds.

G3DLH P. Evans, Beech House, Redhill, Nottingham.

G3DMA S. C. Fincham, Nestlea, Beccles Road, Carlton, Colville, Lowestoft, Suffolk.

G3DMJ A. Roth, 72 Ashleigh Avenue, Bridgwater Som.

G3DNM Walter C. Weatherley, 48 Edgar Road, Yiewsley, Middx.

G3DOO J. H. Rayner, 124 Northumberland Park, London, N.17.

G3DPT W. D. Weald, 103 Merryhills Drive, Enfield, Middx.

G3DQQ D. Winterburn, 28 Moyse Avenue, Walshaw, Bury, Lancs.

G3DQT J. Ayres, 42 Berrylands Road Surbiton, Surrey.

G3DQX K. Wilson, 13 Olivant Street, Burnley, Lancs.

G3DRW H. Richardson Jr., 20 Nixon Avenue, Leeds 9.

G3DRY R. J. Waddington, 8-10 Cotton Street, Burnley, Lancs.

G3DSC W. E. Taylor, 14 Stanstead Road, Forest Hill, London, S.E.23.

G3DSH D. G. Cartmell, 31 Thornton Road, Carlisle, Cumberland.

G3DSV R. W. P. Wilson, 11 Clivedon Road, London, E.4.

G3DTK M. S. Beck, 8 The Oval, Allerton Road, Bradford.

G3DUC E. H. Williams, Pleasant View, The Checkoe, Redbrook, Whitchurch, Salop.

G3DUV J. J. Parker (*ex-D2FR*), 64 Belvedere Road, Erdington, Birmingham, 24.

G3EDM G. L. Mills (*ex-D2DM*), 1 St. Georges Road, Great Yarmouth, Norfolk.

G3ESP W. Farrar, Holmcroft, Durkar, Wakefield, Yorks.

GM3SA T. Grierson, Clarkly Hill, Burghead, Morayshire.

GM4HN J. Blacklaw, 4 Nairne Place, Seafield Road, Dundee.

G6TF A. A. Jones, 18 Cowley View Road, Chapeltown, Sheffield.

G8BQ A. Oughton, 49 Fydell Street, Boston, Lincs.

G8HG L. E. Baxter, 261 Norris Road, Sale Moor, Cheshire.

CHANGE OF ADDRESS

G2AHT J. W. Elliott, 7 Warwick Avenue, Bedford.

G2HCZ E. S. G. Fish, 10 Albion Street, Romford, Essex.

G3ABB C. L. Fenton (*ex-GD3ABB*), BM/CLF London, W.C.1.

G3AHB L. G. Coote, 6 Pitts Road, Slough, Bucks.

G3AWO J. A. Fair, B.Sc., 84 Rutland Drive, Morden, Surrey.

G3BAF F/O J. W. Carter, Parkside, 28 Park Avenue, Birchington, Kent.

GW3BAZ	J. Evans, 188 Inverness Place, Roath, Cardiff.
G3BBD	J. L. Townend, 41 Johns Avenue, Lofthouse Gate, Wakefield, Yorks.
G3BFL	H. V. Siebert, 57 Cambridge Drive, London, S.E.12.
G3BLN	P. M. Trowbridge, Leven Close, Leven Avenue, Bournemouth.
G3CCO	D. A. V. Williams, Ripple Rectory, Tewkesbury, Glos.
G3COV	G. B. Woffinden, 26B Lowther Street, Whitehaven, Cumberland.
G3DZ	M. A. Newman, 90 Norbiton Avenue, Norbiton, Surrey.
G3GN	R. W. Cowill, The Spinney, London Road, Knebworth, Herts.
G4DZ	A. E. R. Buckle, Occlestone, The Beacon, Ilminster, Som.
GM4JO	W. R. Eadie, 51 Sutherland Avenue, Glasgow, S.1.
G5PO	H. J. Pollard, 143 Oldchester Road, Bebington. Wirral, Cheshire.
G6LD	I. C. I. Lamb, 7 Mossom Lane, Norbreck, Blackpool, Lancs.
G6XY	R. H. Webb *(ex-G8WL)*, Renny Private Hotel, Bigbury-on-Sea, S. Devon.
G8QJ	D. M. Gledhill, 8 Romney Drive, North Harrow, Middlesex.

CORRECTIONS

G3CUI	F. R. Ellory, 153 Windsor Avenue, Hillingdon, Middlesex.
G3DER	F/L J. P. Wilson, RAF Compton Bassett, Calne, Wilts.

CARDS IN THE BOX

These are the callsigns for which we want name, address and stamped addressed envelope big enough to take QSL cards. Some of the cards awaiting claim in our Bureau are quite interesting and include C8, CR6, ZD4 and several other exotic prefixes. Please send for your cards to BCM/QSL, London, W.C.1., which is the full address of our Bureau. If you want your callsign published under "New QTH's", mention it at the same time; your address will appear in the appropriate section as soon as space becomes available, and will also be published in the *Radio Amateur Call Book*.

G2ANU, 2AQG, 2BCM, 2BKQ, 2BLT, 2BW, 2CAV, 2DG, 2DXS, 2FJQ, 2HAC, 2HCK, 2HHD, 2HMF, 3AFV, 3AJP, 3AQH, 3BAU, 3BCE, 3BCH, 3BCW, 3BCZ, 3BPX, 3BTG, 3BTY, 3BUS, 3BWZ, 3CCH, 3CDM, 3CKV, 3COX, 3CPT, 3CQX, 3CRW, 3CSF, 3CUD, 3CUF, 3CWB, 3CZG, 3DBG, 3DEP, 3DGB, 3DHN, 3DHZ, 3DKK, 3DKU, 3DLQ, 3DLS, 3DMO, 3DNA, 3DOO, 3DWR, 3FB, 4GV, 4IH, 5LA, 5QG, 5VV, 6AT, 6FH, 6GR, 6TZ, 8SD, 8WP, GD3AGC, GM2CID, 3BXL, 3CWZ, 4RF, 6RA, GW2CUF, 2FGY, 3CDP.

FIRST CLASS OPERATORS' CLUB

PRESIDENT: GERALD MARCUSE, G2NM

HON. SECRETARY:

CAPT. A. M. H. FERGUS, G2ZC

It is with the deepest regret that we record the first loss the club has sustained in the death of E. Fowler, GM5UT. Despite considerable physical disabilities, he never allowed them to hamper his activities in helping others in any good cause; the club loses a valued member who carried into everything he did the spirit of Amateur Radio.

Club Dinner

Will all members please note that the date fixed for the FOC dinner, in London, was incorrectly stated in the last Circular Letter; it should, of course, read "Saturday, November 20, 1948".

Thanks to the helpfulness of our "London" members, arrangements are already in hand. But it is important to know, as soon as possible, how many will be attending.

Election Notice

In accordance with the Rules, the following have been elected to active membership of the F.O.C.:

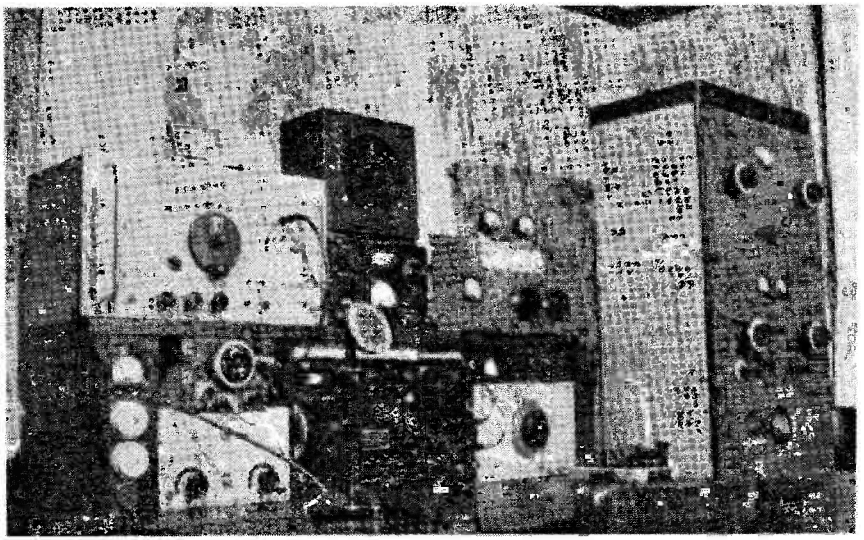
B. Barth, LA4NA (Kristiansand); J. Harris, G2ATZ (Hailsham); H. G. Fownes, ZL2GO (Wellington, N.Z.); F. R. Freeman, G3AXV (Tunbridge Wells); D. Clapp, G3CJM (London); J. H. Cant, G6FU (Surbiton); Capt. Cadell, PAØTOM (The Hague); E. Searle, G3APQ (Portsmouth); F. Bevierre, F8EO (Paris); W. G. Dunlop, G3BYQ (Leafield); L. Parker, G5LP (Wellingborough); G. Eriksson, SM5GL (Stockholm-Riksby); A. G. Davies, G2PC (Elland); C. R. Perks, G4CP (Dudley); W. Metzelaar, PAØMM (The Hague); C. J. Matthews, G5VF (St. Albans); J. C. Foster, G2JF (nr. Ashford).

BRITISH OLD TIMERS' CLUB

We list below the names of ten more members of the British Old Timers' Club, bringing the total to date to 119.

G. F. Kitchen (G5VP), 1922; B. H. Quentin (G6OX), 1922; W Jones (GW6OK), 1923; N. E. Read (G6US), 1923; J. Hum (G5UM), 1927; D. Heightman (G6DH), 1927; R. A. Fereday, O.B.E. (G6FY), 1927; E. R. Martin (G6MN), 1927; C. R. Ponting (G6ZR), 1927; G. G. E. Bennett (G5BZ), 1928.

If you want to be at the Old Timers' Dinner, proposed for the autumn, please let us have your reservation immediately, as arrangements for the event must be put in hand very soon now. A card saying you want to be there is sufficient; the cost will be not more than one guinea, and date and place will be notified in due course to all who are attending.—L. H. T.



The other man's station

G2CXO

G2CXO received his AA licence in April, 1939, at the ripe old age of 16 ! Activities, which were resumed in July, 1946, were complicated by lack of accommodation. It was decided initially to instal the equipment in the bedroom and 14 mc CW transmission commenced with 25 watts to the inevitable 807. Four months later, control grid modulation was used for 'phone working and since then progressive development has resulted in the installation shown above.

As the station expanded, a domestic crisis threatened and, in deference to the XYL's fears that eventually she would be completely ousted from her bedroom, the gear was transferred downstairs to the living room. This introduced aerial feeder complications which were eventually overcome by the installation of a 600-ohm line which is carried around the house on small horizontal poles and feeds all external aerials.

Concurrently with the move downstairs a complete rebuild was undertaken with a view to ease of operation, comfort and appearance. Lack of workshop facilities made it necessary to perform all constructional work on the bedroom floor—nevertheless, the transmitter and most of the ancillary equipment is home-built. The operating desk is designed to house all the receiving and ancillary equipment and carries all primary and operating controls. Relay switching is employed throughout and the transmitter line up is a 6V6 VFO-6L6-807-813 PA, plate-and-screen modulated by push-pull TZ40's. The speech equipment consists of a D.104 microphone into a 6J7-6C5 pre-amplifier feeding a 6J5-6C5-P/P 2A3's amplifier-modulator.

Having no workshop in which to spend time has encouraged G2CXO to concentrate on aerial design and new systems are always being tried. At present 3/4- and 3/2-wave folded dipoles are in use for 14 and 28 mc, with a 3-element indoor beam for the latter band and a long wire for 7 mc.

Plans are in hand for 144 mc equipment, but operation is now mainly confined to 14 and 28 mc 'phone (in a living room 'phone is less anti-social than CW !) and over 80 countries have been worked on telephony alone. Altogether, another fine example of how difficulties can be overcome and an effective station evolved in the most unpromising circumstances—and what a blessing is a co-operative XYL.

THE MONTH WITH THE CLUBS

FROM REPORTS

Activity appears to continue at quite a high level. True, the number of reports has fallen off slightly, but many Clubs make no pretence of keeping a full-fledged summer programme going.

Portable work, D-F Contests and little private Field Day events are a wonderful tonic during the summer months, and those clubs who have not tried them are strongly recommended to do so. Now that so many of them have their own call-sign and equipment, it seems a pity not to make use of it for *al fresco* events, since there is seldom any difficulty in obtaining the necessary permission to use the suffix "/P" at some suitable high spot in the vicinity.

Next month's reports, please, by first post on July 15, which will be the absolute deadline. Address them to Club Secretary, *Short Wave Magazine*, 49 Victoria Street, London, S.W.1. And, as usual, please don't forget that photographs of Club equipment, meetings or events are always welcomed.

Thames Valley Amateur Radio Transmitting Society.—A full attendance was recorded at the June meeting, when a talk on the Radio Amateurs' Examination was given. NFD discussion and organisation filled the balance of the meeting. Next event is on July 7, at the Carnarvon Hotel, Hampton Court, when a lecture will be given by courtesy of Mullard Electronics Products Ltd.

Stourbridge & District Amateur Radio Society.—At the June meeting, members were given an outstanding talk on UHF operation by G2RQ from Birmingham. Demonstrations of UHF technique were given with the aid of a 60-cm transmitter. Members were chiefly impressed by the extreme simplicity of the apparatus, and it is hoped that interest in UHF work has been stimulated.

South London & District Radio Transmitters' Society.—We are notified that this Club has now disbanded. The former treasurer, G2CX, paid the balance of the funds—some £8—over to the Wireless for the Blind Fund, and received a grateful acknowledgment. We are asked to publish this so that ex-members will know that their wishes have been met.

Reading Radio Society.—A recent meeting was devoted specially to those new to amateur transmission. G8TH, using a 4-metre transmitter, demonstrated methods of matching the aerial impedance to that of the feeder line. At a later meeting, the selectivity problem was fully discussed, and a double superhet of about 1935 vintage was demonstrated, giving a bandwidth of about 4 kc. Meetings are held at the Palmer Hall, on the second and last Saturdays of the month.

Southampton Radio Club.—A member has offered this Club the use of his own "shack" and workshop for future meetings, and this offer has been gratefully accepted. Meetings are now being held every Wednesday at the new venue —9 Bullar Road, Bitterne Park—at 7.30 p.m., with Morse until 8 p.m.

Swindon & District Short Wave Society. — Recent activities have included visits to the GPO Auto Exchange, and to the Military School of Science at Shrivenham, where an interesting evening was spent in the Radar Lab. It is hoped that the Club is at last on the way to finding a permanent headquarters.

Coventry Amateur Radio Society.—In June, a "Field Day" film show was followed by a talk by G5PP on 5- and 6-metre experiences. GM3BFG was also welcomed at a recent meeting. On July 9, the Club visits the local telephone exchange, after a demonstration of auto telephone working by G2ZT.

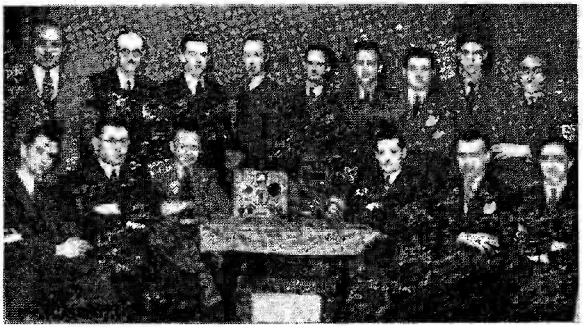
West Middlesex Amateur Radio Club.—Plans are being laid for a full autumn and winter session, and general interest in the Club is increasing. Recent meetings have been devoted to talks, one on Battery Portables (G3BWC), and one on an HF Oscillator and Grid-Dip Meter (G2RF). The Club meets on the second and fourth Wednesdays, 7.30 p.m. at the Labour Hall, Uxbridge Road, Southall.

NORTH BUCKS AREA

Enthusiasts in this part of the world who would be interested in the formation of a club are asked to get into touch with B. Hayes, 8 Althorpe Crescent, New Bradwell, Bletchley, with a view to arranging a meeting and discussion.

Solihull Amateur Radio Society —Membership has now reached a total of 40, including six transmitters. A very successful exhibition of members' gear was held recently, and included UHF equipment. This was run in conjunction with Solihull Youth Week. The Club's Annual Field Day will be held on July 25, using "Top-Band" equipment.

Burton & District Radio Society.—Good attendances are reported in spite of the rival claims of summer weather. At the last meeting a Junk Sale was conducted by G2RH and some useful articles changed hands. A member recently had an unusual QSO with a PA station, as a result of which he rounded up several of the local doctors to obtain a serum which was urgently



Picture taken at a recent meeting of the Glossop & District Radio Society.

needed but not available in Holland; it was located and flown over. The children whose lives were in danger recovered. Fine work for Amateur Radio. Membership is now about 60, and meetings are held on the third Wednesday of the month.

Petersfield.—We are informed that a Club is now in action at Petersfield, but we have not been told its title as yet! Discussions have been held on many radio subjects, and a transmitter is to be built as soon as a permanent HQ has been acquired. Secretary's QTH in panel.

Wirral Amateur Radio Society.—After NFD, many members seem to want another open-air event, and it is hoped to plan something for them. July meetings are booked for the 7th and 21st, both 7.30 at the Y.M.C.A., Whetstone Lane, Birkenhead. Prospective members will be heartily welcomed at either or both.

York & District Short Wave Club.—Since the end of the winter programme things have been rather quiet, but the club call-sign—G3DQR—has now arrived, and members are busy building the transmitter and other equipment.

Brighton & Hove Group.—This Group now meets on alternate Mondays at the "Golden Cross," Western Road. Talks in June were on the Army's "19 Set," and on 144 mc work—the latter being given by G2NH. On July 12, G3YY is giving a description on a 100-150 watt transmitter. All amateurs visiting Brighton on holidays will be made welcome.

Southend & District Radio Society.—At the June meeting Mr. I. W. Merry, of EMI Institutes, gave a lecture on "Reception of Television in Areas of Low Field-Strength." The last meetings of the season will be held on July 16 and 30, and a D-F Contest is booked for July 11. Visitors will be welcomed for this, whether they compete or just watch!

Wanstead and Woodford Radio Society.—Attendance recently has been down to a minimum owing to other seasonal attractions. Highlights of the past month were a visit to the Cable and Wireless Station at Ongar, and to Messrs. Plessey's works at Ilford. A member of the latter firm's Micro-Wave Section gave a talk on the subject. An extraordinary general meeting has been arranged for July 6, to discuss revision of subscription rates.

Following are the names and addresses of the secretaries of the Clubs whose reports appear in this issue. They will be pleased to give all possible information and assistance to prospective members:

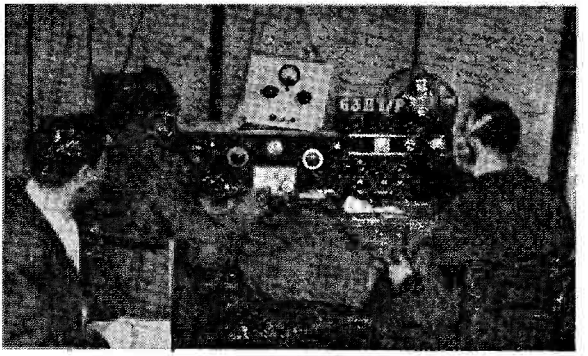
BRIGHTON AND HOVE. F. Harrop, 12 Park Street, Brighton, 7.
BURTON-ON-TRENT. E. B. Hardy, G3BSL, Hill Cottage, Dunstall, Burton-on-Trent.
COVENTRY (G2ASF). J. W. Swinnerton, G2XS, 118 Moor Street, Coventry.
EDGWARE (G3ASR). R. H. Newland, 3 Albany Court, Montrose Avenue, Edgware, Middx.
HARROGATE. A. Wilson, 16 St. Georges Road, Harrogate.
MEDWAY (G2FJA). S. A. Howell, G5FN, 39 Broadway, Gillingham, Kent.
PETERSFIELD. C. Watts, Hylton House, St. Mary's Road, Liss, Hants.
READING. L. Watts, G6WO, 817 Oxford Road, Reading.
SOLIHULL. T. O. G. Talboys, G2ATK, 6 Bramley Croft, Shirley, B'ham.
SOUTHAMPTON. J. H. Sillence, 80 The Drove, Coxford, Southampton.
SOUTHEND (G5QK). J. H. Barrance, M.B.E., G3BUJ, 49 Swanage Road, Southend-on-Sea.
STOKE-ON-TRENT. D. Poole, G3AQW, 13 Oldfield Avenue, Norton-le-Moors, Stoke-on-Trent.
STOURBRIDGE. W. A. Higgins, G8GF, 35 John Street, Brierley Hill, Staffs.
SUNDERLAND (G3CSR). J. Rose, 34 Dundee Street, Sunderland.
SUTTON AND CHEAM. B. J. Blount, 5 Priory Crescent, Cheam, Surrey.
SWINDON. P. Greenwood, G2BUJ, 49 Western Street, Swindon.
THAMES VALLEY. A. Meers, G8SM, Broadfields, East Molesey, Surrey.
WALSALL. L. G. Barlow, 15 Kinnerley Street, Walsall.
WANDSWORTH. A. Bennett, 19 Dempster Road, London, S.W.18.
WANSTEAD (G3BRX). R. J. C. Broadbent, G3AAJ, 24 St. Margarets Road, Wanstead Park, London, E12
WEST BROMWICH (G3BWW). W. G. Johnson, G2BJY, 22 Lynton Avenue, West Bromwich.
WEST MIDDLESEX. C. Alabaster, 34 Lothian Avenue, Hayes, Middx.
WEST SOMERSET. T. C. Bryant, G3SB, 29 Lower Park, Minehead, Som.
WIRRAL. B. O'Brien, G2AMV, 26 Coombe Road, Irby, Heswall, Ches.
YORK (G3DQR). G. W. Kelley, G5KC, 123 Kingsway West, Acomb, York.

Sunderland Radio Society.—We have received this club's second "Newsletter," which really puts the Club's activities before the members. A course of study for the Radio Amateurs' Examination is being made available to those members who wish to take it; and the usual instructional lectures are continued at meetings. In May, the subject was "Aerials—Theory and Practice (Part I)"—by G3BS.

Edgware & District Radio Society.—A recent event was an interesting talk by G60T on Impedance Matching, covering both the RF and AF aspects of the very wide subject. NFD took up a good deal of the Club's time during the month, and the final score of 811 from the two stations is thought highly satisfactory. A 5-metre D-F contest is planned for September 12. The hidden transmitter will be G3HT/P, and competitors will be on foot. Entries from non-members, with a fee of 1/-, should be sent to the Hon. Sec. by August 18.

Harrogate & District Short Wave Radio Society.—June saw this Club's AGM and the election of new officers. Formal meetings are held fortnightly on Wednesdays at 7.30, but members gather every Wednesday and at other times at 31 Park Parade. The Club Tx is nearing completion; new Secretary's QTH in panel.

Walsall & District Amateur Radio Society.—This Club, formed last year, now has a membership of about thirty, including six transmitters. Lectures have been arranged on Receivers (Stratton & Co.), Valve Operation (G.E.C.) and on Radar. A visit to Droitwich is also planned. Work is under way on a portable transmitter, which it is hoped to operate from the top of Barr Beacon. Meetings are on alternate Wednesdays, 8 p.m., at Wolverhampton Road Schools, Walsall. The next after publication date is July 21.



G3HT/P was operated on 1·7 and 3·5 mc during the portable activity over June 5/6. The station when manned by G3ABR and G3HT (right). Aerials used were dipoles cut for the bands covered.

West Somerset Radio Society.—Membership is still increasing, and a full programme of future events has been planned, together with a monthly News Letter. A demonstration of oscilloscope technique was given at the June meeting.

LEYTON DISTRICT

It is hoped that it may be possible to organise a Club in the Leyton district, and anyone interested is asked to get into touch with Mr. R. Cowell, G3WX, at 59 Morley Road, Leyton, E.10.

Wandsworth & District Radio Club.—This newcomer has just been formed and already has 30 members, ten of whom are licensed. The main meetings are held monthly, and technical classes take place weekly—all at Waldron Road School, Earlsfield, on Saturdays at 7 p.m. Next main meeting—July 21. Secretary's QTH in panel.

West Bromwich & District Radio Society.—Fortnightly meetings continue at Charlemont Schools, and the Club Station G3BWW is active on CW at the LF end of the 7 mc band. Members recently gave informative lectures on the cathode ray tube.

Sutton & Cheam Radio Society.—The highlight of this Club's NFD effort was the erection of G3AYC's 20-metre rotary beam, 40 ft. high. In spite of the low power used this year, results are believed to have been better than last year's. Meetings are held on the first and third Tuesdays at Ye Olde Red Lion, Cheam.

Medway Amateur Receiving & Transmitting Society. — The Capt. Plugge Trophy contest concluded at the end of May, with G2CBA the winner, and G4FN as runner-up. NFD was also a great event and the possibilities of 5-watt working opened many eyes. G5FN/P worked all districts USA except W5, and a VK. The Club station G2FJA is being rebuilt and will be on 3·5 mc CW and 'Phone in the near future. Plans for the November Exhibition are also well in hand.

Stoke-on-Trent Amateur Radio Society.—Members held their first Field Day on May 23, and home constructed equipment of all shapes and sizes was in evidence. A further event will take place shortly, in conjunction with the Leek and District Radio Society. Recent lectures have been on Power Packs, Doubler Units and VHF Receivers; there has also been a successful Junk Sale.

SMALL ADVERTISEMENTS

TRADE ADVERTISEMENTS

9d. per word, minimum charge 12/-. No series discount; all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). Press day July issue, July 12. No responsibility accepted for errors.

SMALL ADVERTISEMENTS

TRADE—*continued.*

SELSYN Motors for remote control of your beam aerial. Precision made, with ball bearings, weight 4lbs, torque 1½ in. lbs. Three required per set (Transmitter, beam repeater, indicator repeater), work direct from 230v. AC mains (in series). Each, brand new, in original packing with instructions 23/6, post free. R3002 Transmitter-Receiver Units, 10 valves (4-SP41, 1-EF50, 3-DI, 2-RK34), motor-generator, 12v input, 480v 40 mA output, large number useful components, variable condensers, relays, resistances, etc. In excellent condition, 22/-, Carriage 6/-.—Logan, 1 West Alley, Hitchin, Herts.

BC348 Receivers, New and complete, £14/10/-., Post 10/-. Tuning Units, TU6, 7, and 8, 12/6. Post 2/-. Noise Suppressor Units, complete with Valve, 5/-. All spares for B2 Receivers, Send for lists. —Radio Sales, (Luton) 55 St. Mildreds Av., Luton, Beds.

MICROPHONE floor stands. Adjustable 3-5½ ft. Black anodised stems, black crackle base and rings. Other colours to order. 21/6, £10 doz.—E.M.D.O., Ace Works, Staines, Middlesex.

BEAMS. 2½/20 metres, motors, bearings, indicators, chimney lashings. Special offer, dural masts 1½ × 17 SWG 11-12 ft., 17/6, S.A.E.—E.M.D.O., Ace Works, Staines.

EX-GOVERNMENT VHF Receivers, Type 1132A. These receivers are absolutely brand new in makers' original wood transit case. Specification: 11-valve superhet, 100-124 mc. Large tuning scale with super slow-motion drive. 0-5 mA tuning meter. RF and LF gain controls, dB attenuation control, BFO, AVC controls, jack sockets for line and monitor. Valve line-up: RF amplifier, VR65; mixer, VR65 · local oscillator, VR66; 1st. IF VR53; 2nd. IF, VR53; 3rd. IF, VR53; 2nd. detector and AVC, VR54; LF amplifier, VR57; LF amplifier, 6J5; BFO, VR53; voltage stabiler, VS70. The set is totally enclosed in grey enamelled cabinet, front panel grey, all controls clearly marked, plated bandles. Size: 18 in wide, 10 in. high, 11 in. deep. Weight when packed, 40 lbs. Calibration chart and circuit diagrams supplied with each set. LASKY'S PRICE 95/-, carriage 7/6, extra in U.K. As above, only slightly used, 69/6. carriage 7/6, extra in U.K. Lasky's Radio, 370 Harrow Road Paddington, London, W.9. *Telephone*: CUNningham 1979 open all day Saturday. Half-day Thursday. Send 1d. stamp for our current list and bulletin of other Ex-Service bargains.

G5AD Professional communications engineer, offers unrivalled service in repairs, overhauls, calibration, of communication receivers, transmitters, frequency meters, oscilloscopes, etc. Rapid service. We supply anything radio. Try us and take advantage of free technical advisory service. Send for Lists.—G5AD Radio and Aerials (Preston), 19 Victoria Road, Fulwood, Preston, Lancs. *'Phone* 79051.

AR88D "Inside" information. Fully detailed Alignment Instructions covering Calibration, IF Alignment, RF Alignment. With measurement methods and figures, and modification details for super performance 10/6.—W. K. Miller, 94 Hilton Lane, Little Hulton, Nr. Bolton, Lancashire.

YOUR BC348, etc., converted for AC Mains 200-250v., within 7 days for only £5 inclusive. This is a guaranteed service. Quality of valves, electrolytics, etc., available. Write for details.—Box No. 317.

G200 41MPT, EC52, VR65A (SP41), VR65 (SP61), 6D6, 6C6, 6F7, KTW61, 6K7G, 6J5. 5/- each. 6SG7, 6SH7, 6SA7GT/6, CV18 (RK34), 12SG7, 12A6, 12SQ7, 12C8, 6/6 each. Bliley or RCA 100 kc Xtals, 17/6. Jones 4-pin plug and socket, complete, crackle finish, 1/6 each. New button-based tubes; 9006's, 6/6, 6J6's, GAG5's, 12/6, 6C4's, 15/6.—A. C. Holle, Loose Village, Maidstone, Kent.

SMALL ADVERTISEMENTS

TRADE—*continued.*

SMALL ADVERTISEMENTS

TRADE—*continued.*

BC348 Receivers, new, £15/10/-, Post 10/-. Few as new, £11/10/-, Post 10/-. R.1155 £8/10/-, Post 5/-. AC Transformers, 200-250, 50c, 250-0-250, 6·3, 5 volt 120 mA, 22/6. Send for lists.—Radio Repairs Unlimited, 381a Dunstable Road, Luton.

TRANSMITTERS, Type T.3180, with collapsible masts, brand new, 12/6 each.—H. H. Bradford, Ltd. Ramsey, Harwich, Essex.

TYPE 145 Oscillators, absolutely new, but without dial, £2/2/-, plus carriage. Dural tube, ⅝ in., 1 in., 1⅛ in., 2 in. Just the stuff for that beam. *'Phone UNDerhill* 0026, Rex Radio (G5JV), 198 Harrow View, Harrow.

QSLs and LOGS by Minerva. Always new and attractive designs. Samples from Minerva Press, Elm Park, Essex.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box numbers 1/6 extra.

G200'S announcement now appears in the Trade. Small Advertisement column and on Page 368

HRO Senior, good condition, 6 coils, speaker, handbook, bargain at £35.—23 Pembroke Grove, Manchester 13.

WANTED.—B2 Tx/Rx, complete with P/P and coils. Exchange or sell R208 with complete spare set valves. Good working condition.—Box 311.

SALE or exchange B2/Rx, TR9H, 50 watt Tx, transformers; heater, power. R1155E. 30 valves, 807, 6SN7GT, etc. Want Avominor, BC342, wavemeter, xtals 20/40/80.—Box 312.

FOR sale—BC 312, with mains transformer, new condition, £14 or exchange for either R107, 1155 N or Bendix MN260 or BC433.—Box 313

RCA Ribbon mike, including two transformers, £4/10/-. Ditto, no stand £3. B2 outfit, complete, £8/10/-. MCR1 receiver, only £3/10/-. Two DC Avominors, 30/- each. 805, unused, £1.—2 Parkhill Road, Chingford, E.4.

R107 20, 40, 80, 160 metres and BC, first-class Rx, BFO, NL, AVC, etc., brand new, unscratched, perfect condition, £13 c.p.—Box 314.

EX-U.S. Sig. Corps crystals, 6350 kc, boxed and unused, 15/6. 6450 kc, unused, 13/-. Post paid on all. C.W.O. only.—Box 315.

SHORT WAVE MAGAZINE, Vol. IV, Nos. 1, 2 and 3 wanted. Perfect condition only.—8 Avenue Gardens, Alwoodley, Leeds.

VHF PA AM18/APT, 2-35TG in P/P, 200 watts, 2-836 in Power pack, 2,000v, but 115v-400 cycles input. About 60 mc. Superb job, new, unused, £6/10/-. Set drawing instruments, 8 pieces, silvered by Rieffler, £5/10/-.—G4OZ, Banger's Oborne, Sherborne, Dorset.

FOR sale—6 807 at 17/6, 2 813 at £3, all new.—Smith, Braemar, Oxenholme, Kendal, Westmorland.

HALLICRAFTERS SX24 for sale, excellent condition, re-aligned. 540 kc to 43 mc. Noise limiter, Xtal gate, etc., £30.—1 Webster Gardens, Ealing, W.5.

NEW unused BC-348 receiver, for AC mains 200/250v. Bargain price, £23. Also 8-valve communication receiver, 145 kc-30 mc, excellent condition, £13 or nearest offer.—Box 318.

CR100 Spanking condition. 6 wave-bands, 60 kc-30 mc, tiptop working order, £30. R1155, as new, £9.—Box 316.

SMALL ADVERTISEMENTS

READERS'—*continued.*

SALE.—Rebuilding. High fidelity crystal cell mike, List £20, for £8. 80 per cent. efficiency 150-watt 'Phone/CW Tx, P/P 35T's PA, TZ40's modulator, with five power packs. S.A.E. particulars. 13-valve double superhet, 6 wave-bands, 6 dB better than HRO, £35. Spare IF/AF amplifier, complete, £14.—G21Q, 44 Tapton Hill Road, Sheffield, 10.

EX-CANADIAN Rx, 1-16 mc, 8-valve, AC, built-in P/P, and speaker, BFO, AF/RF controls, and Radiovision 5-10 Expander, Exchange for CR.100 or BC-348 with cash adjustment.—20 George Road, Erdingtonk Birmingham, 23.

SALE.—R1481, R1132A, £5/10/-. R1116, £3/10/-. R1224A, £3. All working, carriage paid. EF50's, SP41's (6·3v), 3/-; RK34's, CY6's, 6J5's, 4/-.—Box 320.

RME69 AC and batt model 10-in. speaker, 'phones and full service gen. Re-valved Condition as new, £40.—Box 319.

HAM married, no children, requires an unfurnished flat, preferably in S.E. London. Can anyone help, please ?—G3BZW, 48 Consort Road, Peckham, S.E.15.

BC348 Modified for 250 AC-6·3 AC working, New cabinet, 'Phones/speaker jack, 6V6 output, £18. Power pack, £3/10/-.—G2CVY, Ebberly Dairy, Newport, Barnstaple, Devon.

AMATEUR disposing redundant equipment has two 20-watt amplifier/modulators, complete in stee cabinets, £10 each. Battery wavemeter (modulated) 10/2000 metres, £2. Mains wavemeter with 100 kc check points, harmonics to above 30 mc, £5. Hallicrafters S21 (5/10 metres) receiver, £15. Type 145 VFO and power pack, £8. Offers considered.—Box 323.

ARMY 12 Tx—complete with all valves, in working condition, £25. No offers.—Box 322.

BC348 modified, 230v AC, as new, excellent order, £19/10/-.—Box 321.

HALLICRAFTER Sky Champion in new condition, original owner, with instruction manual, some spare valves, 'phones, £25 or best offer.—54 Wyncliffe Gardens, Leeds 7.

TRANSMITTER complete set 36 10-60 mc, mains operated, with modulating power unit push-pull 807's, £25. R.O. 85 Navy Short Wave receiver, 230v. mains, 13 valves, 27-84 mc, 6V6 output, £15. Short wave set 1132a, 100-124 mc, £5. All tested.—Field, 435 Stratford Road, Sparkhill, Birmingham, 11.

EXCHANGE or buy. Wanted HRO Bandspread 7-14·4 mc coils. Also Bandspreads for 3·5 and 7 mc. Have 1,000v 250 mA, plus 4 × 4v, transformers, new, designed for GU50 bridge rectifier, 829B, RIC 1708, etc. —87 Ennerdale Road, Richmond, Surrey.

WANTED Oscillator Type 37, also SCR-522, complete. State condition and price.—GW5B1, 171 City Road, Cardiff.

5 6K7, 2 6N7, 2 6J5, 6F6, 6L7, unused metal midgets, 7/6 each. S.A.E. for component list.—Gaskell, Severn Hill, The Schools, Shrewsbury.

BC348R as brand new, unmarked, with data book, heaters modified, £16. Buyer collects.—Easton, Trinity College, Glenalmond, Perth.

HRO Senior, complete with coils, AC Pack, speaker, not ex-Govt., new, shipped from U.S.A. in 1945, superb condition, £65. QRO Tx, P/P 813 ; 2,000 1,500, 800, 300 volt power supplies, P/P 808 modulator, VFO, controlled all bands. Write for complete specification. A bargain at £90. U.S. Navy TC5 Tx, complete with AC pack, £28.—Box 326.

SMALL ADVERTISEMENTS

READERS'—*continued.*

WANTED, B2 Tx/Rx, Power Pack and coils complete. Also any good Pre-selector, preferably RME DB20. Details to G3CEN, 38 Grange Walk, Bermondsey, S.E.1.

CR100 11-valve communication receiver, 30 mc 60 kc. Bargain that buyercollects, £17/10/-—6 Morston Avenue, Off Warbrick Hill Road, Blackpool.

MCR1 'Phones, power pack, £7. American Lionel Bug, FB, 35/-. EF50 TRF, less power pack, £5.—Collett, 47 Lindsworth Road, Birmingham, 30.

I WANNA good bug key cheap.—G3AKY, 425 Hastilar Road South, Sheffield.

SX24 Good condition, £20 or offer. American TubeTester I 177, brand new, with data sheets for all American types, £10.—Box 324.

HALLICRAFTER Sky Buddy, power pack needs attention, otherwise good order. Best offer over £5. —G2SA, Burnham-on-Crouch, Essex.

WANTED.—Set of coils for HRO Senior receiver.—Mortimer, Dore, Sheffield.

BC640A Bendix VHF Transmitter (100 to 155 mc, at present modified for 28 mc). This transmitter is complete with receiver type BC-639A and frequency meter BC-638A. Complete with power packs, etc. Superb American outfit. What offers?—Mortimer, Dore, Sheffield.

R1155N with transit case, 100-1 tuning, 6V6 push-pull output, 10-in. speaker, 120 mA quality power pack, £32 or offer.—Box 327.

MARCONI CR100, £35. RME 69 and RME Speaker, £43. Hallicrafters Sky Challenger, £22 *Plus* carriages. All very good condition.—G6PL, 40 Dale Lane, Heckmondwike, Yorks.

AR88D S-Meter, recently aligned, Auto-trans, handbook, £40. RGD 37 Osc., brand new, handbook, £11. Buyer collects or arranges transit. —Olley, 56 Hampton Road, Forest Gate, E.7.

NATIONAL One-Ten Receiver, complete with power pack and coils, £20 or nearest. B2 Transmitter, with coils, £3. 1154 Transmitter, with valves, £5.—Cousins, 14 Earl Street, Abertillery, Mon.

WILL exchange 1938 Austin 7 saloon for RA-88 and Wavemeter. Cash adjustment.—Barnett 65, Woodstock Gardens, Blackpool.

EDDYSTONE Hetrodyne Frequency Meter. New, with VHF Unit, Complete with calibration, £11/10/-. Letters only.—Cranfield, 9 Southfield Park, North Harrow, Middlesex.

TYPE 145 VFO with Power Unit. Western Electric Double Button Microphone. Offers.—G6NM, 10 The Circuit, Wilmslow, Manchester.

FOR sale.—Complete matched station Tx T1154, VFO or CO-FD, all coils 20-40-80-160, CW or 'Phone. Also Rx 1116, 142 kc-20 mc. All as new, working order, with valves. Nearest £10. Lot collected. —Pratt, 205 Nevell's Road, Letchworth, Herts.

FOR Sale.—New Communication Receiver, Modified, Best offer over £22 secures.—Peter W. T. Craig, St. Abbs. 12 Chaterherault Avenue, Cambuslang, Nr. Glasgow.

WANTED.—HRO Bandspread coils 160, 80 and 20 metre bands, also Vibroplex Key. Will buy items separately.—G6BS, 96 Hinton Way, Gt. Shelford, nr. Cambridge.

SMALL ADVERTISEMENTS

READERS'—*continued.*

QST—For sale complete 1940-1946 inclusive, also part 1939, 1947. What offers? Write Baker 137 Hartham Road, Isleworth, Middlesex.

HAMMARLUND HQ-129X, one only, new in original packing case, complete with speaker and handbook, offers around £100. New unboxed 100TH (3), £2. Canadian 58 Walkie-talkie, unused, in maker's boxes, complete with spare valves (8), Vibrator and fuses, Accumulator and Vibropack, Battery box for all-dry, two sets 'phones and mis. rod and telescopic aerials, £15. Write for details—Box 328.

SACRIFICE. T1154M Transmitter, special job covering 1 mc to 16 mc, 2 power units each 1,200v 200 mA, all brand new, also Marconi 100/12 metre communication receiver, battery operated, tuning meters; Lot, £12. CR300, 15 to 25 mc, matched speaker, 8 ranges, 5000 kc crystal check all ranges, with power pack, given away, £12. Communication receiver, 20,000-12 metres, tuning meter, batt. operated, spare valves, marine job. £5.—Box 329.

BC342 210-250 AC. BC312, no power pack. Both *QST* modified. Offers? 500 microamp m/c meter, 10/6. 100 microamp m/c meter, 20/-. 837, PT15, 7/6; RK25, 10/6; 6X5, 5/6 G21K, 42 Norton Road, Bristol, 4.

HALLICRAFTERS Sky Champion, 550 kc to 43 mc, external xtal filter, perfect condition, re-valved, overhauled, £26. RME DB20 pre-selector, self powered, as new, £16. Both units, £40. Circuits, etc., available. —G2BVN, 43 Pettits Lane, Romford. Essex.

100TH, 45/-; "Mac" straight key, 10/-; E. F. Johnston 250 mmF variable condenser (FB for 150-watt Final), 20/-; Eddystone 1070 SM Dial, 9/6; 2-Ferranti modulation transformers (P/P 807's to single 807 final), 16/- each. Set new National 175 kc IF's (3 IF's, one BFO), 70/-.—Box 334.

HALLICRAFTERS S-40 Receiver, excellent condition, used few months, instruction manual, 230v AC, price now £45, must sell. Bargain £35, or near offers.—G2HMK, 7 Brinkburn Drive, Darlington, Co. Durham.

WANTED.—Complete B2 Tx/Rx VFO and/or Xtal. Would swap R1155 with cash adjustment or fully cash if desired.—Box 333.

BARGAINS.—50-60 watt Tx, rack-built, covers 20-40-80; two 80 xtals; two 40 xtals; full sets coils; fully metered; P. Pack; for VFO plug into xtal socket, £25 or nearest. V55 Rx, £20. Sky Challenger, 9 tubes, infinite image rejector, 38 mc-540 kc, £30. Mounted, xtals with certificates: 1820, 3582, 3533, 7085, 7010, 7162, 14385; £1 each.—G5LH, Croft House, Horbury, Yorks. *Tel.* 327.

KAAR 20-watt Tx 160, 80, 40, 20, 10 metres, bandswitched, 6v DC and 230v AC, xtals and mike, £30. 829B's, new, 37/6. 93LA's, new, £3/5/-.—Parker, 12 Cobham Terrace, Greenhithe, Kent.

VT52's, 4/-; 6F6's, 2/6; VR137's, 4/-; 35T's, 23/-; TZ40's, 25/-; Ceramic UX5 and Brit. 5-pin, 9d. each. Ceramic trimmers, 5-80 mmF, 9d. Pots, 1 meg, 2/-. Mallory 6v vibrators, 5/-. One T1131 Driver Deck, 28 mc, VT52-KT8C-KT8C-TZ40. Offers?—T. Foord, London Road, Hurst Green Sussex.

SALE.—MCR1, Power Pack, coils, £5. B2 Tx/Rx complete, £12/10/-. Hambander Rx, speaker, £19/10/-. TU6B Unit, £1. W66 Wavemeter, £1. Type 31 S 19 Gen, no charts, £10.—Box 332.

R1155A unscratched, modified, re-aligned, 6V6 incorporated, power unit, new crackled panel, new speaker cabinet, £15.—Allon, 117 London Road, Reading.

SMALL ADVERTISEMENTS

READERS'—*continued.*

WANTED to purchase or hire instruction manual of Philco C43 Transmitter. Please write—G3DAE. 84 Milton Road, Nunsthorpe, Grimsby.

FOR Sale.—RK Senior Speaker with energising unit incorporated; re-coned by B.T.H., £3. Battery communication receiver, 10 valves, 2 HF, 3IF, Turret coil, var. Selectivity, etc., 1-12 mc, Perfect, spare valves and 'phones, £6. Battery wavemeter, 2400-3900 and 300-600 kc, 35/-. Carriage extra, 11/6 × 1/6.—Box 331.

SALE Tobe communication receiver—excellent condition and performance—mains energised speaker 4 bands, £15.—J. Woods, G3VG, 6 Springfield Road, Portishead, Bristol.

WANTED for purchase or hire, Instructograph with tapes. Also contact with Ham who has had experience on the VRL receiver.—Box 330.

WANTED to buy, borrow or hire January *QST* (with details on "Q Fiver").—GM3CCK, Herald, Kirkwall, Orkney.

J36 bug key, £2/10/-; BC221, £16; 2C26 VHF triodes, 17/6 each. 83OB, 17/6; 814, £2; 6K7M, 7/6; 6F6M, 8/6. BC614E speech amp., £8. BC906 D freq. meter, £3/10/-. All above gear brand new. 6v AC Class-D Wavemeter, £3/10/-. Type 37 Osc., £9/10/-, both as new. 35 mc Xtals, £2 each. Other gear S.A.E.—Parker, 9 Cheltenham Road, Broadway, Worcestershire.

SALE.—1481 complete Manual, £3/10/-. Wavemeter 1238, 5-10 metres, £4. Eddystone 2-stage pre-selector, valves, coils, £4. All as new. Carriage extra.—G2FXA, 35 Kensington Road, Stockton-on-Tees.

BC221 £13/10/-. BC-348, £16/10/-. BC-453, (Q5'er), £2/5/-. ASB8 (double-super for 420 mc), £5/10/-. Wavemeter 65-75 mc containing 1 mc and 10 mc Xtal, 2 EF50 and 2 DH63, £3. Valves 807, with base, 10/-. PT 15, 12/-. 6AG5, 6C4, 6J6, 10/- each. —G5KX, 1 Balmoral Drive, Southport, Lancs.

SKY Champion, with S-Meter, in good condition. Reasonable offer to G2HAC, 54 Lodge Street, Accrington, Lancs.

RESULT of 4 months' spare time. Complete Station including test equipment in steel case, 18-in. × 1 in, × 8 in. ECO 807 running cold, 3-8 mc, 125-350 kc, directly accurately calibrated. T9x Keying of ECO signal generator by switching in audio oscillator. Black crackle. B2 transmitter and receiver, 25 watts, 20-40-80 metres, all coils, AC power pack, quality transformer, adequate smoothing. Goodmans speaker, multi-range test meter using switched meter in B2, wooden transit case, £30.—G3AQY, High Street, North Thoresby, Lincolnshire.

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AR88; rack mounting 25-watt transmitter 6L6-T20 PA, 6V6 push-pull modulator, supply, D104 mike, crystals, perfect. 19 Set 1360 transreceiver, 500 and 300v supply. all or separate.—Fry, 33 Somerset Street, Kingsdown, Bristol.

TU5B for VFO Unit, brand new 12/6, carriage paid, 14/-.—Woodhouse, 22 Darbishire Road, Fleetwood, Lancs.

EDDYSTONE 504 for sale, £45 or nearest offer. Also T1131 driver unit, modified for 5 metres and 807 output, including Xtal and valves, £15. Numerous new and unused Mullard and RCA metal valves, 6v and 12v types, 12SK7, SJ7, etc., EF50's, 54's, etc., 3/- each.—G3ASK, F/O E. Laraway, Officers' Mess, R.A.F. Hendon, Middlesex.

SMALL ADVERTISEMENTS

READERS'—*continued*

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WANTED.—American TBY7 Trans/receiver 28-80 mc; also ASB8 420 mc receiver or other 420 mc Rx or Trans/receiver. Also require Nife batteries, petrol electric plant, AC or DC.—Glenhaven, Cliffe Road, Wembury, Devon.

FOR disposal; Labgear, Wearite, BVA Valves Components. New at trade prices. Service sheets and test gear in perfect condition. Offers?—G2AQG, 30 Chancery Lane, Maidstone, Kent.

FOR sale.—Type 145 VFO Unit, no power pack, good working order, £5 carriage paid.—G6KJ, 20 Church Street, Buckingham.

HALLICRAFTERS Sky Champion, Model S20R, 6·8-550 metres, fine condition, £25.—Hodgkins, 43 Hawthorn Avenue, Bury, Lancs.

TRANSFORMER 3850v, 50 mA. 4·1v, 1a, 4·25v, 2-3a, 35/-. carriage, 3/6.— Box 280.

HALLICRAFTERS SX 24, RCA matched Speaker, £22; 150-watt Tx, VFO-CO, 813 final, complete with all power packs, xtal, £35.—G2FDC, Outermarch Road, Coventry.

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HALLICRAFTERS S-38, new condition, with transformer for 250w, 220v to 110v, step down; £25.—Fowler, 12 Margaretta Terrace, S.W.3.

SALE.—R.1155, fully modified, EL33 output, 'phone jack M/E speaker, separate power pack, covers 18·5 to 3 mc, 1,500 to 600 kc, 500 to 75 kc. In FB condition. Offers? Husbands, 73 Stainbeck Road, Leeds, 7.

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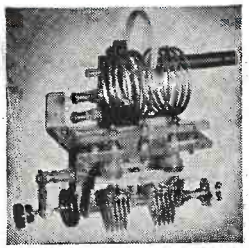

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