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VOL. XX JANUARY, 1963 NUMBER 11

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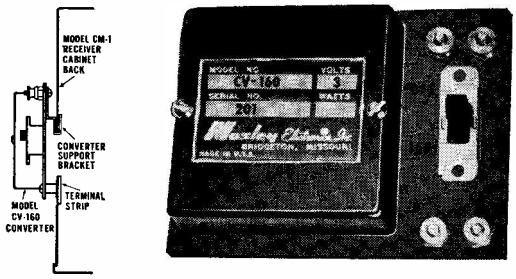

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The SHORT WAVE Magazine

To All Our Readers, a Very Happy New Year, with Prosperity and Good Health in 1963

It is again the season for Sound Advice and Good Resolutions—and it hardly needs saying here that in our world of Amateur Radio much useful advice could be given and a long list of excellent resolutions could be catalogued.

It is widely held that nowadays radio amateurs use more commercial equipment than gear they design and build themselves. Certainly, whereas 25 years ago it was essential to home-construct much of one's apparatus, today there is no need to build anything at all — it can all be bought off the shelf, ready to go on the air. There is nothing wrong with this; indeed in many ways it is a very good thing that such an approach to Amateur Radio is possible.

But as always, amateurs will remain individualists who pursue a great hobby as the spirit moves them — they are not really much concerned about what others may be doing, thinking or building.

So instead of offering advice for the New Year to those who may glance over this page, we would simply say that we wish all our readers, all over the world, the best of luck, happiness and good fortune for the coming year, and success in whatever direction their amateur activities may lead them.

Austin Forbes G6FO.

WORLD-WIDE COMMUNICATION

DESIGN FOR A TWO-METRE TRANSMITTER

VFO DESIGN AND CONSTRUCTION—SETTING-UP PROCEDURE—OPERATING POINTS

Part II

A. J. REYNOLDS (G3NNK)

The first part of this article appeared in the November issue of SHORT WAVE MAGAZINE, *and should be read with the discussion following here, which finalises on the design and operation.—Editor.*

Before proceeding further, attention is drawn to a correction which should be made to the circuit diagram on pp.458-459 of the November issue: Contacts 1 and 3 on switch Sw3b should be taken to chassis; and contact 2 and lower end R31 connected to the −105v. line.

The Modulator

THIS comprises an EF86 pentode speech amplifier followed by two triode stages consisting of one half of a 6J6 and a 6C4—circuit Fig. 4. The output is switched either to the VFO for NBFM or to the 12BH7 for AM. The speech clipper consists of two OA81 diodes followed by a three-section filter, details of which are given in Fig. 5. To compensate for loss in the filter when in use, a further stage of amplification is switched in, using the other half of the 6J6. The modulator is coupled into the VFO by a small AF transformer; in the writer's case this has a 3:1 ratio and is connected as a step-down from the modulator.

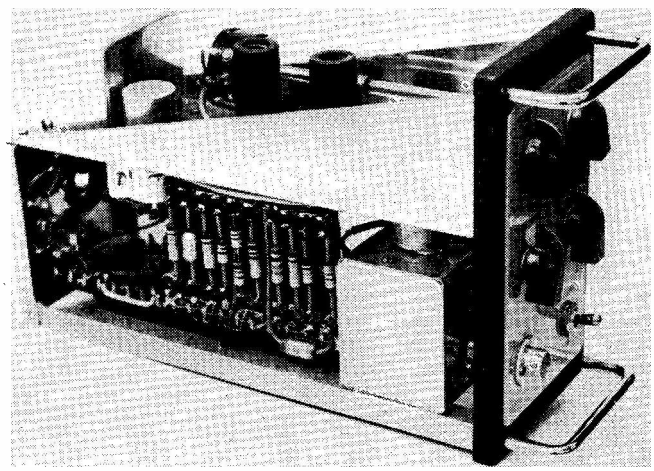
The unit is built into a box made the same height and depth as the transmitter. The first stage is contained in a small section measuring 2½ in. by 2 in. by 2 in. The microphone input is completely screened right up to the grid of the EF86 and the HT and LT is supplied *via* feed-through capacitors C2 and C6, Fig. 4. The filter coils and the associated capacitors are mounted on a tag board at the bottom of the unit. Another tag board on the side serves to mount the resistors and the two diodes. Chassis measurements are given in Fig. 6 and the general layout can be seen from the photograph below.

The VFO

From time to time a number of circuits for two-metre VFO's and VXO's have appeared in print. After much study, that chosen by the writer was a Franklin oscillator using a pair of EF95's (6AK5), pentode connected, followed by two EF91 (6AM6) buffer stages. A frequency of 6 mc was selected, enabling the output to be fed straight into the first stage of the transmitter in place of the crystal.

With a frequency multiplication of 24 to reach 144 mc, the oscillator needs to be extremely stable if it is to be of any great use. The graph of Fig. 9 shows the amount of drift at 144·5 mc recorded over a period of five hours. This has been repeated in different temperatures with similar results.

Many L-and-C combinations of tuned circuit were tried in order to arrive at a circuit with a low L-to-C ratio, and at the same time to maintain a reasonably high Q-factor. The coil used is made of ten turns of 14g. silver-plated copper wire wound to ¾ in. inside diameter, self-supporting, spaced to occupy a length of 1 in. and covered with polystyrene cement. One turn at the end is left free until final adjustment of frequency coverage is made. The inductance L1 has approximately 700 $\mu\mu$F capacity in parallel with it. The tuning capacity C1 should be of sturdy construction, with a double-ended bearing. (The type used by the writer is made by Wingrove and Rogers, and has a three-hole fixing.) It is mounted on the underside



Three-quarter side view of the modulator. The screening of the microphone socket is extended, by thin brass strip, to the inside of the box housing the first speech amplifier stage, an EF86, V1 in Fig. 4. The output transformer T1, at the rear of the chassis, is shown screened, but this is not absolutely necessary.

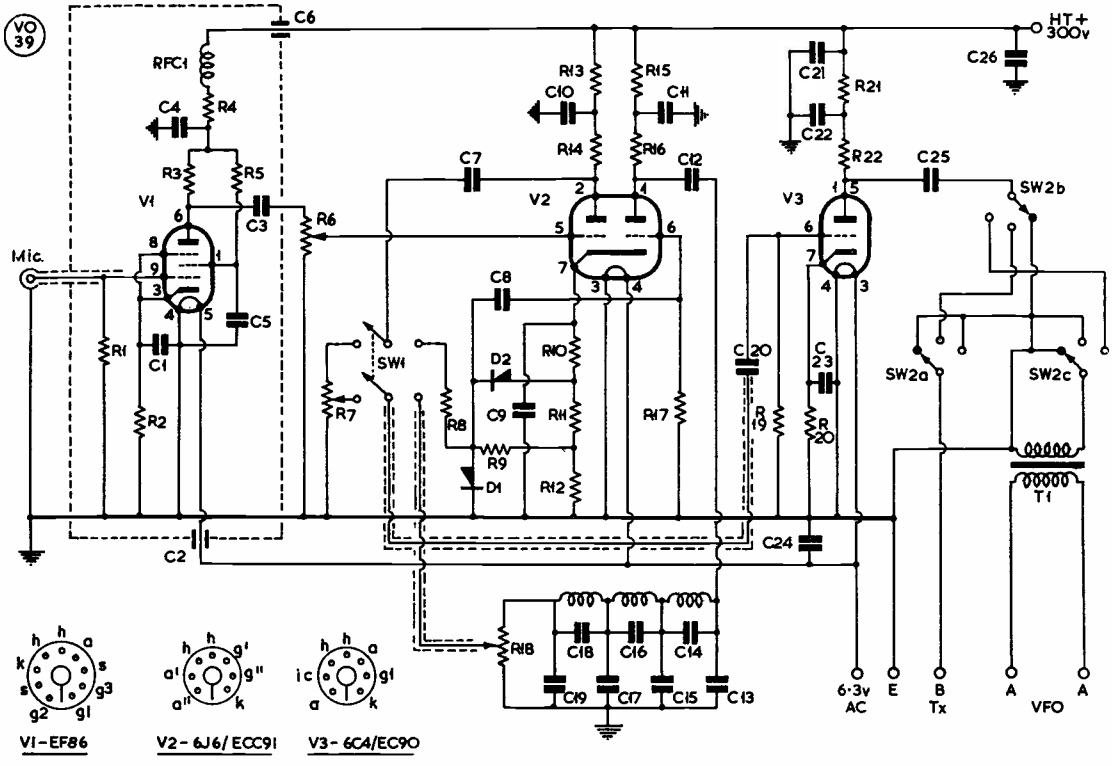


Fig. 4. Circuit diagram of the modulator for the G3NNK two-metre transmitter, with switch Sw2 shown in the CW position. If speech clipping is not required, the first half of V2 and the 6C4 (V3) could be combined in one valve, such as a 12AX7; this would enable an extremely compact unit to be constructed. With series-gate modulation it is necessary to reduce the bass response to avoid distortion due to automatic clipping on speech peaks when the voltage on the screen of the PA reaches maximum. Note that the coils associated with C14, C16, C18 should be marked Ch.1, Ch.2, Ch.3.

Table of Values

Fig. 4. Circuit of Modulator Section

C1 = 10 μF elect. 25v. wkng.
C2, C6 = .001 μF feed through
C3, C7, C8, C12, = .01 μF paper 350v. wkng.
C20, C25 = .01 μF paper 350v. wkng.
C4 = 8 μF elect. 350v. wkng.
C5 = .1 μF paper 350v. wkng.
C9, C23 = 25 μF elect. 25v. wkng.
C10, C11 = 8 + 8 μF elect. 350v. wkng.
C13, C14, C16 = .015 μF paper
C15 = .03 μF paper
C17 = .05 μF paper
C18 = .003 μF paper
C19 = .06 μF paper
C21, C22 = 8 + 8 μF elect. 350v. wkng.
C24, C26 = .005 μF ceramic disc
R1 = 1,000,000 ohms, ½-w.
R2 = 1,500 ohms, ½-w.
R3, R22 = 220,000 ohms, ½-w.
R4, R16 = 47,000 ohms, ½-w.
R5 = 1,500,000 ohms ½-w.
R6 = 1,000,000 ohms, carbon potentiometer
R7 = 10,000 ohms, carbon or w/wound potentiometer
R8, R9 = 100,000 ohms, ½-w.
R10, R20 = 1,000 ohms, ½-w.
R11, R12 = 1,200 ohms, ½-w.
R13, R15 = 10,000 ohms, ½-w.
R14 = 100,000 ohms, ½-w.
R17, R19 = 470,000 ohms, ½-w.
R18 = 2,500 ohms, carbon or w/wound potentiometer
R21 = 3,300 ohms, ½-w.
RFC1 = 100,000 ohms, ½-w. resistor wound full with 28g. enam.
Ch.1, Ch.2, Ch.3 = 2,400 turns of 40g. enam. on bobbin (*see* Fig. 5 opposite)
SW1 = DPDT toggle
SW2 (ABC) = Three-pole three way ceramic wafer
D1, D2, = 0A81 diodes, matched pair
T1 = 3 to 1 AF transformer
V1 = EF86
V2 = 6J6, ECC91
V3 = 6C4, EC90

(*All resistors 20%*)

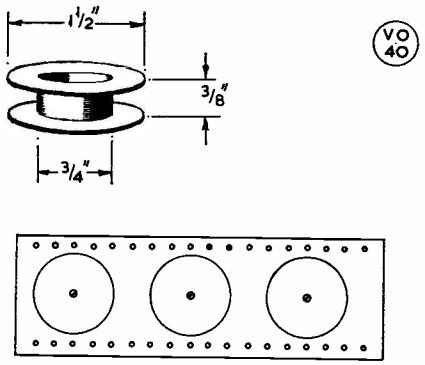


Fig. 5. Detail of the bobbins used for the filter chokes Ch.1, Ch.2, Ch.3 (Fig. 4, Modulator). The cheeks are cut from 1/16-in. paxolin and made a tight fit over the pieces of dowelling. Each bobbin is wound with 2,400 turns of 40g. enamelled wire; this can be spun on with a hand-brace mounted in a vice. The chokes are mounted on a tag-board, together with their associated condensers C13-C19, making up a single unit between C12 and R18 in Fig. 4.

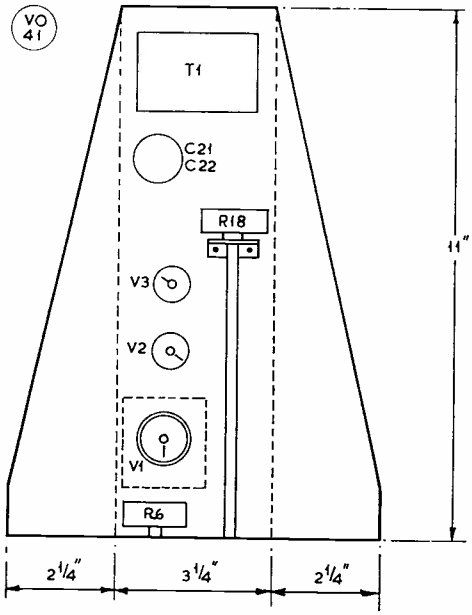


Fig. 6. Layout above chassis of the modulator unit; compare with the photograph. The sides are bent upwards along the dotted lines.

Table of Values

Fig. 7. Circuit of VFO for VHF Transmitter

C1 = Approx. 30 μμF tuning (*see* text)
C2, C5, C6 = Philips concentric trimmers (*see* text)
C3 = 620 μμF silver mica, resin cased
C4 = 27 μμF NTC N750
C7, C8, C11, C12 = .001 μF, ceramic disc
C9, C16 = 27 μμF silver mica
C10 = 5 μμF silver mica
C13, C14, C15, C17, C18, C19, C21, C22, C23 = .005 μF ceramic disc
C20 = 8 μF elect. 200v. wkng.
R1, R5 = 3,900 ohms, ¼-w., 10%
R2, R8 = 100,000 ohms, 1-w. 10%
R3, R6 = 10,000 ohms, w/ wound, 5-w. 10%
R4, R7 = 150 ohms, high stability
R9, R13 = 330,000 ohms, ¼-w. 20%
R10, R14 = 4,700 ohms, ¼-w. 20%
R11, R15 = 100,000 ohms, ¼-w. 20%
R12, R16 = 47,000 ohms, ¼-w. 20%
V1, V2 = 6AK5 or EF95
V3, V4 = 6AM6 or EF91

TABLE OF COIL VALUES

The VFO Circuit

L1 = 10 turns 14g. silver plated copper ¼-in. inside diameter, length 1-in. (*see* text).
L2, L3 = 110 turns 36g. enam. close wound on ¼-in. Aladdin former, two layers 70 turns and 40 turns, slug tuned.
L4 = 7 turns insulated wire on earthy end of L3.

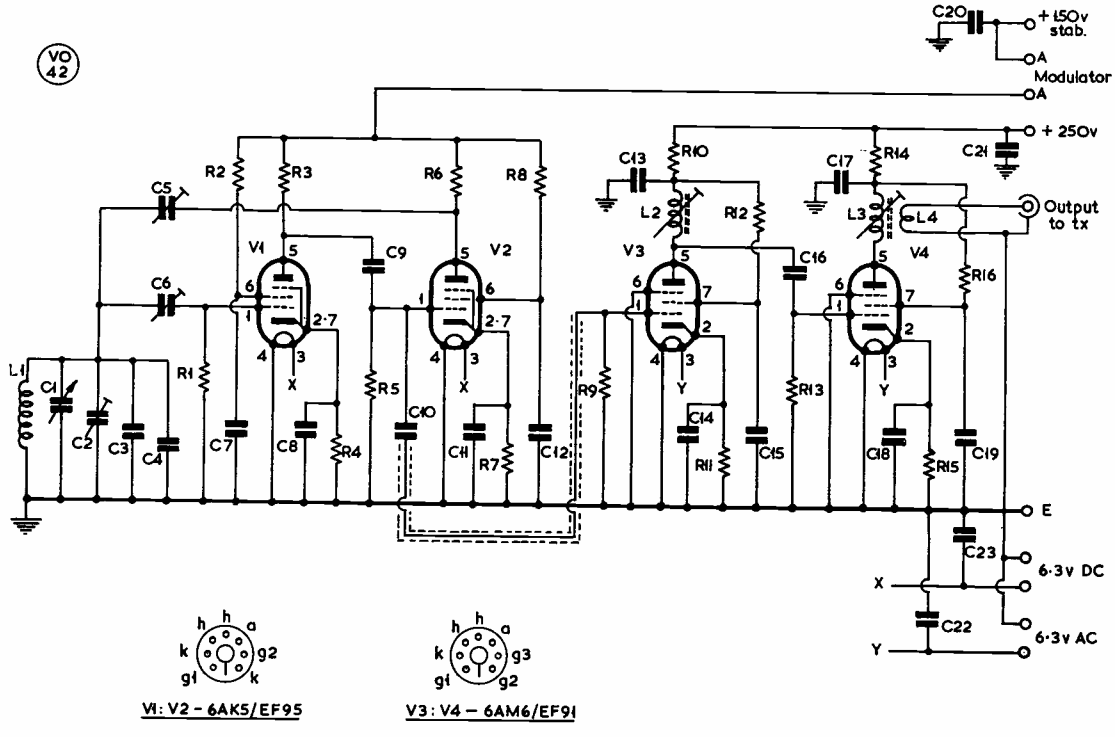


Fig. 7. Circuit of the 6-mc Franklin oscillator, to give drive into the 144-146 mc band. It is built as a separate unit — see photograph — very rigidly for stability, and has an excellent drift characteristic (Fig. 9). L2, L3 should be adjusted to give level output over the band. Very small capacities are used for C5, C6—see text.

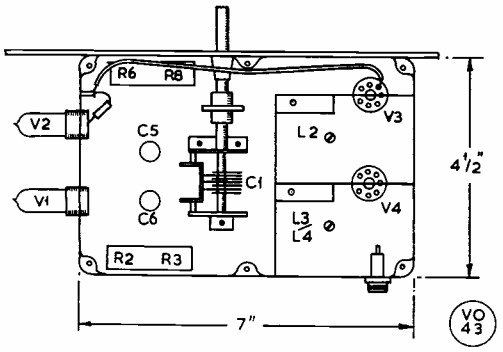
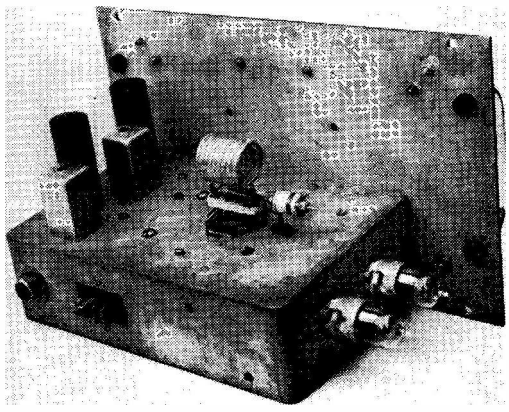


Fig. 8. Layout for the VFO, under chassis. Screens straddle V3, V4, and pin 4 of each valve is soldered to the screen. A flexible coupler is used between the slow-motion head and the tuning condenser C1 to eliminate mechanical strain. C5, C6 are on small ceramic stand-offs.



Top chassis view of the VFO. The two oscillator valves are mounted on the side of the chassis, with the tuned circuit well in the clear. The trimmer C2 is adjustable from the side of the cabinet. The oscillator valves should be fitted with their grids vertical.

of the chassis by brackets fixed to both end plates, and the number of vanes are reduced to three fixed and four moving vanes, not double spaced. The unit is built on a 7 in. by 4½ in. Eddystone diecast chassis and housed in a diecast box. As will be seen from the photographs, the two oscillator valves are mounted horizontally on one side of the chassis, well away from the tuned circuit. The buffer stages are also kept well clear. The valves are convection cooled through holes at the ends of the box, top and bottom, and in this way there is minimum change of temperature around the oscillator coil.

The coupling condensers C5 and C6, and the trimmer C2 are all made from Philips 8 $\mu\mu$F concentric trimmers. The outer cylinder of the movable section is carefully cut round to leave a disc, the minimum capacity then being about 1 $\mu\mu$F. It has been found that oscillation can be maintained with these coupling capacitors unscrewed almost to their full extent, thereby ensuring that valve capacities have negligible effect upon the tuned circuit.

Screens are fitted to the underside of the chassis to isolate the buffer stages, the associated coils L2 and L3/L4 being wound on Aladdin formers mounted above the chassis in screening cans.

All components must be rigidly mounted, especially the oscillator section, and wiring such as supply leads between stages are secured to the chassis by an application of *Araldite* at suitable points. The wiring of the tuned circuit is in 14g. wire, and all other wiring in the oscillator section is carried out with not thinner than 18g. wire. The shunt capacitor C3 is of the resin-cased type and is adhered to the top of the chassis immediately below the oscillator coil. The negative temperature coefficient capacitor C4 is soldered directly across, and as close as possible to the coil. The small concentric trimmer C2 is mounted horizontally and adjacent to the coil. A length of polystyrene rod is cut and a short piece of PVC sleeving is made a tight fit over the end, leaving

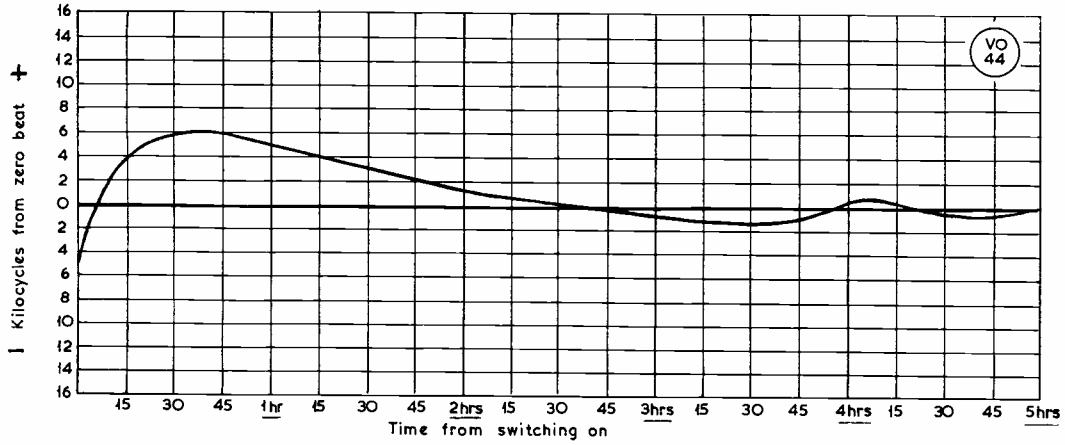


Fig. 9. This curve shows the measured frequency drift of the VFO — circuit Fig. 7 — recorded over a period of five hours, against the beacon transmitter GB3VHF on 144.5 mc. Curves of similar shape have been obtained during five-hour tests at different ambient temperatures. This inherent VFO stability derives from the fact that the oscillator is in the Franklin circuit.

sufficient for a push fit over the nut on the trimmer; the rod then fits into a bush at the side of the cabinet and engages the trimmer when the unit is in position, so that adjustment can be made externally.

The slow motion drive is constructed from a (pre-war) "Utility Micro Dial," fitted with a new cursor. The scale, made of ivorine or white card, is marked with eleven semi-circular scales, making ten divisions. The inner and outer scales are calibrated at 100 kc intervals from 144 to 146 mc. It will be seen (photograph p.457, November) that curved lines are drawn from calibration points on the inner scale to calibration points 100 kc higher on the outer scale. These lines bisect the intermediate scales, giving 10 kc points throughout the band. The hair line cursor fitted to the slow motion head further divides each 10 kc. The curvature of the lines drawn between each 100 kc is substantially constant, with the exception of the highest 100 kc of the scale, where C1 is approaching minimum capacity.

TABLE OF VOLTAGE AND CURRENT READINGS

Transmitter

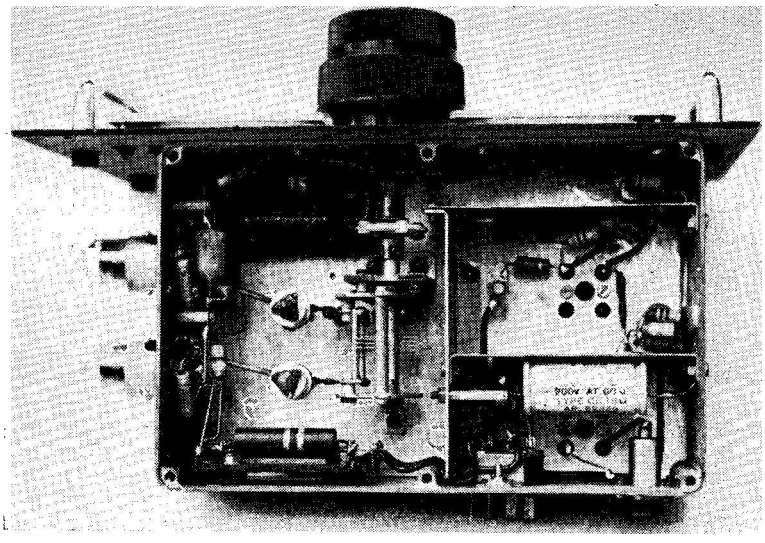
STAGE	GRID CURRENT *mA*	ANODE CURRENT *mA*	SCREEN CURRENT *mA*	ANODE *voltage*	SCREEN *voltage*
V2 6BW6	0·5–0·75				
V3 5763	1				
V4 TT15	2	40	3	300	
V5 QQV06-40					
MODE					
Full Carrier (CW)	4–5	190	14	500	250
Quiescent Carrier	4–5	30–50	5	500	125
Peak Carrier	4–5	150	12	500	230

Tuning Procedure *(Refer circuit pp.458-459, November)*

The initial alignment of the tuned circuits is most easily carried out with the aid of a grid dip oscillator. However, coils up to and including 36 mc are screened and are best adjusted by applying LT and HT to V1 only and listening on a receiver, or by temporarily connecting a 1 mA FSD meter in the appropriate grid circuits, in which case V2 should also be supplied with power. Next, set the two potentiometers R26 and R27 to the correct grid bias voltage. With negative 105v. applied, the slider of R26 should read negative 30v. with respect to chassis, and R27 should read negative 55v. likewise. These voltages should be measured with a high resistance meter. With the residual carrier control R.34 set at minimum, *i.e.* slider at cathode end of V6, power may be applied, except the PA anode supply. Tune each stage in sequence for maximum drive, and tune the driver anode for a dip in current. Set R22 to give 4 mA of drive to the PA. Apply voltage to the PA anodes and tune quickly to resonance. C39 and the coupling coil L12 should be adjusted for correct loading. It will be found that C39 needs very little capacity. With the residual carrier control R34 fully advanced, the PA should take 190 mA with 500v. applied, for a grid current of between 4 and 5 mA. Increasing the drive beyond this does not increase output to any great extent. Grid voltages of the driver and the PA should be checked and adjustment of R26 and/or R27 made if necessary. A full table of readings is given in the panel above.

For amplitude modulation the residual carrier should be set by R34 to approximately one-fifth of the full carrier input. Automatic speech clipping is possible merely by advancing the audio level beyond the point which produces a full carrier on peaks. Practically all available audio can be used before clipping becomes too heavy.

The functions of the three potentiometers in the modulator (Fig 4) need explanation. With the switch SW1 in the non-clipping position, R6 and R7 both act as gain controls, and R18 is out of circuit. With the



Underside of the VFO assembly, to the circuit of Fig. 7. The Franklin oscillator section, on 6 mc, is rigidly wired, and connected to the buffer stages through a length of coax. Performance figures for the VFO are given in Fig. 9, p.571.

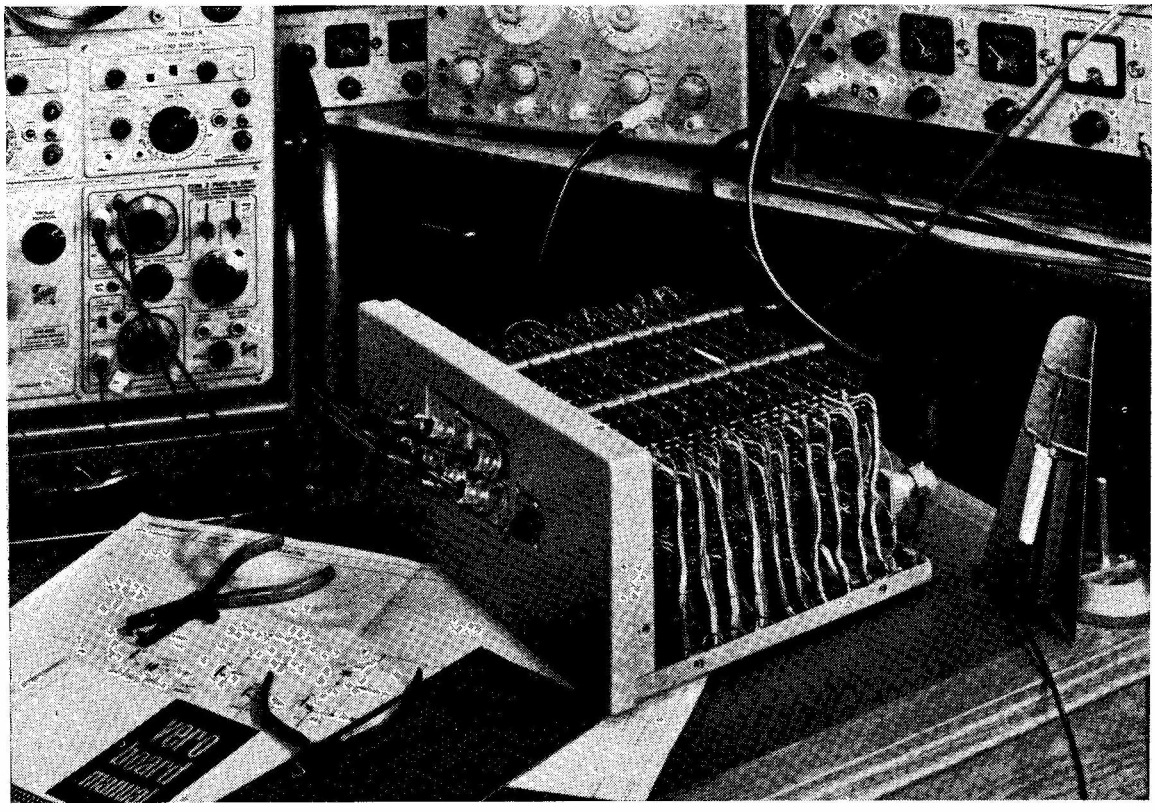
clipper switched in, R18 becomes the audio level control, R6 controls the clipping level and R7 is out of circuit. When using NBFM and " straight " audio, *i.e.* non-clipped, R6 and R7 need only be advanced half-way for a deviation of 2·5 kc.

The buffer stages in the VFO and the input coil L2 in the transmitter should be tuned to produce a bandpass characteristic. The capacitors C5 and C6 in the VFO should be set at the minimum capacity consistent with stable oscillation.

Conclusion

The transmitter has been in use at G3NNK for the past six months, and the VFO for two years. Results have been very encouraging, excellent reports having been received on all three modes of transmission. The stability of the VFO is good, and the maximum calibration error over a period of weeks has been 10 kc at 144·5 mc, checked against GB3VHF ; slight adjustment of the trimmer C2 brings it back to zero heat. It is intended to fit a discriminator to the receiver and compare AM to NBFM under correct receiving conditions, rather than detuning on an AM receiver. Remarks from stations worked, which are equipped with FM receivers, suggest that this system is preferred to AM. It is the answer to a difficult TVI problem; it also keeps one out of trouble with nearby tape recorders and portable receivers. For those who prefer AM, series-gate modulation is well worth trying when one considers the saving in the " heavy " components. The carrier level control is a useful facility for test purposes and wastage of power when working local stations can be avoided.

The writer would like to thank G3PED for assistance in preparing the article and photographs.



Interesting example of the use of " Veroboard," a universal assembly system enabling the technique of printed circuitry to be applied without the inconveniences normally associated with this form of construction. " Veroboard " consists of a basic framework of wiring in the form of copper strips bonded to an insulant and pierced with a pattern of small holes. Circuit parts are arranged to span and connect up to the required copper strips, which can be broken where necessary, either with a cutter or by drilling out an oversize hole. The wide range of " Veroboard " sizes enables a large variety of equipment assemblies to be accommodated on standard boards. The illustration shows a small computer built up on a series of " Veroboards " which plug together, forming a stack easily opened up for inspection. For quantity production boards can be marked with component locations and all copper breaks included, making assembly an easy matter for semi-skilled labour.

NOTE ON RADIOMETEOROLOGY

MET. INVESTIGATION BY RADIO AND THE STUDY OF WEATHER EFFECTS ON PROPAGATION

From a Lecture by

J. A. SAXTON, D.Sc., Ph.D., M.I.E.E.

An authority on radio-wave propagation, Dr. Saxton is also well known to many amateur VHF operators—for he has always taken a keen interest in the EDX/GDX results obtained on our VHF bands. This article is based on a recent lecture by him on the somewhat esoteric subject of radiometeorology, delivered before the Electronics Division of the Institution of Electrical Engineers, and is reproduced with acknowledgements to that Institution.—Editor.

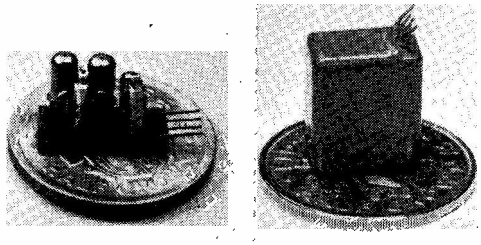
THE subject of radiometeorology, although not then known by that name, goes back to the beginnings of radio, for the reception of "atmospherics"—the radiation from electrical discharges in the atmosphere—was amongst the earliest radio experiments to be performed, and this aspect of the subject has maintained its interest up to the present day.

Radiometeorology may now be taken to embrace a two-fold relationship between radio and meteorology: It is concerned with (1) Those aspects of meteorology which affect radio-wave propagation, and (2) Applications of radio techniques to meteorology. Developments in the two fields were taking place before the Second World War, but the past twenty years have seen an expansion of the subject which could not have been foreseen at that time. Radiometeorological phenomena are troublesome at times, at least from the radio engineer's point of view; but they may also be exploited to advantage for radio purposes, for meteorology and in the study of cloud and precipitation physics.

The application of direction-finding techniques to the location of atmospherics has enabled meteorologists to track distant storms, whilst investigations of the characteristics of the atmospherics themselves have yielded knowledge on wave propagation and on the nature of the electrical discharge processes occurring in clouds. The study of the world-wide distribution and intensity of radio noise resulting from atmospherics has provided the engineer with data vital to the planning of communication circuits. The balloon-borne *radio-sonde* (brought into use some thirty years ago) is still the meteorologist's basic source of information on the pressure, temperature and humidity away from the ground; in conjunction with a direction-finding network or with radar it may also be used to determine wind-velocities in the atmosphere.

The troposphere, with which radiometeorology is at present mainly concerned, is a refracting, absorbing and scattering medium and these properties depend upon the weather to an extent which is important for the propagation of waves in the VHF and higher frequency bands. There result some significant effects in the use of radio at such frequencies, and problems arise in broadcasting, point-to-point links—including space communication—and in radar applications. For many years the main source of information about the refractive index of the atmosphere was the *radio-sonde*, the index being calculated from measurements of pressure, temperature and humidity. However, the structure so determined has proved to be too coarse for many propagation studies, and new radio techniques have been developed to enable finer scale refractive index variations to be observed. Foremost amongst these techniques is the microwave refractometer which yields direct measurements of the refractive index. Sounding of the troposphere by radar also shows promise of providing valuable information on the detailed structure of index variations.

Precipitation, especially heavy rain, can adversely affect the performance of microwave radar systems, both as a result of the attenuation of signals and of echoes from the precipitation which mask wanted target echoes. On the other hand the fact that such echoes are obtained from precipitation is not only useful for short-range weather forecasting but it has also provided the cloud-physicist with a powerful new tool. Whilst all the early hopes in this field have perhaps not been realised, centimetric radar has been of great value in the study of the distribution, movement, structure and development of precipitating or rain-giving clouds; and it seems likely that millimetric radar will prove to be most useful in the study of non-precipitating clouds.



A new micro-amplifier with a power gain of 60 dB, having a sensibly flat response between 500 c/s and 100 kc, using micro-alloy transistors, working from a power supply of between 1½ and 9 volts. The reference size is a half-crown and on the right is the fully potted version of the device, as produced by Sinclair Radionics, Ltd.

EMBELLISHING THE BC-221

USEFUL ADD-ON UNIT

B. M. SANDALL (G3LGK)

THE regular measurement of frequency to great accuracy is not an essential aid to working rare DX—you've still got to hear it to work it! However, it is nevertheless a fact that most amateurs look on the BC-221 as one of those pieces of gear that is highly desirable for the operation of an efficient station, and these excellent instruments are still quite readily obtainable at reasonable prices. Having obtained one, the writer decided to make it work as hard as possible, and to make it self contained.

Modifications

Strictly speaking, there are very few ways in which the amateur could improve the performance of the BC-221. It is, perhaps, fairer to regard the following notes as suggestions for adding to a highly satisfactory basic circuit, to assist in its operation.

In the original form, the BC-221 is a wide-range frequency-meter which is available with or without modulation. With the possible exception of the calibration of a receiver having no BFO, there are very few uses for the modulation (in the amateur field), so its provision is ignored here.

To operate efficiently, a stabilised power supply is required, and to avoid the use of headphones for checking and monitoring, an output stage is useful. The circuit shown below for the power supply also includes a small output stage, a built-in speaker and stabilisation of the HT supply.

Circuit

The circuit of the unit makes all this clear. Perhaps the component ratings given are worth comment. It will be seen from the diagram that a transformer rated at 60mA is specified, and a little calculation will show that only about half this load is drawn by the entire circuit. The over-rating of main components in this way means that the whole cabinet runs very cool, and the stability of the unit is thus not impaired by heating of the tuned circuits. When the power pack was built, the GZ34 rectifier was chosen for the same reason—but it could be replaced by the silicon type, with even cooler running.

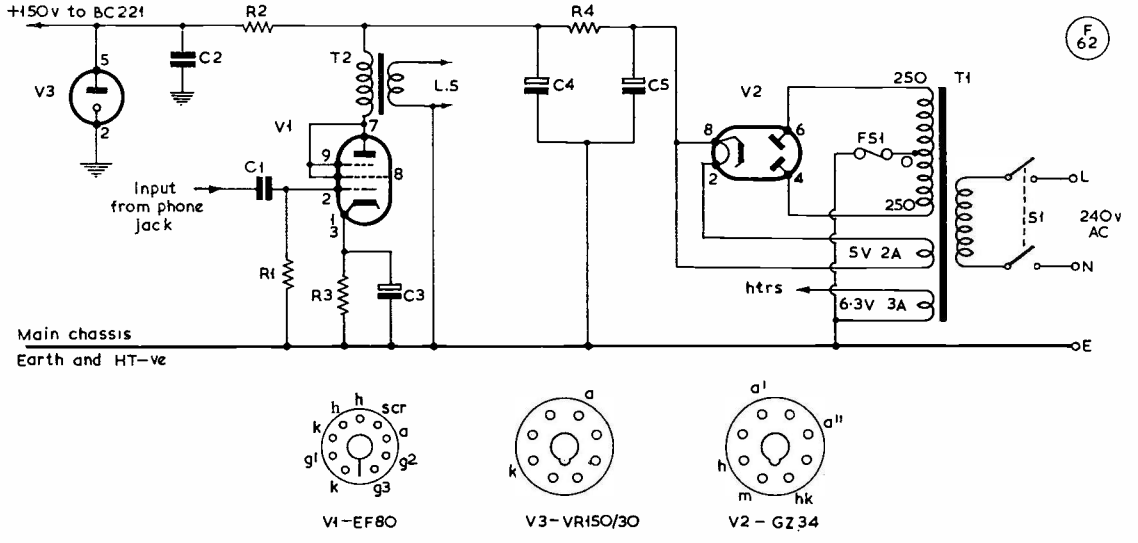
Output Stage and Monitoring

Choosing between phones or speaker is perhaps more a personal preference than a requirement, but the small speaker has proved very useful for bench testing of VFO's, transmitters and oscillators in general, where the BC-221 beat may be used for checking long-term drift. The output of the normal circuit is taken to the grid of a triode-connected EF80, which serves as a low-power output valve, again producing very little heat. For audio gain, the normal BC-221 control is used, and is quite satisfactory. It will be seen from the circuit that a DC blocking capacitor C1 is included between the headphone jack of the BC-221 proper and the new output stage, this

Table of Values

Circuit of the BC-221 modification

C1	= .01 μF, 350v.	T2	= 10,000/3 ohm o/p xformer
C2	= .25 μF, 350v.		
C3	= 10 μF, 25v.	V1	= EF80
C4, C5	= 32 μF, 350v.	V2	= GZ34
R1	= 150,000 ohms, ½w.	V3	= VR-150/30
R2	= 3,300 ohms	FS1	= 60 mA fuse
R3, R4	= 1,000 ohms, ½w.	S1	= DPST toggle
T1	= 250-0-250v., with LT's		



The add-on unit for the BC-221 provides a stabilised mains HT feed and includes a small audio output stage for amplification of the beat from the BC-221. With a mains unit to power the frequency meter, good smoothing is essential if the PDC note is to be retained.

enabling the amplifier and speaker to be used for other audio work about the station, or as an intercomm. stage.

The HT supply for the output stage is at approximately 250 volts, taken from a point before the voltage is dropped for the stabiliser. To feed power to the BC-221 chassis, a set of leads have been taken to the original battery terminals so that the chassis still plugs-out for maintenance, but the connection to the EF80 grid has been left as a flying lead between the two chassis, as the gain of the EF80 is sufficiently low in this application to make hum pick-up of no consequence. It is simply soldered to the "live" side of the headphone audio output. One further small modification to the main chassis, to make it independent of the use of phones, is to short out the pair of auxiliary contacts on the phone jack. These break the heater supplies when the phones are removed, so continuity is thus restored; it is only necessary to do this on one of the sockets.

Power Supply

Smoothing must be very good to retain the good note of the oscillator, so large condensers are used. Resistance smoothing (R4) is quite in order, although a small choke of 10-15H may be substituted if available. Stabilisation is at 150 volts, with the standard VR150-30, or the miniature OA2. Even greater stability than normal could be obtained by using a 105 volt HT rail, and the VR105-30 or OB2 may be fitted, increasing R2 to 4·7K. The loss of output is barely noticeable under normal conditions.

Loudspeaker

That fitted is a standard 3½in., 3-ohm unit, and the magnet should not be too large. It goes into the spare compartment at the front of the main cabinet. To make the speaker as unobtrusive as possible, the holes cut for the aperture were covered with a small piece of cloth glued in from the rear; this is painted black, to match the original crackle finish of the cabinet.

Construction

The power supply and output stage complete are assembled on an aluminium chassis which is fitted in the base of the BC-221 cabinet. The underside of the chassis is relatively "bare," apart from wiring between main parts. The few additional components are easily fitted either in the wiring itself or to tagstrips, and the layout is very tolerant, as no high gain stages are involved.

The new "Pensource," a pocket signal generator, based on a transistor oscillator giving about 0.5v. output, for RF, IF or audio signal tracing. Powered by a 1½v. pencil cell, the "Pensource" is made to cover several ranges from 500 c/s to 465 kc, and is an extremely useful instrument for test, calibration and service work.

SOME R.A.E. STATISTICS

In the three years May 1960—May 1962, the total of candidates sitting the Radio Amateurs' Examination (Subject No. 55 in the City & Guilds of London Institute examination syllabus) was 3,714; of these 2,373 passed, which is about 64%, and quite a reasonable figure for an examination of this sort. By no means all who passed went on to take the Morse Test for the issue of an actual transmitting licence—this is shown in rather startling fashion by the fact that though the May 1961 and May 1962 R.A.E. passes, taken together, come to 1,674 the *Call Book* shows that in the period November 1961—November 1962 only about 600 new U.K. licences were issued. In other words, approximately two-thirds of those who passed have never got as far as taking out a licence! This is a phenomenon that seems to require further investigation—it cannot all be to do with the alleged difficulty of passing the Morse Test.

JOIN YOUR LOCAL CLUB

If you are seriously interested in Amateur Radio, and there is an active club in your locality, or within travelling distance, you should join it. If you are an old hand, with many years' experience on the air, not only will your support be welcomed, but you may be surprised to find how much you don't know about the modern techniques in Amateur Radio. If you are a beginner, it is from the membership of your local club, collectively, that you will learn a great deal about the art and practice of Amateur Radio, and there will be few practical problems on which you cannot get somebody's help. Each month in SHORT WAVE MAGAZINE we publish a long list of active Clubs, with the hon. secretary's address—*see* p.546 December issue. Because not all Clubs report every month, it is a matter of looking back through three or four issues of the *Magazine* to see whether there is an active group within joining distance for you. The next Club list will be in February.

ART OF CONTEST OPERATING

IDEAS AND SUGGESTIONS FOR THE BEGINNER

G. C. VOLLER (G3JUL/GB2SM)

Our contributor has made a study of contest operating and participation; he has been very successful in charge of GB2SM, the Science Museum station, and enters regularly for the major DX events. This article is by way of guidance for the AT station operator who has yet to break into contest working.—Editor.

THERE can be few who are unaware of contests, for they are a controversial aspect of Amateur Radio but nevertheless are established and popular. Those who have not participated may be under the impression that special skill or exceptional equipment is necessary and that the only motive for entering is to win an award. It is hoped that this article will help to dispel these ideas, for there is much to be gained in the way of satisfaction and incentive towards improving one's operating ability and increasing the efficiency of equipment.

The duration of participation in any contest is a matter of personal preference. You can enter seriously by commencing operation at zero-hour and finish by forwarding a fully completed log to the appropriate organising body, or you can join in for the odd half-hour. The first entry into a major event can be a terrifying experience! The operating speed is usually much higher than normally encountered on the bands, and there is a good deal of "pushing"—but the pattern is simple and is soon assimilated. The information transmitted, apart from call signs and brief greetings, may consist only of a combined signal report and running serial number, such as 569001, although variations have been introduced here and there.

The newly licensed amateur is recommended to attempt several contests early in his career to gain initial experience and overcome nervousness. He will soon discover this to be a ready way of gaining new countries and enhancing his QSL collection.

About thirty international contests are held each year with many national and club events varying in duration from 96 hours, spread over two week-ends, to a few hours and catering for single and

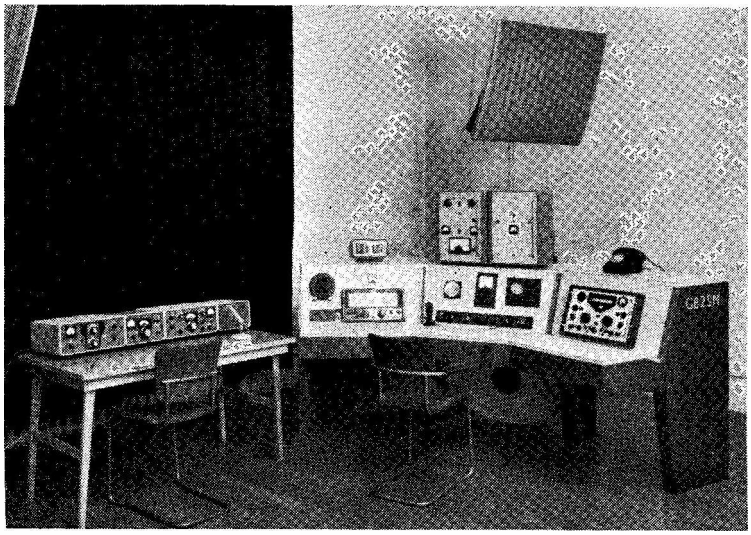
TABLE I

Contest Diary

TITLE	TYPE	COUNTRY OF ORIGIN
A.R.R.L.	*Phone and CW*	U.S.A.
CQ S.S.B.	*SSB*	U.S.A.
H22	*Phone and CW*	Switzerland
PZK	*Phone and CW*	Poland
R.E.F.	*Phone and CW*	France
PA.C.C.	*Phone and CW*	Netherlands
M.I.R.	*CW only*	U.S.S.R.
OZ.C.C.A.	*Phone and CW*	Denmark
S.O.S.	*Phone and CW*	Austria
C.H.C./H.T.H.	*CW only*	U.S.A.
S.O.P.	*Phone and CW*	East Germany
W.A.E.	*Phone and CW*	West Germany
ASIAN	*CW only*	Japan
S.A.C.	*Phone and CW*	Scandinavia
OCEANIA	*Phone and CW*	Australia
CQ DX	*Phone and CW*	U.S.A.
M.C.C.	*CW only*	England
OK DX	*CW only*	Czechoslovakia

The significant international contests in the Amateur Radio field in approximate order of appearance during the period January to December, 1963. For actual dates of the more important events refer to "DX Commentary," in which advance details are given of the contests of general interest on the HF bands.

[over



A view of the very fine amateur-band station now in operation at the Science Museum, South Kensington, London, under the GB2SM callsign. Commercial gear of the most modern type is used throughout—this is definitely not a "museum" station!—with an aerial system in keeping with the equipment. One of the operators on GB2SM is the author of the article. He also has his own home station, at Ashford, Middlesex.

TABLE II

Propagation Conditions

TIME	BAND		DIRECTION IN PRIORITY ORDER
0001	7 mc		South Africa, Asia, Europe.
0300	3.5 mc	Also watch 14 mc band	Asia, Europe.
0400	7 mc		North America, Asia, Europe.
0500	3.5 mc		North America, Europe
0600	7 mc		North America, Africa, Europe.
0700	14 mc		Asia, Oceania, North America.
0800	7 mc		Europe.

One of the most important considerations in effective contest operating is when to be on the right band to make the most of propagation conditions for working the DX. This chart is derived from standard data and will hold good for most contest situations on the amateur bands.

multi-operator stations on a single and multi-band basis. Preliminary planning should start well in advance with the preparation of a contest diary from published information and details obtained from the organisers—*see* Table I.

Scoring Systems

The points-scoring system provides a basis for one's strategy and stimulates interest in working countries, zones and continents on various bands, which in turn calls for knowledge of propagation conditions supplemented by reference to the published charts—*see* Table II. *The Radio Amateur Operator's Handbook* (available from SHORT WAVE MAGAZINE Publications Dept.) offers a wealth of information for contestants in a concise form.

Points are awarded for each contact, with "multipliers" for countries, bands and continents. Clearly, a score can be built up from individual contacts but it will be evident that with the acquisition of multipliers, contacts receive a bonus so that each may, eventually, augment the total by a hundred or more. The process can be seen more clearly in Table III, where comparison between the points awarded for contacts alone can be compared to the final score which takes into account the multipliers.

Apart from the skill of the operator, the effectiveness of a stations depends upon the efficiency of the equipment, which can be both simple and inexpensive and yet still give a good account of itself, even if restricted to one band. But to win a multi-band, single operator certificate in one of the principal contests demands a high standard of equipment, operating skill, good location, organisation, hard work, endurance and luck!

As the contest progresses the need to identify stations already worked on each band becomes apparent. Repeated reference to the log is impossible due to the speed of operation and as the memory is unreliable recourse must be had to a check list which in its simplest form consists of a card, measuring about 12ins. by 24ins., say, for each band, ruled with vertical columns, each devoted to a call-sign prefix. As a station is worked its call-sign suffix is entered in the appropriate column to form a rapid reference system, as in Table IV.

Getting Organised

The physical comfort of the operator is of paramount importance. Unnecessary effort should be avoided by carefully planning the station layout, position and function of controls, and refreshment and resting facilities should be arranged. The tired operator cannot give of his best especially, towards the end when stations, not already worked, become hard to find.

Club members will find contest operation a stimulating group activity calling for sound organisation and the employment of many special skills. Produce a carefully considered rota, from those wishing to take part, bearing in mind their preference for operating times and abilities, and elect one as leader. It helps if operators have a liking for, and experience

TABLE III

Scoring and Multiplier System

TIME	CALL	REPORTS Sent	REPORTS Received	ZONE	ZONE Multiplier	COUNTRY	COUNTRY Multiplier	POINTS
1722	W2BIQ	5814	5905	05	1	U.S.A.	1	3
1725	KP4CL	5914	5908	08	1	Puerto Rico	1	3
1726	YV5FD	5714	5609	09	1	Venezuela	1	3
1728	W1JFG	5814	5905	—	--	--	—	3
1729	CN8IU	5914	5833	33	1	Morocco	1	3
1730	CT1YE	5914	5914	14	1	Portugal	1	1
1732	PY4AS	5714	5611	11	1	Brazil	1	3
1733	EA4GZ	5914	5914	—	--	Spain	1	1
			TOTALS		6		7	20

Zone Multipliers		Country Multipliers		Points	
6	--	7	×	20	equals a score of
					260

Part of an actual contest log, produced at GB2SM during the recent "CQ" World-Wide Phone event. The running serial number is here replaced by the zones in which the various stations are situated. Naturally, the log form to be used depends upon the scoring system for the particular contest entered, and this is merely to show how a layout can be contrived for quick reference and easy computation of the final score.

of, quick contacts and are used to working under conditions of heavy interference. Do not overlook the experienced SWL when choosing log-keepers, for his work (which does not require him to be licensed) will be appreciated by the operator who is thereby able to concentrate upon the main task.

Less competent members, taking on the off-peak hours on bands where only run-of-the-mill contacts are expected, can gain experience without jeopardizing the team effort. One or two can listen on spare receivers for band openings.

Each contest should be followed by a meeting for analysis of results supplemented by reports, with tape recordings, by SWL's from their home QTH's, to consider equipment modifications and procedure deficiencies. Training sessions and club contests will help the inexperienced to participate more effectively. It is of interest to have one member dealing with statistics; provide him with a blackboard and he can maintain a progress chart.

Where equipment is to be handled by operators unfamiliar with it, ensure that adequate marking of controls, servicing instructions and special directions to modifications are conspicuous. Spare valves, fuses, light bulbs and test meters should be to hand.

Substandard signals and some undesirable operating practices unfortunately accompany most international contests but attention paid to the many signals which are beyond reproach and the technique of capable operators handling QSO's at, perhaps, one per minute can be both inspiring and satisfying to the newcomer and experienced amateur alike.

The complex character of contests is too broad a subject for every detail to be included here. However, it might be agreed that no other aspect of the hobby contributes as much to the experimental objective of Amateur Radio as these concentrated operating periods. With the ultimate satisfaction of winning an award, which cannot be accomplished without submitting an entry, you will not regret your decision to have put yourself and your station to the test.

TABLE IV

Check Card Layout

CTI	DL	DJ	DM	EA	EI	F	GC/GD	GI	GM
A1	1AZ	5ZZ	2ANO		8L	8BC		3BZJ	
JT	3BG	1BZ				2ML			
	2HC								

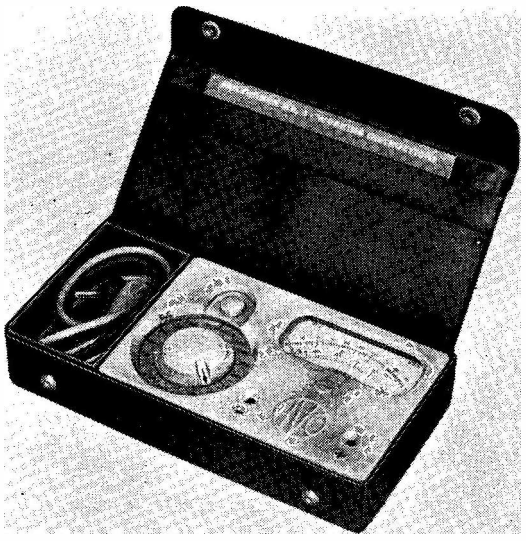
Almost any amateur-band contest involves the problem of marking off worked stations, which become unwanted as the contest progresses. As explained in the text, a check list can be produced, on a large card, enabling the logger to keep a running record of stations worked.

FOR TAKING THE R.A.E.

Those who are sitting the next Radio Amateurs' Examination, in May, are reminded that specimen question papers can be obtained from : Sales Dept., City and Guilds of London Institute, 76 Portland Place, London, W.1, price per set 2s. post free (quote "Subject No. 55—Radio Amateurs' Examination" when ordering). An extremely useful guide to the whole business of taking, and passing, the R.A.E. is the *Radio Amateurs' Examination Manual,* available from our Publications Dept. at 5s. 6d. post free.

ARTICLES AND PHOTOGRAPHS

We are always on the look-out for good technical and semi-technical material, on any subject of Amateur Radio interest, for possible use in SHORT WAVE MAGAZINE—articles we can publish are paid for at good rates, immediately on appearance. General notes for the guidance of potential contributors appear at the foot of the Contents page in every issue, and more detailed information on the preparation of material for publication in the *Magazine* for May, 1959. Photographs of stations, equipment and personalities of Amateur Radio interest are also a regular requirement ; they must be clear and sharp, and the descriptive notes should be on a separate sheet, with the print itself only identified on the back in light pencil. Photographs are used for general illustration as opportunity offers, and paid for on publication.



The new Mark IV version of the world-famous AVO Multi-Minor Test Meter incorporates accuracy standards of within 2.25% either way on the DC ranges and 2.75% of FSD on AC. It is an 18-range instrument with single-switch control, giving six DC voltage ranges up to 1,000 and five AC voltages of 10v.-1,000v.; DC current in five ranges from 100 μA to 1 amp.; and two resistance ranges of 0-20K and 0-2 megohm. The ranges can be extended to 2500v. DC and up to 25 amps. by the use of shunts and multipliers as external accessories. The standard pack for the AVO Multi-Minor Mk. IV includes leads, prods, clips and full instructions in six European languages.

AND WHAT ABOUT JUNK BOXES?

By G3COI

I WAS reading an article the other day on how to build a small portable transmitter when I came upon the phrase " the whole outfit should not cost much as most of the parts can be culled from the junk box . . . "

It occurred to me that there could be readers of the article who would never become satisfied builders for the simple reason that they just hadn't got a junk box! You, sir (or you, madam), may be a hardened radio amateur and thus already have a box of splendidly varied junk, ancient and modern, collected over the years. In fact, you may even have several junk boxes, as I have, chockfull of valuable, and in some cases irreplaceable, rubbish. (For instance, I have a number of large air-spaced variables that as they stand make excellent toast racks.)

However, difficult as it may be to believe, there are people who have virtually *no junk at all.* They have to make do with a commercial Tx and Rx and do not even have one loose resistor with short wire ends. So what can these people do when they are confronted with a constructional article such as I have mentioned? You may be saying that if they have commercial gear then they are not interested in building stuff, anyway. Don't you believe it! Deep down inside the most rabid commercial-gear type amateur there lurks one who would build everything he needed—from a loop lamp indicator up—provided he had the *time.* And a junk box.

Some enterprising manufacturer should, therefore, market a series of junk boxes, to fill this long-felt want. The Junior Kit for the young-impecunious—or even old-impecunious-but-just-starting amateurs—would retail at about 3s. 6d. and consist of the following:

One stout cardboard carton as used for carrying butter *(say).*

One dozen assorted resistors with short ends *(some open circuit).*

One dozen condensers, mainly electrolytic *(over 50 per cent very doubtful).*

Three dozen assorted nuts and bolts *(none of which fit anything).*

One ounce mixed fluff, spent matches and dust.

Two peculiarly-shaped metal brackets.

To follow in the series there would be five other Junk Box Outfits up to a ceiling price of 29s. maximum—this last would, of course, be the *de luxe* offering, containing many surprises, such as an electric drill with burnt-out field winding. The box holding the *de luxe* outfit would be of real wood finished in a pleasant shade of olive drab, complete with carrying handles and original U.S. lettering inside and out.

Of course, it would also be possible to start with the junior box and add to it by buying Supplementary Kits 2A, 3A, and so on.

I was going to deal with our *very* impecunious friends in my next article, but I know and appreciate how galling it can be to read the words " Next month I shall be dealing with 'Starting Your Own Junk Box,' " so I have decided to give those who would be unable to afford even the Junior Kit a few hints immediately.

Begin by visiting some of those relatives of yours you haven't seen for years and ask if they happen to have an old broadcast receiver for disposal. When you get one, remove the chassis and hack it to bits. Yes, it must be *hacked* because most of the parts will be worn out anyhow, so it's a waste of time to unsolder them carefully.

You will now have before you a pile of junk. Put it all into a box, which can be cardboard, wood or metal. It is not necessary to have a lid—in fact, I think a lid is undesirable because you can't *look* at what you've got. And what have you got?—A junk box of your very own!

From here on you can't miss. Any lump of surplus gear you come across at a reasonable price—buy it and dismantle it right away, so that you can add another layer to your box. It's a fascinating hobby in itself. You'll wonder what you ever saw in rag-chewing and DX chasing.

My next article will be a constructional one, describing how I looked at what I'd got in my junk box and made a rig which *fitted the parts available.* To save any agonising speculation I'll tell you right now what the rig is. It isn't exactly a rig; it's a reservoir condenser shorting stick with holder and should be handy for anyone provided you wear gloves when using it.

MOBILE RALLY DATES

Those now fixed for the 1963 season are as follows: International Mobile Rally, *Verviers, Belgium,* April 28; *A.R.M.S., Barford,* June 16; *Chiltern, High Wycombe,* July 14; and *Derby,* on August 18. Organisers of other Rally events are asked to come up with their dates as soon as possible, so that clashes can be avoided.

The Verviers meeting is specially interesting, because the *locale* is very close to Belgium's frontiers with Holland and Germany—the idea is to make the event truly international, and U.B.A. (the ON national radio amateur organisation) is hoping to arrange for the issue of temporary ON5 licences to visiting foreign amateurs, to permit them to operate /M while on Belgian territory. This should be an attractive proposition for U.K. mobiles, though it should be noted that the Rally bands will be 80m. and two metres only, as 160m. operation is not permitted in Belgium.

THE SEVENTEENTH MCC

The Magazine Top-Band Club Contest November 17-18, 1962

MORE activity, more logs received, faster scoring—a very satisfactory pattern for the Seventeenth MCC. Over 100 Club stations put in some sort of appearance, even if some of them made very few contacts; but no fewer than **87** logs were received by the closing date (compared with 71 last year and 59 in 1960). So there is no doubt that MCC is more popular than ever.

Last year the organisers were very pleased, at the inauguration of the "regional" system of scoring, to find four different regions occupying the first four places; and this year it has happened again, although the Far North has displaced the Western region from the Top Four.

1st:	**Gravesend, G3GRS** *(Southern)* ...	**560**
2nd:	**Stockport, G6UQ** *(Midland)*	**554**
3rd:	**92nd Sig. Regt., R.Sigs., AER, GM6RI** *(Far North)*	**536**

Sharing the fourth place were two Clubs—**Hallamshire (G3JHC),** from the Northern region, and **Wolverton (G3LCS)** from the Southern, both with 520 points; and an honourable mention for **Sheffield (G4JW),** who, with 518, were only two points behind their local rival **Hallamshire** (who, it will be remembered, were last year's winners).

With four regions in the first four, and all five of them in the first nine, the organisers feel that the handicapping system cannot be far wrong. At one time it appeared that the extra encouragement given to the GM's this year might even have produced a winner, since until the arrival of the last twenty logs GM6RI's 536 was the highest figure to come before the judges. A very creditable effort and it should be a real shot in the arm for Scotland . . . will they produce just a little extra urge next year and score an outright win?

With the event confined to one week-end, one would have expected the scores to run at something like half of last year's figures, but they were considerably higher than that, owing to the increased activity. This, however, meant harder work, faster operating and no letting up at all—which was what was hoped for.

The Leaders

The winners, *Gravesend,* were unable to use the rented premises that they have for meetings, and asked G6BQ to make his station available. The Club call, G3GRS, was used, and G6BQ's location was confirmed by the GPO as the *permanent* alternative address of G3GRS. The shedding of the "/A" must have been worth several minutes of operating time! G6BQ and G3MXJ shared the operating, with G3NZR assisting. The transmitter was a home-brew affair built in 1939 (but modernised from time to time); the receiver a combination of an Eddystone 888 with an HRO tuned to 85 kc; and the aerial—wait for it!—a 274-ft. centre-fed wire, 65 feet high in the middle.

The runners-up, *Stockport,* describe their gear very succinctly as "Panda Cub, HRO and Dipole." Their only other comment is that had their station been *one mile* further north they would have had the benefit of 5-point contacts with Southern zone stations; as it was, they were firmly in the Midland zone—and did extremely well despite that.

The Club who put Scotland into the picture (full title is "*92nd Signal Regiment, R. Sigs., A.E.R. Radio Club*") was operated by GM6RI, who described the gear as "VFO-PA, HRO and half-wave centre-fed." So the three leading stations all had half-wave aerials and HRO's; the other thing they obviously had in common was good operating technique.

Participation

We are really tired of remarking on the complete absence of activity from GC, GD and GI, and now finally give those three spots up as a bad job! The activity came from 44 Southern stations, 23 Midland, 15 Northern, three Far North and two Western. The ten-point incentive given for contacts between Zones S and F not only made things fairer for the Scottish stations, but really encouraged the Southern operators to look for them. (One high-scoring Southern station might have been a place higher if he had not dismissed a certain GM as "not worth waiting for," thinking he was only a single-pointer, when in fact he was worth ten.)

Table I shows the complete list of positions and scores; Table II the leaders in each Zone; and Table III, as a matter of interest, shows the average score for each Zone, which probably means very little but is rather intriguing.

Conditions and Operating

General opinion is that conditions were fair or "not bad" on the Saturday, and considerably better on the Sunday. In some parts of the country a lengthening of the skip about halfway through the Sunday session was very noticeable. GM6RI's ten-point contacts with the South were spread evenly throughout the contest. Actually his third contact on the Saturday and his *first* on the Sunday were with

TABLE 1:

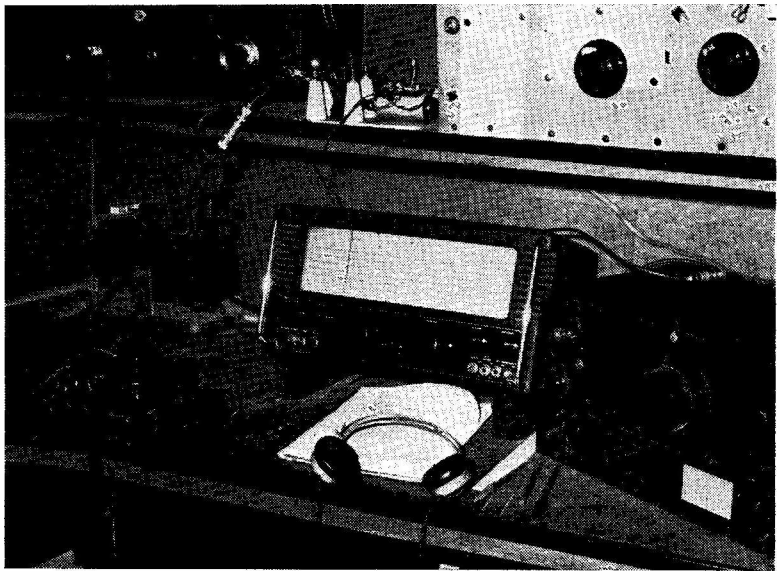
POSITIONS AND SCORES

	CLUB	REGION	POINTS
1.	G3GRS, Gravesend	S	560
2.	G6UQ, Stockport	M	554
3.	GM6RI (92nd Sig. Regt., Forfar)	F	536
4.	G3KVG, Hallamshire	N	520
	G3LCS, Wolverton	S	520
6.	G4JW, Sheffield	N	518
7.	G3KMO, Ash Green, Hants	S	499
8	G2FJA/A, Medway	S	494
9.	GW3KSQ, Port Talbot	W	479
10.	G3KIN/A, Kingston	S	475
11.	G2AJS, Surrey (Croydon)	S	473
12.	G3IGW, Halifax	N	460
13.	G3PIA, A.E.R.E. Harwell	S	444
14.	G3REI, Reigate	S	436
15.	G5YC, City and Guilds, London	S	395
16.	G3RCW, North Notts.	M	373
17.	GM3LUM, Leven	F	370
18.	G3ERN, Harlow	S	364
19.	G6OI/A, Stourbridge	M	361
20.	G3IVH, Norwich	M	359
21.	G3EFX/A, Harrow	S	358
22.	G3DDI, South Shields	N	355
23.	G3OAM, Rotherham	N	352
24.	G3ERD/A, Derby	M	346
25.	G2XP, Sutton and Cheam	S	343
26.	G2AFV, Barnsley	N	336
27.	G3EKW, Nottingham	M	328
28.	G3RBP, Oxford	S	326
29.	G3GHN, Clifton, London	S	323
30.	G3OBR, Aldershot	S	306
31.	G3ENH/A, MRCC, Birmingham	M	303
32.	G3JWZ/A, Verulam, St. Albans	S	298
	G3TR/A, Crawley	S	298
34.	G3OWM, Durham University	N	296
35.	G3AHD/A, Liverpool	N	294
36.	G3OUV, Chiltern, High Wycombe	S	289
37.	G3ILO, Dursley, Glos.	S	288
38.	G3GTK, Newbury	S	285
39.	G3FKF/A, Salisbury	S	278
40.	GW6GW, Blackwood, Mon.	W	269
41.	G2ASF, Coventry	M	267
42.	G3KQH, Overstone, Northampton	M	264
43.	G3IIU, Acton, Brentford and Chiswick	S	263
44.	G3NGZ, RAF Little Rissington, Glos.	S	260
45.	G3JLA, Stevenage	S	259
46.	G3LRS, Leicester	M	255
	G3OCB, Cornish	S	255
48.	G3NJN, Blackpool	N	254
49.	G3BXF, Rugby	M	245
50.	G3NJF, Grimsby	M	231
51.	G3FTQ, Purley	S	225
52.	G3NHZ, Dollis Hill, G.P.O.	S	222
53.	G3MHB, Bradford G.S.	N	219
54.	G3FNV, Chester	M	217
55.	G3MSZ, RAF Watton	M	208
56.	G3RAL, Loughborough	M	207
57.	G3OXD/A, Albright & Wilson, Birmingham	M	204
	G3IDV, Hartlepools	N	204
59.	G2CUZ, Ainsdale, Lancs.	N	203
60.	G3IHH, S.E.E., REME, Arborfield	S	196
61.	G3OUF, St. Benedicts, London	S	192
62.	G3ASR, Edgware	S	183
	G3LTY/A, East Kent	S	183
64.	G3ELJ, Newark	M	174
65.	G3PXT, Norfolk	M	173
66.	G3LXN, South London Mobile	S	168
	G3GDT, BBC, Bush House	S	168
68.	G3BRK, Aquila	S	164
69.	G2DPQ, Shefford	M	157
70.	G3HVI, Burslem	M	156
71.	G3HEV/A, Ravensbourne	S	150
72.	G5FK, Research-GEC	S	148
73.	GM3GDU, Dalriada	F	146
74.	G3LCW, Deal	S	142
75.	G3COY, Staffs ATC	M	140
76.	G3LUU/A, Leeds University	N	137
77.	G3NTS/A, BBC, Lime Grove	S	128
78.	G3PAD, Paddington	S	125
79.	G3NUK/A, Burnham-on-Sea	S	119
80.	G3LDT, Macclesfield	M	114
81.	G3GBU, Stoke-on-Trent	M	105
82.	G3DOE, Thanet	S	104
83.	G6DT, Petersfield	S	103
84.	G3ENT/A, North Kent	S	99
85.	G3GPH, Morecambe	N	98
86.	G3GXI, Eccles, Lancs.	N	40
87.	G3CMH/A, Yeovil, Somerset	S	35

the South, which makes nonsense of the demand of those who want the thing to start later, "so that we have a chance of working the GM's"!

Comments on the operating standards are fairly kind, on the whole; one or two Clubs come in for caustic remarks about poor technique, but there are always new operators coming on, who have to learn the hard way—and we hope that many of them profited by the experience.

Gravesend thought it "a very snappy contest." which suited their style. They say "the most important consideration is—how many stations can you *hear?*" As a matter of interest, they made 148 Club and 28 non-Club contacts; *Stockport,* the runners-up, made 139 with Clubs and 21 with non-Clubs; and GM6RI, up there in the Arctic, made 66 Club and 7 non-Club contacts. Figures for the next three, whose scores were almost identical, were 137 and 8 for *Wolverton;* 116 and 13 for *Hallamshire;* and 115 and 11 for *Sheffield.*



Winning station in the Seventeenth Magazine Club Contest, MCC, was G3GRS, Gravesend Amateur Radio Society, provided and operated by G6BQ with the assistance of G3MXJ. Between them they knocked up the splendid score of 560 points. The gear as shown here consisted of a gang-tuned transmitter, with an Eddystone 888 receiver coupled into an HRO as a Q5'er. Aerial was a half-wave at 65 ft.

So, apart from our Scottish friends who so bravely insinuated themselves among the leaders, the order was decided simply by the number of Club QSO's made, irrespective of the zone in which you were.

The operating practices that came under fire were pretty obvious: first, the carefree way in which people would send "BK" when, in fact, they couldn't break-in at all and should have sent "K"; and the great number who went straight into another CQ at the end of a contact, to the fury of those who were all ready to give them a snappy call without wasting time in that way.

GW3KSQ and others remarked that the standard of operating, *except for the leading stations,* doesn't seem to improve (that's why they *are* the leading stations!)

SWL D. L. A. Law (Leicester), who again sent in a very valuable check log, thought the operating was better than last year, except for a few cases of "beginner's finger" and "glass elbow." He thought there was more careful listening and less blind calling of CQ.

TABLE II

Top Scorers in Each Region

	Southern	
1.	Gravesend, G3GRS	560
4.	Wolverton, G3LCS	520
7.	Ash Green, G3KMO	499
	Midland	
2.	Stockport, G6UQ	554
16.	North Notts., G3RCW	373
19.	Stourbridge, G6OI/A	361
	Northern	
4.	Hallamshire, G3KVG	520
6.	Sheffield, G4JW	518
12.	Halifax, G3IGW	460
	Far North	
3.	92nd Sig. Regt., Forfar, GM6RI	536
17.	Leven, GM3LUM	370
	Western	
9.	Port Talbot, GW3KSQ	479

Comment

As always, many useful and interesting suggestions have come from the clubs. Unfortunately many of these tend to cancel each other out—which merely shows that you can't please everybody! But the one point on which nearly all of them are agreed is that if the event is to be kept to one week-end, they would like a longer operating period. With such a large number taking part, this seems reasonable and practical, and we shall seriously think on the lines of two four-hour periods for next year—probably 1700-2100 GMT. Some of the GDX is improving by the later hour, but we propose to keep to the 1700 start, because that first hour can be useful in separating the men from the boys!

Remarks worth quoting come from so many clubs that we shall have to condense them severely. "Poor conditions on Saturday, but Sunday just the opposite, with excellent signals all round" *(Wolverton).* . . "Remarkable how many clocks had gone slow by 2000 hrs." *(Sheffield).* . . "Worked 84 different clubs, of whom 44 had their own callsign; also worked more non-Club stations than before, and feel that they wasted a lot of our time under the existing rules" *(Reigate).* . . "Found it a great help to have an

equally competent operator just listening, to act as a check and also as a logger" *(City & Guilds)* . . . "Only two stations seemed to be working real break-in—not too good considering the prolific use of 'BK'" *(Crawley)*. . . "Ideal contest for the single-operator station" *(Newbury)*. . . "On Sunday heavy snow kept our two main operators from attending—they were snow-bound at home in Brecon" *(Blackwood)*. . . "Severe gales gave us a lot of aerial trouble" *(Cornish)*.

"Still too many CQ's; we would never have worked our GM by calling CQ" *(Dollis Hill)*. . . "Change-over relay went faulty and the change had to be executed by a violent bash on the Tx case; had a big bruise on my fist by 1940 and had to QRT" *(Norfolk)* . . . "It would help the QRM problem if more of the band was used" *(BBC, Lime Grove)*. . . "On arrival we found the local inhabitants had sawn up half the aerial pole for fuel. Force 8 winds and a blizzard didn't help" *(Stoke-on-Trent)*.

"On the Sunday the strongest signals were noted as coming from stations that did not answer" *(Hallamshire)*. . . "Our aerial was 270 feet long, 42 feet up, with the base of the poles in the sea!" *(Ainsdale)*. . . "Noted excessive use of 'BK' when stations were in fact not using it" *(Salisbury)*. . . "Black mark to clubs who work a GM and then sit on his frequency calling CQ" *(Ash Green)*. . . "We struggle through bad weather to an inhospitable clubroom and are just getting warmed up by 8 p.m.. when it's time to stop" *(Clifton)*.

The Kingston group, signing G3KIN/A, gained 10th place in the 1962 Magazine Club Contest. The operating team consisted of G3NFV (centre), with SWL's Davison (left) and Godwin assisting with the logging and looking after the running of the station. They made a score of 475 points.

Suggestions

The pattern is always the same . . . about 90 per cent of participants say that everything was just about right, and the remaining 10 per cent make suggestions for possible improvements. Some are eminently sensible, others . . . well, shall we say impracticable ?

Three clubs, this year, thought we should publish a full list, beforehand, giving callsigns and numbers, and no late entries should be accepted. This because "it would assist the log-keepers to find out who was genuinely participating." One club suggested that the numbers should remain the same each year, to avoid confusion. Another thought it "unfair" that the callsigns should not have been published as well as the numbers.

Since the numbers identify the Clubs in the same way that their callsigns do, it is difficult to see the point of this. And as to publishing entrant-Clubs' callsigns in advance, we tried that once, some years ago—never again ! What with having to start talking about the Contest in July-August (with everyone thinking of holidays); the necessity to set a deadline date for entries about two months before the MCC dates (and therefore before most Clubs had been able to make up their minds whether to enter or not); getting entries from Clubs unable to say, so long before the event, what their callsign was going to be; last-minute changes of callsign. because somebody had gone sick or couldn't do it after all; late entries; and telephone requests for further changes after we had closed for press, so that anyway the list as eventually published was neither complete nor accurate—as we say, never again! The number system, by which we list the Clubs thought likely to be participants. obviates all this, and Clubs know they can come in on the Contest without even having to write us a letter to say so—unless they happen not to have been given a number, in which case all they have to do is to ask for one.

Regarding the scoring system, some very sensible comments have been made. One is that it is absurd to have a "W" area with only two or three stations in

TABLE III
Regional Activity and Scoring

REGION	NUMBER OF ENTRANTS	AVERAGE SCORE
Southern	44	271.5
Midland	23	249
Northern	15	286
Far North	3	351
Western	2	374

it, whereas the "S" area has at least forty. One club with a genuine grievance (though they are very sporting about it) is *Cornish*. To work stations in their own Southern zone, they have to cover distances that would reach from the Midlands to Scotland, and they have hardly any stations at all within 100 miles or so. They almost deserve a zone of their own!

We must seriously consider one suggestion that the South should be divided into South-East and South-West zones . . . and, last of all, another very interesting idea that contacts within one's own zone should not be allowed at all! One club thinks that non-Club contacts should be outside one's own zone, but two or three others would ban even *club* contacts of this type.

We look at all of these with a sympathetic eye—but if you change the rules of a contest every year, there is bound to be a feeling that to win the event means very little except that the handicappers have possibly erred in your favour. So, for that reason, we try to resist changes unless they appear absolutely essential for the benefit of the majority. There is always the odd man out, like *Cornish;* and we hope it is realised that merit is not always judged by the top five only, but by the score, having regard to the local circumstances.

Merit is also to be judged by the relative positions of stations situated fairly close together, so that the rules cannot be loaded in favour of one or the other. Note the phenomenally close scores of *Hallamshire* and *Sheffield,* operating from the same town; *one more* Club contact for *Sheffield* would have reversed their positions—after six hours of hectic operating—which seems to prove that these two were fully-extended all the time. (Last year there were 173 points between them.) *Kingston* and *Croydon,* too, were separated by only two points.

Some of the very low scores were occasioned by inability to operate for the whole period; *Thanet* (G3DOE) for instance, admit that theirs is "more or less a check log." And *Harlow* (G3ERN), who have figured high in the table for many years past, were let down this time by unavoidably missing the first hour and a quarter on the Saturday.

All in all, it seems pretty fair to say that the scoring and final positions were decided by operating ability rather than anything else—which justifies the whole thing. There *were* some hard-luck cases, it is true; but many of the stations well down the list would have been much higher, without making any other changes, if they had been capable of snappier operating. Even those with poor aerials don't always make the most of their opportunities . . . and in some such cases we suggest that a better aerial *could* be provided, with a little thought and energy. (Or, as happens in many cases, the station of a member who *has* a good aerial could be nominated.)

More Short Snorts

"Put up aerial in Saturday's pouring rain, but worth every foot of it" *(Kingston).* . . "Some of the signals were fantastic—amazing what can be done with ten watts" *(Surrey).* . . "Somewhat of a scramble to our VHF operators, but very much enjoyed" *(AERE, Harwell).* . . "Our aerial was of the invisible type, erected at dead of night over some allotment gardens" *(North Notts).* . . "When the skip changed on the 18th, the Southern stations came up in great style" *(Leven).*

"Would like 1963 Contest to score bonus points for OK, HB, DL and so on" *(MRCC).* . . "For next year—a receiver with 100-cycle selectivity" *(Verulam).* . . "Jolly hard work for a phone man, but exciting and enjoyable" *(Overstone).* . . "Suggest identification numbers begin at 100, so everyone has three figures" *(Blackpool).* . . "During the early hours we attempted to set up a portable station on Ilkley Moor, but due to gales and snow it was impossible to erect the aerial system—so we retreated and began at 1814 GMT" *(Bradford Grammar School).*

Agreement

A remarkable number of logs include the comment "One week-end excellent, but more hours wanted."

The operators on G4JW for the Sheffield Amateur Radio Club's MCC entry were, from left to right: G4JW, G8NN, G3PHO and G8KB; also taking part was G3LLV. They were able to work full break-in, using an electronic change-over switch, and the aerial was half-wave at a height of about 30 feet. The rig and the operators put Sheffield into 6th place with a score of 518 points.

This seems to be an almost unanimous wish, and will be duly respected next year. Also, a considerable number of people called attention to the slight unfairness of the identification numbers—three figures could be a genuine handicap and cause a measurable loss of time. We are thinking in terms of identification *letters* for next year (AA, AB and so on). Roughly 700 such groups are available, and we don't expect an entry quite so large!

Final

Some of the logs were a little short of what we have come to expect, but the majority were no trouble to the scrutineers. The fine check log from D. L. A. Law, already mentioned, ran to nine pages and was extremely useful. We should appreciate more of such efforts from SWL's, but unfortunately CW seems to be a minority interest among that fraternity these days.

It is much to be regretted that, as usual, five logs were received too late for adjudication—as in two cases the claimed score would have put the Clubs concerned into good positions in the list, this is all the more regrettable, and represents a good deal of wasted effort. But we did make the difficulty about late logs quite clear (*see* p.494, November) and if 87 entries can be in on time . . . !

In general, there is no doubt that the Contest was enjoyed by all who took part—even those who ran into serious difficulties and had to take emergency measures of one kind or another. Who knows—they may be next year's winners, thanks to experience gained this time.

The organisers would like to thank all the Clubs who entered for making this MCC the most successful of the series. Judging from the number who comment "Can hardly wait for next year," they will all be back again. Let's see if we can't top the hundred mark in 1963 !

Surrey Radio Contact Club, G2AJS, ran their MCC station from the physics laboratory at Caterham School. The combined efforts of G2AJS (standing, and himself the senior physics master there) with G3IAS, (at the operating position) and SWL Wilmot, produced the very creditable score of 473 points for 11th position in the final list. Their Tx takes a QV04-7 in the PA, the receiver is an HRO, and the aerial a half-wave for the band, at a height of 45ft.

And now a note to Club Secretaries concerning their activity reports. **Friday, January 11, 1963,** is the date. Address them to "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And from the said "Club Secretary," a Happy New Year to all secretaries, officers and members of the many clubs who correspond with us regularly. May the coming year be a most successful one for you all.

NOTICE TO ALL HONORARY SECRETARIES

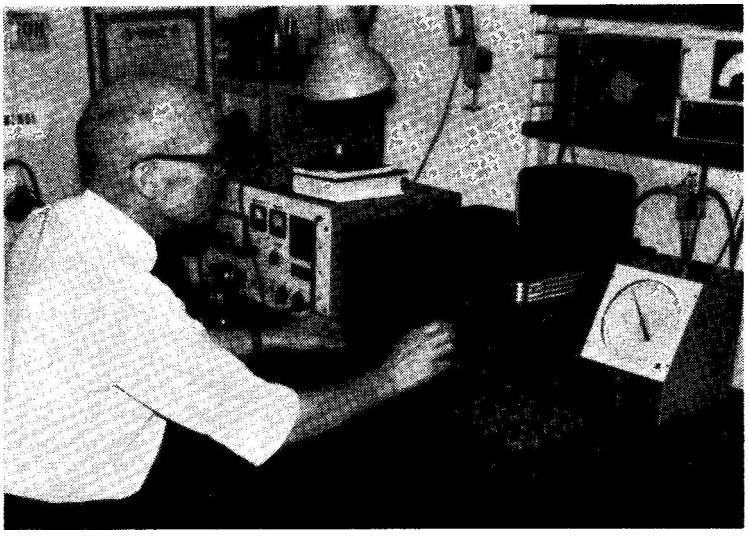
Publication of the usual Club reports will be resumed in the February issue, for which the closing date is January 11. Appearance in this space is free to those Clubs who care to make use of it for publicity and the reporting of their activities. Hon. secretaries are asked to ensure that their reports, addressed "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1, reach us by the date given each month at the head of the article. It is impossible to write in late reports, received after we close for press. All reports must include the name and QTH of the hon. secretary for publication in the address panel.

LATEST EDITION "CALL BOOK"

The Winter Edition of both sections of the *Radio Amateur Call Book* is now available from us, from stock. The American section, listing some 225,000 U.S. amateur stations, with their addresses, costs 45s.; the Foreign section (which is the rest of the world outside the U.S.A.) gives about 100,000 amateur station call-sign/addresses, including the U.K. listings, and costs 27s.—or the two together at 65s., post free. In addition to these 325,000 QTH's, both sections of the *Call Book* include several pages of general DX information, such as prefix lists, Zone areas and a world standard-time chart. Each edition of the *Call Book* is an entirely new issue, completely revised to take in newly-licensed amateur stations and changes of address since the last quarterly appearance.

DX COMMENTARY

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



SM7XY

A HAPPY New Year to all readers. May their DX-chasing be fruitful, and may their DX-commenting be regular, to their mutual benefit and the efficient continuation of this column. There seems no reason why 1963 should not be a pretty interesting year, even if things do get a little more difficult. Despite the shortage of sunspots, 1962 was one of the best of years from the DX angle.

In the past we have been rash enough to attempt a few New Year predictions in the January issue. This time we thought it would be just as interesting to look back ; and this was settled for us by the surprise appearance of our aged friend Arabackle Oblifork, who is probably a stranger to newer readers but still a frightening figure to the older ones.

After being inactive for many years, Arabackle unearthed his old 0-V-1 receiver with a view to looking over the DX bands. His findings were pretty revealing. First remark : " They've made the licence conditions too easy—there are far too many stations on." Second observation : " This over-modulated phone shouldn't be allowed—why, lots of them have got bags of modulation but no carrier at all ! "

On the subject of DX, he was rather caustic. " These boys are not so hot," he said ; " the old DX aces of the past wouldn't have bothered to look at the stuff that these boys go scrabbling after. Why, somebody takes a boat to an island and tells everyone in advance that he's going there—what time, what frequency, MC's. QSL managers—why, *everybody* works 'em. Call *that* DX? In my time you had to happen upon the chap—you didn't know when he was going to be on, or on what band. Every man for himself, with 50 watts, and those who got in first were the winners. Nowadays everybody's the winner—you can't lose. And even QSL's can be covered by insurance, they tell me."

Poor old Arabackle—when we last heard of him, he was fitting his third 5 : 1 reduction gear (in cascade) to his 0-V-1 so that he could resolve SSB on Forty. He reckoned that if you could do that with a plain oscillating detector and none of these cissy-aids, then you had mastered the SSB racket. But on our last contact he hadn't found any amateur signals on Forty—he thought it was still an exclusive amateur band, 7000-7300 kc, and all those broadcast stations convinced him that he had got mixed up with a harmonic somewhere and tuned in the 31-metre band.

So—the menace is now at large. An Ancient Timer (ordinary Old Timers are just boys) with an 0-V-1, a 50-watt transmitter (TPTG and Goyder-lock, which we'll explain some other time) and a Windom aerial—the trio that used to devastate the South London ether in the pre-television days. Back in the rat-race, and trying to find out what some of these new-fangled prefixes are.

CALLS HEARD, WORKED and QSL'd

A Good Year

It may be that we shall all remember 1962 as the peak year of the DX-pedition. What with WØMLY and his epic travels around Central Africa, and then Gus Browning with his record to date of Monaco, Seychelles, Aldabra, Chagos, Burundi, Rwanda, Gough Is. and Bouvet Is., to say nothing of Danny Weil with his transmissions from the Marquesas, Manihiki and now Western Samoa . . . anyone spending his time following just these three fellows around could have added twenty countries to his total.

Other rarities have also been quite numerous ; contest activity

has been high; Top Band has handed out some new DX. It seems that the only item on the debit side has been the virtual disappearance of Ten Metres. Eighty-metre DX, especially on SSB, has conquered all sorts of new frontiers, and now it seems that Forty is becoming the vogue for the Sideband gang.

No complaints, then, about 1962, and we can only hope that the slope down which conditions are bound to run in 1963 won't be too steep. Brush up the receiver, transmitter and aerial system, and you might almost level it out.

DX News from Everywhere

The big event of the period was of course the wonderful operation from Bouvet Is. by Gus (W4BPD) signing LH4C. Just too late for last month's deadline, he duly showed up, and handed out nearly 4,000 contacts in less than five days! Despite rumours of a trip with one of the FB8's to Crozet Is., latest news is that Gus will probably join in with ZS6IF's expedition to ZS8, which should be all over by the time you read this—but with another one from ZS9 just about to begin. ZS7 will follow that. Operation mostly at the low end of 14 mc—call 10 kc up or down as requested.

Other choice ones active (if you can find them) are Danny Weil from ZM6AW; Campbell Is. (ZL4JF); Kermadecs (ZL1ABZ) and Ascension (ZD8JP). These are long-term affairs—except that we don't know how long before Danny is on the move again.

Short-term, but equally good DX, are the following: KC6BD, Eastern Carolines (14 mc CW. 0800-0830); VR4CC (mostly 21 mc CW); VP2MV, Montserrat, very active on 14 mc CW around 1200; FK8AZ (14 and 21 mc SSB); ZA1KFF, said to be "a genuine Albanian at last" (14 mc CW)—but what's the good if he doesn't QSL?

Lots of activity seems to be coming from the various components of VP2, which makes a change. During the last month, VP2LA (St. Lucia), VP2ML (formerly 2MC, Montserrat) and VP2VL (British Virgin Is.) have all been on. VP2KJ on St. Kitts is reported as quite keen.

After those that are, some of those that aren't . . . the proposed Jordan (JY) expedition by IT1TAI and IT1ZGY is off—no permit . . . also the mooted Marcus Island trip by KA2JL had to be cancelled . . . and two possible sorties to the Marianas are also reported off; there is even a rumour that no licences are being issued for the Marianas.

A few more stray ones that you may encounter if lucky: AP5CP, 5AH and 5JA all said to be on 14 mc CW . . . VS1FJ goes to Christmas Island (the VK9 one) in January . . . VR4CC is said to be on 21 mc CW . . . 4S7WP has been putting Ceylon back on the map (mostly 14 mc CW).

DX News from Readers

You may agree that the Feat-of-the-Month should be credited to G3FPQ (Elstead), who, on December 3, worked VP8GQ on 7 mc at 2230, on 3·5 mc at 2245—and on *Top Band* at 2345! VP8GQ didn't think 160m. be open as early as that—but it was. G3FPQ also tells us that the rumour about VR3O hearing G's on Eighty was—just a rumour. The facts are that VR3O has worked CN8FV on the band, but has never even heard a European.

ZS6BBB, who "expedited" from Bechuanaland from November 29 to December 3, asks us to state that the QSL address for all concerned is P.O. Box 9299, Johannesburg.

Anyone who worked VS6EF (1957-60) and ZC5CB, after that, who did not get a QSL may now do so by writing to G3LZV, who will send them a card direct. QTH: Clive Berry, 4 Godwin Road, Canterbury, Kent.

9M2ER, who was VS2ER (1955-58) and DL2ER (1958-62) hopes to be active almost at once. His QTH is: Lt.-Col. J. C. Clinch, Gurkha Signals, 17 Gurkha Sig. Regt., c/o GPO Seremban, Malaya.

From G2DC: Danny is still on QRP from ZM6AW, but spares have arrived. He still finds 21 mc as good a band as any, and skeds KV4AA regularly at 2030. He passes on the news that the new prefix for Western Samoa will be 5W3 . . . FB8XX said that activity could be expected from Crozet around the end of December. This does *not* mean our friend Gus, who is planning to go there a little later.

It's A Hobby!

Referring to recent castigations of sloppy operating and sheer liddery, G3NWT (Sandiacre) writes: "I think it is possible to be over-critical of operating shortcomings and mannerisms. Some of them do jar, some stick out a mile vertically, some give you the proverbial abdabs, but what the heck!—I've dropped an average of three bricks every QSO I've had. I have a horrible consciousness of this both during the descent and after . . . I'd give it up if there was any hobby in the world like it—*does it matter?* If a character needs to say 'Dog X-Ray' let him say 'Dog X-Ray'—it doesn't necessarily mean he's lost as an operator. But things like 'Go' and 'After-

FIVE BAND TABLE

Station	1.8 mc	3.5 mc	7 mc	14 mc	21 mc	Countries Worked
G3FPQ	26	113	139	269	256	296
G3IGW	25	51	99	131	127	184
G2YS	20	75	96	181	129	205
G3NFV	16	55	44	91	121	167
GW3CBY	16	36	54	78	32	98
G2DC	12	101	147	286	268	307
G3KMQ	12	42	64	176	75	196
G3LHJ	11	23	47	134	173	204
G3NYQ	11	30	38	32	17	55
G3DO	10	59	55	275	222	299
G3FXB	9	88	159	276	267	306
G2BLA	9	39	77	96	97	150
G3JWZ	9	52	62	107	77	132
G3IDG	9	17	27	51	63	92
W6AM	8	30	59	316	87	320
G3PEK	8	22	47	65	25	76
G3PEU	4	14	10	119	63	131
G3JVJ	4	41	72	89	77	128
G3NOF	2	29	19	184	184	234
G3BHJ	1	11	29	65	165	180

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

burner' (for linear) get my personal goat."

He then points out that much of what offends the pedantic arises from nervousness, and with foreign operators the added tension of coping with English (they have to, because few of us bother to get even a smattering of their language).

Of course G3NWT is right—it *is* a hobby and these things don't really matter. But what so many object to is not these small shortcomings due to ignorance or nervousness, but rather to the silly talk perpetrated by the knowledgeable ones trying to be clever. We don't *want* to sound like a lot of Charlies when we take the air, and there's no need to. Plain-language contacts can be made when there are good signals from both ends, and they sound so much more adult than all those phoney phonetics and misbegotten CW abbreviations.

G3IDG (Basingstoke) adds to the list of dislikes with the "Best 73's" types and the "Hi-Hi" phone merchants. Also the growing tendency among U.K. stations to call each other "dr om" on CW, which for some reason sounds natural between Europeans but a bit quaint between G's.

Ah, well—don't let's leave the Season of Goodwill behind us just yet. And don't let us be misunderstood when we say "Bless 'em All."

Top Band Contest

Last year the *CQ* 160-metre CW Contest was held at the end of February and clashed with some other events. This year it has been brought forward one month and takes place on the last week-end in January *(0200 GMT on January 26 until 1400 GMT on January 27)*. The rules are as last year—2 points for contacts within your own country, 5 points for contacts with other countries and 10 points for contacts with W/VE stations. After this, a multiplier derived from the number of foreign countries, U.S. States and Canadian Provinces worked.

The interesting thing about this particular contest is that it is possible for a G station to put up very competitive scores, by virtue of the fairly heavy activity in this country. Last year G3IGW was the leading U.K. station, with a score of 9,136; G3CHN second with 6,372; and G5JU third with 4,188. The world's highest score came from WØNWX with 23,670, but the only station outside the States and Canada to beat G3IGW's score was HC1AGI, with 9,620.

So this is one contest in which we could show up pretty well (and, in fact, we did in 1962!) if some real activity could be stirred up. Why not see what *you* can do that week-end? There should be no shortage of QSO's during the afternoons and nights, and you can snatch a sleep in the mornings.

Robert Schott, LX1DC, 35 Rue Batty Weber Esch, S/Alzette, runs the QSL bureau for the Luxembourg group. He shows a nice lot of DX cards of his own.

Top Band DX

Practically all the Top Band news this month concerns DX—there has been plenty of it around. And the CW section of the *CQ* Worldwide Contest brought them all out—even on this band. On the Sunday, November 25, G3IGW (Halifax) raised 5A3CJ, 5B4PB, UB5CI, UB5WF, OH2NB and 21 OK's. December 9 was good for W's, but he only managed W2EQS. Other news from G3IGW: The PAØ's are now licensed for the band (as if you didn't know by now—what a trade they have been doing!) . . . VE1ZZ was heard by EI5B as early as 2330 on November 22 . . . ZB1BX heard G3IGW, same night; he awaits more G contacts, with 10 watts and a long wire . . . OH2YV has joined OH2NB, and ten other OH's have licences.

G3REA (Warrington) has been on the band since August 28 and scores 54 Counties, 9 Countries up to date. He will be in the new table for G3P-- and G3R-- stations when it starts next month. No real DX as yet, but his best catch was G3MQY/A in the Scilly Is.

GM3KLA (Shetland) remarks that he hasn't yet worked "his neighbour, OY7ML" . . . G3PQA (Epping) has, together with OH2NB, UB5WF and 5A3CJ; then, on December 1, he raised W3GQF for "half a QSO"; and afterwards made a better one with W1ME; on December 5 he worked him again, with an exchange of 589/479! December 8 brought a proper one with W3GQF: December 9, W2FYT and a QRZ from W2GGL, and he heard VP8GQ at 0445; December 12, G6BQ and G3ERN were working W2IU (0450).

G3PLQ (Salisbury) received all the DX previously mentioned during the *CQ* Contest, as well as UO5AA and ZB1BX; on December 9 he logged nine W's, VE1ZZ and VP8GQ (0453-0514). G3RBP

TOP BAND LADDER

(G3O-- and G3P-- stations only)

(Starting January 1, 1962)

Station	*Countries*	*Counties*
G3PHO	15	74
GM3PBA	14	85
G3OQT	14	58
G3PLQ	13	89
G3PGN	12	66
G3PRM	10	83
G3OWR	10	70
G3ORH	10	44
G3OLN	9	78
G3PDM	9	68
G3PPU	9	64
G3PEK	8	48
G3OXI	7	57
GW3PPF	7	46
GW3PHH	7	32
G3PSB	6	57
G3PJD	4	42
G3OHL	4	21
G3OLU	3	46
G3PHS	1	15

(Note: This ladder will appear **finally** *in the February issue, carrying scores up to December 31, 1962. The order will be based on the sum of the two columns.)*

(Abingdon) made it with UO5AA. UB5WF, OH2NB and the PA's, and heard VP8GQ. Further, he thinks he was called by 5B4AK at 1900 one evening.

Now for some general comments on Top Band: G3PLQ says it is time this nonsense of long "CQ DX" calls on the band was stopped. The culprits should have found out by now that it doesn't produce results, for which you have to listen and listen. Much of the current DX is between 1824 and 1829 kc, and it only wants a couple of CQ-DX'ers to ruin the lot. (We recently heard three of them at it, with UB5WF putting out unheeded CQ's right alongside them.)

G3PLQ also aims a swipe at people who use SSB up around this region; that's a real example of Blow-You-Jack mentality, and their splatter does far more damage than a clean CW signal would cause.

G3IGW makes a similar appeal, with respect to both points—CQ calling at random, and making inter - U.K. QSO's on the 1825-30 kc sector. He has heard calls from 5A3CJ and 5B4PB going unanswered, while on and near the frequency there have been scores of U.K. stations calling "CQ DX" or just nattering *about* DX. That's the real trouble—they all want to *talk* all the time, not to listen! (Yes, we know it's a free country and all that, but if people would keep off that 1825-30 kc slice of the band and use it for *listening* for DX, they would *all* be better off.)

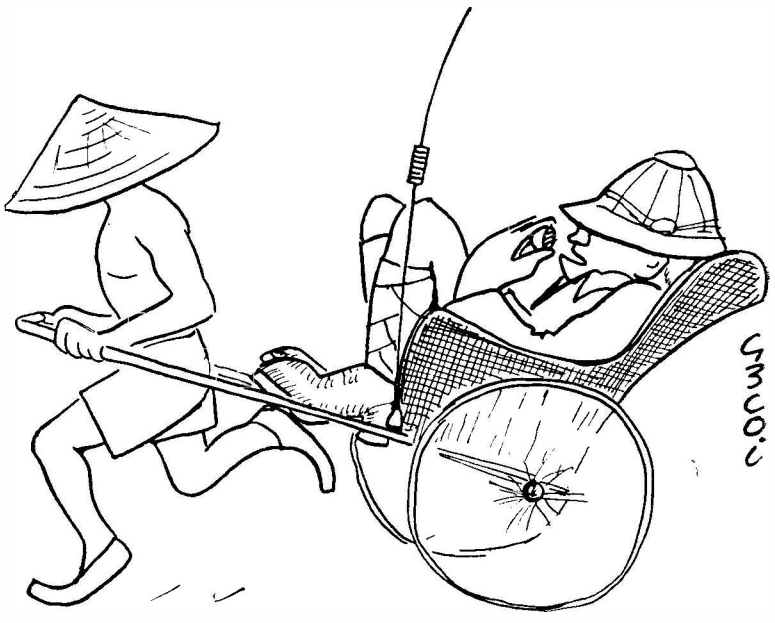
G3OWR (Grantham) hasn't done better than OH2NB as yet, but he has hopes, and sends us details of an interesting aerial system in a 60-ft. garden. Briefly, it's one of those wrap-around affairs—not in a horizontal plane, but from chimney-stack to mast, then down, and back along the garden. Some fiddling with loading coils proved well worth while, and the whole thing seems to have a nice long skip after dark. He, too, comments on a G station working cross-frequency phone on 1825 kc one night, although the station he was working was on 1990 kc!

G3PHO (Sheffield) is now up to 15 countries, thanks to UB5CI and 5WF, OY7ML, OH2NB, UO5AA, HB9QA and the like. He also has his 60 counties confirmed for WABC. No W's as yet, but there's plenty of time.

GW3PPF (Cardiff) bemoans the QRM on Sunday mornings, when G's still call W's on their own frequency; he suggests that their calls be published, and thinks this would cure it. Well, if they read these columns they must know by now that the practice is — well, discouraged, shall we say? And if they still persist, then the pleasure of seeing their own call in print would hardly deter them. (*Late Flash:* December 16, 0015—W2FYT calling "CQ DX." Four or five G's reply *on* his frequency, and so no one knows whether he came back at all.)

Eighty Metres

To Old Timers who remember Eighty as "the quiet band" it is incredible that, despite its present horrific state, it should now be one of the most exciting DX bands. A casual look at the CW end reveals little but jingle-bells and high-speed commercials; at the other end there usually appear to be rag-chewing nets of SSB stations tightly filling the available spaces in between the strange noises. And yet real DX work does go on. (A politician would now come to the part about "man's indomitable spirit" and so on, but we'll just



". . . Running at the moment with 10 watts input . . ."

say that they really must be keen.)

G3FPQ (who has more to say later) worked SSB with FG7XT, HK5CR, VE8ML, VK2AVA, VP2LS, VP2ML, VP9BW and YV5ANS—apart from his CW QSO with VP8GQ.

G2DC, on CW, found it mighty difficult to discover a hole anywhere, but managed to work LX3TA, PX1AC, UA9KD, VE1-3, W1-4 and 8. and 4X9HQ. (The latter station. handy for WPX-hunters, operated during the *CQ* Contest from the Tel-Aviv Radio Club.)

G3NOF (Yeovil) didn't make any DX contacts, but heard SSB from FG7XT, VP2ML, PZ1AX, W's and VE's. Others listening on the band included some very keen SWL's. David Hayes (London, N.3) covered the band pretty thoroughly; the early mornings (roughly 0630-0730) yielded several ZL's, VE7YY, W6's, VP2ML, VP7CU, YV1KE, HK4EB and others. ZL2AIX peaked at S7 around 0730; ZL4OD was heard as late as 0830. Others heard during the small hours were PJ2AA (0300), VP2ML and VP9DL (0550). Evenings, from 2100 onwards, revealed FA2VX, PZ1AX, FG7XT, KP4AAD, VQ4AA, FM7AA and W's. Nearly all of this was heard between 3793 and 3800 kc. and SWL Hayes suggests that the DX'ers spread out a bit (but there is another side to this—*see* later).

SWL Barry Cushing (Whyteleafe) also heard most of the above, plus 4X4DK (2040), HZ1AB (2315), KP4AHU (0635), EA9AZ (2245), XE1CV (0630), SVØWT (2130), VK3AHO (1910), LA1LG /P (2210) and other KP4's, YV's and such. He found much Caribbean DX available in the early mornings, but a lack of Europeans to attract them.

Now for G3FPQ's argument: He appeals to the rag-chewers to leave the top 20 kc of the band for the DX'ers. As he says "It's difficult enough working DX without coping with rag-chewers who could just as easily use another part of the band . . . The attitude 'I am licensed to operate up to 3·8 mc so why shouldn't I do so?' is all very well, but it ignores the spirit of our hobby, which should include operating in such a way as to cause as little inconvenience as possible to others. The proportion of SSB stations interested in DX is increasing all the time, and they take up *less* band-space than the rag-chewers because there are often as many as a dozen listening on a DX frequency while one of them transmits. If the local natterers make it impossible to work DX, then the DX-conscious boys will go back to rag-chewing in groups of three or four, and will occupy more band-space than they do at the moment. There is a lot to be gained by mutual agreement to keep apart."

A meeting in a Chinese restaurant in Rangoon. Left to right: 2nd op. XZ2KN, XZ2VK, VS1GC, XZ2KN and XZ2DW. Stations in Burma rate as DX almost anywhere in the world and there cannot be many U.K. operators who have worked the XZ types shown in this photograph.

Forty Metres

G2DC sums up the present state of this band: "Poor old Forty appears to be the Clots' testing-ground; 80 per cent of the signals are atrocious in respect of quality and operating. I tried to work LH4C (Bouvet) on this band, but owing to a rasping T7 LZ station who persisted in calling *me* every time I went over to Gus, I had to give up. I could hear Gus answering me, but couldn't get his report. It just beats me, why these European stations persist in calling people who are trying to work someone else. To try and tell them what's happening, or to choke them off is useless—they come back and tell you their age and the weather. I never answer these merchants, so perhaps in time they may give up." Despite all this, G2DC worked ST2AR, VQ4IV, VK3TL and 4SS, ZL2GS, VE's, W's, UJ8 and UH8.

Our own view is that these "primitives" have extremely poor receivers, on which they hear little except the really strong signals of the types who are trying to work DX. To them, these people *are* the DX . . . the real thing is a completely closed book to them. In some cases they may have adequate receivers, but seldom listen and spend all their time calling "CQ DX"—then going back to someone in a neighbouring country. We must just tolerate them as The Clueless Ones, who should never have been licensed anyway. Many of them are pirates, as it is.

G3PEK (Cheadle), with 40 watts and a dipole, worked 4X4KK, 4X9HQ, 5A1TW, KV4AA and 4CI, KP4AOO, ZL2GS and VK6CE (the latter at 1840); it was a pleasant surprise to hear him answer a "CQ DX" instead of the usual flood of LZ's and YU's. Heard, but not worked, were 4S7WP, VP8GQ, VQ4IV, HK1QQ and 7BE, VU2GG (1500)

and W6's over the long path (1430-1530) as well as PY, YV, LU and JA. Dozens of PY's have been called without any luck.

G3JVJ (Haywards Heath) completed his WAC on Forty, after ten years of trying, with ZL2GS (0745). Other DX worked was VP5MJ (2330) and KP4BCL (0110). G3PHO reports working OX3BZ on this band.

Twenty Metres

G2DC thought conditions quite poor, with the band closing by 1800 on many days. However, he worked LH4C, FB8XX, PJ2AE, ST2AR, ZM6AW, VK1-6, ZL 1-4, all on CW.

G3NOF was not able to get on the band at the right times for DX conditions, but worked SSB with VE's, W's, TF2WGW, VP2LS and 2ML, and ZL2UW. G3PHO, now on Twenty with 30 watts and a TT21, worked W's, VK's, VS9AAA, MP4BBW and ELØA.

G3PEK stuck to CW, which raised CN8FE, 4X9HQ, VK6RU, HK1QQ, HZ1AB, 4S7WP, VP5XG and YV5AXA. He is another of the "beamless ones," using 40 watts to a full-wave wire and a sloping dipole.

GM3JDR (Sutherland) was more active on CW than SSB this month. The latter brought him LA9RG/P, LH4C, OX3KW, TF2WGW, VP2LS, ZS6PC/9, SM5CBC/9Q5 and 4X9HQ. From a very long CW list we select CX2CO and 6CB, F2CB/FC, FB8XX, KG4AM, KH6DVG, LH4C, LX3TA, TU2AP, VP8GQ, VK6SM, VQ2EW, ZS3EW, ZS6APL / Antarctica, 5H3IP, 9U5ZZ/MM, 9Q5EI and 9G1DV.

G3RFE (Barrow - in - Furness) introduces himself as a newcomer, with a DX-100U, an R.206 and an indoor aerial as described on p.404 (Fig. 4) of the October, 1961, issue of SHORT WAVE MAGAZINE. He worked mostly on Fifteen, but on Twenty he raised KV4AA, SVØWZ and VO1AW.

Fifteen Metres

G3RFE's very first QSO, which was on this band, was with WA6NPW/AM, flying at 10,000 feet over Italy, who gave him a 599 report. Others worked (all CW) were CT2AI, HZ1AB, KP4, MP4, SVØWS, SM5CGK/9Q5, VP5GT, VQ2EW, VU2GG, XE1PJ, ZE3JO, W 1-Ø, 3V8CA, 5A3TX and 9K2AD. Looks as if we have a real DX type joining us, with this little lot in his first month of operation ! (He is an ex-R.N. telegraphist, which may help.)

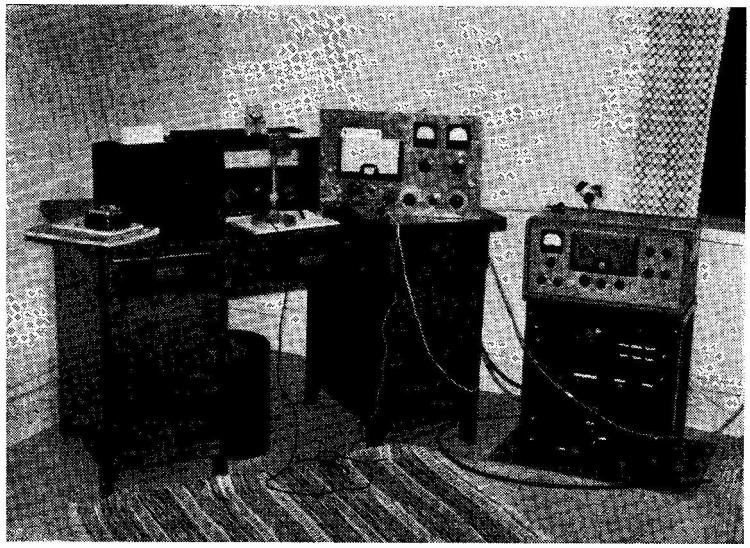
There is still no lack of AM Phone on Fifteen; G3NWT (Sandiacre) raised VK's 2AKV, 5LA, 6RE, 6RY and 6QL, ZS9G, ZD6's, 5H3, MP4TAC, ET3HP, VQ8AM, HK3EY, XE3AF—but missed out FG7XH and CO8JK, who were coming in with a lot of Central American DX at 1330 on December 9.

G3MBL (London, N.12) on the same mode worked VK6QL and ZD6HK, with 30 watts and a home-made two-element beam. G3NOF—yet another on AM—collected CR7CI, MP4, VP9DL, VQ2, VS9AJA, ZD6RM, ZE, ZS, 5H3IW, 5N2BRG, 2JKO, 2PJL, 2RSB, 9G1AB, 1EE and W's.

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
CW and Phone		
G2NJ	98	98
GM3COV	98	98
GM3OM	98	98
G3LWQ	93	93
G3MBW	91	92
G3OIT	90	93
G2CZU	90	92
GM3KLA	87	88
G3NNO	84	92
G3NVO	84	90
G3OHX	84	87
G3PLQ	81	89
G3OLN	79	89
G3JFO	76	83
G3OWR	75	80
G3PGN	73	76
G3PDM	72	78
G3OXI	68	73
G3OKJ	62	69
G3PHO	60	81
G3RBP	57	70
G3IDG	49	51
G2BP	48	54
G3NAI	42	61
Phone only		
GM3OM	89	90
G3FS	86	86
G2CZU	69	69
G3NNO	60	72
G3PLQ	37	41
G2NJ	37	38
G3OIT	33	58
G3OLN	30	48

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



Neat station operated by Lars Bohm of Stora Engesby, Motala, under the callsign SM5CAK. He has a home-built transmitter and works both phone and CW.

Heard, but not worked (also on AM)—FR7ZC, 5R8AH, 5R8BZ. And worked on SSB—VP2ML and W's.

G3PEK used some AM as a change from his normal CW, and was delighted to raise VK6QL, followed by 5N2JKO, 9G1EE, CO8JK and W's—all with 30 watts and his 40-metre dipole.

Holding up the CW end, G2DC made it with CE1AD, CR6AD, CX2CP, HC1DC, LH4C, TU2AP, UJ8, UH8, VP8AI and 8GQ, VP9BO, VU2BK, VK6SM, ZD6GA and ZS 1-6.

Ten Metres

After filling a whole column in the December issue, this month's Ten-metre news consists of the facts that G3NWT worked VQ2BK, and G3NOF worked ZE2JA. Otherwise no one even mentions the band! It really seems almost impossible to stir up any activity hereabouts . . . maybe most operators actually *enjoy* QRM.

G3PEK has a funny story: In the middle of a QSO with a W8, he looked out of his window and saw his full-wave aerial fall down! He swapped over quickly to the sloping dipole, which was still up, and continued, with no comment from the other end.

The Tables

The Five-Band Table will continue, as at present, during 1963, and so will the Top Band Counties Ladder (although we may only show it alternate months). The present G3O--/G3P-- Top Band Ladder will make its final appearance next month, when we have received the scores right up to December 31. Replacing it—and starting next mnoth—will be the new G3P--/G3R-- Top Band Table, with scores for countries and counties beginning as from *July 1, 1962.* (This is to avoid making all those keen newly-licensed G3R-types start all over again.) We would like to see more entries for all the tables . . . don't be shy about exhibiting a low score!

Final

Normally we don't believe in New Year resolutions—except to the extent of making bad ones and feeling virtuous when they are broken. But it is obvious that our bands could be much improved—for all—if everyone who uses them would make one very simple resolution, that we feel we *must* sign off with. Simple? Certainly it is . . . "During 1963 I will listen more and transmit less." Just once in a way, when we feel like pushing that switch and calling "CQ DX," something is going to remind us that results are more likely to come from a further five minutes' *listening.* All in favour?

And so to the final-final—all best wishes for the New Year, coupled with thanks to all our most helpful friends who scour the bands and supply the information for this Commentary. The next deadline falls on **Friday, January 11,** and the following one is the earliest yet recorded—*February 8.* Please note both these dates and don't be late. Address everything to "DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. So Good Hunting in 1963—or perhaps we should say Good Listening. 73 and—BCNU.

NEW SATELLITE LAUNCH

The American satellite *Relay* is now in orbit, to take the place of *Telstar,* and the G.P.O. Radio Station at Goonhilly, Cornwall, will again be in action for the experimental work to be carried out from this side. Because *Relay* is a more advanced conception and is in an orbit giving a longer transmitting period across the Atlantic, some equipment changes have had to be made at Goonhilly—these include a 10 kW. transmitter on 1725 mc, and modifications to the aerial steering gear to cope with the longer drive times involved. An article on Goonhilly and the apparatus in use there appeared in the August, 1962 issue of SHORT WAVE MAGAZINE.

DO LET US KNOW!

Readers who build up apparatus described in SHORT WAVE MAGAZINE, or use any of the great number of circuit ideas discussed over any period of a few months, are reminded that it is of great interest to us to hear what success may have been attained—we know all about the things that go wrong, but are practically never told about those that go right! Just a card is usually enough.

At the Weston-super-Mare Rally, left to right: G2HCV/M, G3ONS, G3ENG/M, G2CDN/M, EI7Y and G3JUC. This event held on September 22, was very successful, particularly as it was on a Saturday and so far to the west.
A G3GMN print

MULTI-BAND RADIATING SYSTEM

TRAP DIPOLE FOR 10-80 METRES

THE aerial design discussed here is attributed to W3DZZ and his idea was first published in *QST* for March 1955; since then it has been embellished by various other writers.

Briefly, it can be shown that an aerial 110 feet long and centre-fed can be made to resonate on the bands 28-3·5 mc if a loading section—the coil-condenser assembly L, C in Fig. 1—is included in each arm. By suitably proportioning this inductance and its fixed parallel capacity, the waveform on the aerial on any of the five bands is such that a current antinode always appears at the centre. Hence, it can be fed at this point with low-impedance line, such as 75-ohm coax or twin feeder.

The effect of the traps in each arm is to make the system ½-wave on both 7 and 3·5 mc—because the traps isolate the end-sections on 7 mc, but add sufficient inductance to increase the electrical length to a ½-wave on 3·5 mc. By the action of the traps, the system becomes three ½-wave on 20m.; on 15m. it is five ½-wave; and on 10m. seven ½-wave. Note that in this configuration the 7 mc centre-section is *not* used third-harmonically for 21 mc, as would be the case with an ordinary dipole.

Trap Design

It follows that this happy five-band result can, in fact, only be achieved by correct choice of trap values, and this tends to make the system as a whole frequency-sensitive—that is to say, it will be found to resonate best over some particular frequency-area in each band, and these areas will not necessarily be in close harmonic relation. Local site conditions will also affect the resonant frequency differently on each band.

However, by using an inductance value of 8·3 μH for each of the coils, with a parallel fixed capacity of 60 $\mu\mu$F, good multi-band working is possible, the actual resonant frequency area in each band being determined in the first instance by the lengths of the sections with reference to the centre, *i.e.* the arms must be kept symmetrical about the centre.

If the correct inductance-capacity values are achieved, an aerial to the dimensions given in Fig. 1 will resonate at around 3·65, 7·05, 14·15, 21·25 and 28·5 mc—subject to the site factor already mentioned—with a band-width varying from band to band. (This could be the subject of some interesting experimental work with GDO and SWR meter.)

Construction of Traps

The 60 $\mu\mu$F condenser must be a good ceramic or mica type, rated at around 2,000v. for a 150-watt transmitter, since on some bands it will be at or near a voltage antinode. To meet the rating requirement, it could be built up using larger capacities of lower rating in series. This condenser pack must not be too large physically, as it is incorporated with the inductance—*see* Fig. 2.

In this drawing is suggested how the coil can be mounted without having to subject it to any mechanical stress. The aerial pull is taken up by an isolating insulator (which could be contrived either from a ceramic spreader, or made from a piece of thick paxolin or tufnol) and the coil mount is bolted to this insulator, with the condenser inside the winding.

A coil of the required 8·3 μH inductance can be obtained with 13 turns of 16g. enamelled wire wound to a diameter of 2½ ins., the windings being spaced over about 2¼ ins., or approximately the wire diameter. It is possible to adjust for resonance on different bands by trimming the coils (or by varying the length of the centre sections)—but as such adjustments will obviously affect other bands, this can really only be done for a particularly-wanted frequency area on some one band.

The design of Fig. 1 is, of course, anyway a compromise, but it is a good one, and it should be found that a reasonable SWR is given on all bands. To finish the job, the finalised assembly of Fig. 2 should be well larded with insulating varnish and then enclosed in a polythene bag or bottle cut to make a neat fit.

Finally, for those who may require further guidance, notes on the construction and mounting of coils using the heavier wire gauges, suitable for transmitting and the purpose discussed here,

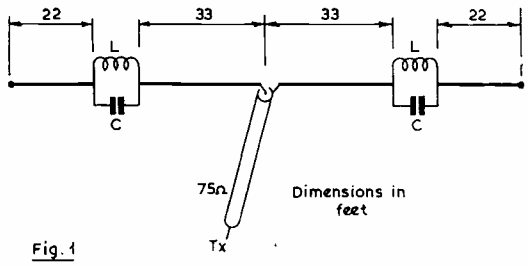


Fig. 1

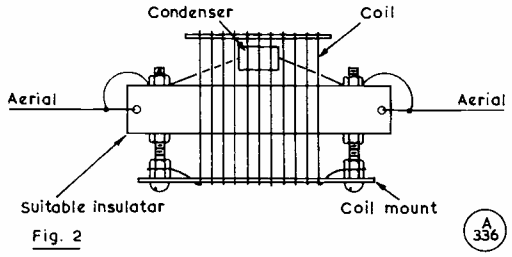


Fig. 2

The trap-dipole configuration explained and discussed in the text. It calls for a span of about 115 feet overall, the actual aerial being 110 ft. of wire, with the traps L, C in each arm. The essential consideration is symmetry about the centre. A suggested method of constructing the traps is shown in Fig. 2, and full details are given in the text. The aerial shown here will take power on all bands 10-80 metres with the centre always at low impedance, and therefore the feed-point for all five bands.

appeared in the October 1960 issue of SHORT WAVE MAGAZINE. Trap dipoles are dealt with in the latest *ARRL Handbook* and also in the *Radio Handbook*. This article itself is based on some information on the basic W3DZZ design in the November 1962 issue of the French *Radio REF*.

UNIT FOR AM/SSB VOICE CONTROL

SINGLE-VALVE CIRCUIT, FULLY ADJUSTABLE

THE arrangement shown here is due to ZL1CJ and was developed to simplify operation on SSB by the use of voice control (VOX). The device can also be used to switch up an AM transmitter.

Audio at a reasonable level—say, after the second stage of the transmitting speech amplifier—is applied to the grid of the double-diode triode through C1 ; the anode output from the triode is fed to the diodes (strapped) which produces a negative voltage, passed back through R4,R1 to the grid to bias the valve to near cut-off. The current through the relay, and hence the operation of the relay contacts actuating the transmitter, is thus controlled by the audio input to the microphone.

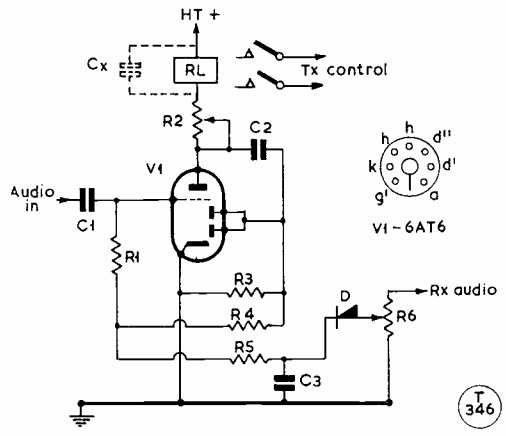
To effect anti-trip, the receiver audio is rectified by the diode D to produce a *positive* voltage, also applied (through R5,R1) to the grid of the control valve. R6 adjusts the suppression voltage, which can be obtained either by a connection to the plate of the Rx output valve (through a condenser) or—a better method—by putting a small step-up transformer across the Rx speaker output, with R6 on the secondary (high impedance) side of this transformer.

Adjustment under operating conditions is by R2, brought out as a panel control, and the initial setting-up procedure is as follows : R6 is turned to "off," and R2 set so that the relay just closes; speaking into the microphone should open the relay ; turn the receiver audio gain control up to normal level and set R6 to the point where the receiver audio output does not drive the transmitter into action.

The delay time—period for which the relay holds on while speaking normally into the microphone—is affected mainly by R3 and to a lesser extent by R2 ; hence the first move here is to find the right value for R3 for the valve, relay and HT voltage being used. If the relay tends to chatter, Cx right across it will put that right. With 200v. or so on a 6AT6, a current swing of from 0·5 to 5 mA will usually be obtainable, which is enough to actuate most relays of the GPO pattern.

If an AM phone transmitter is being used, the system is set up in an exactly similar manner and the transmitter is driven by the speech into the microphone in the same way. When working correctly, only a sound louder than normal speech input can trip the Tx into action.

The circuit shown here appeared originally in the July 1962 issue of the New Zealand *Break-In*, and this article is based on the notes by ZL1CJ in that issue.



Circuit of the single-valve VOX unit, explained in the text. R2 gives some control of delay time, and R6 is for the anti-trip setting, by which a bias voltage is obtained to hold the Tx off against normal audio (speaker) output from the receiver. The unit is driven by audio from the transmitting speech amplifier, producing a current swing in the anode circuit of the valve, thus actuating the Tx control relay.

Table of Values

Single-Valve Circuit for VOX Control

C1	= .05 μF	R3	= 330,000 ohms (*see text*)
C2	= .01 μF	R5	= 2 megohms
C3	= 0.1 μF	D	= Diode rectifier
Cx	= 0.25 μF (*see text*)	V	= 6AT6, or DH77, EBC90
R1, R4	= 3 megohms		
R2, R6	= 250,000-ohm potentiometer		

FREQUENCY FOR THOUGHT

It emerges that those who are investigating the mysteries of telepathy and communication by the waves of thought have arrived at the conclusion that anyone sensitive enough to respond "on the plane" radiates on frequencies between 20 mc and 110 mc. It has been found possible, with a suitable subject (and some slight electronic trickery) to ring bells and light lamps purely by the concentration of thought.

BACK NUMBER SITUATION

Except for some months of last year, we now have very few back numbers left of any issue—most are now right out of print with us. If you require a particular copy, and cannot borrow it locally, about the only suggestion we can make is that you try a notice in the Readers' Small Advertisement section of SHORT WAVE MAGAZINE. The point is that there are plenty of copies of all issues "somewhere," *i.e.*, in the hands of readers. The cost of the advertisement itself need not be more than 5s., the minimum charge.

THE OTHER MAN'S STATION 9M2MC

STATION 9M2MC is owned and operated by Capt. M. Creighton, of 26 Regt., Royal Artillery, at present at Terendak Camp, Malacca, Malaya. Previous locations have been Gravesend, under G3NBM; Dortmund, DL2AL; and Ktima, ZC4MC.

As can be seen, the equipment now is of the latest in amateur-band gear—the transmitter is a K.W. Electronics Viceroy Mk. III and the receiver the new K.W.77. Aerials in use include a multi-band trap dipole, a V-beam, and a vertical system.

Since the only available operating space is in the living-room of an Army quarter, the layout has necessarily to be particularly neat (the XYL insists on this!) and also it must occupy the minimum of space. That this has been achieved is evident from the photograph.

The operator of 9M2MC was first licensed in 1957, as ZC4MC. His initiate year of operation was confined to 20-metre CW, the gear used being a modified TA-12B, with an AR88D. After a brief stay in the U.K. at the end of 1958, as G3NBM, he was posted to Germany and the call became DL2AL. The TA-12B was then further modified to cover all bands 15-80 metres, a modulator was added, and the receiver changed to an HRO.

Interest in Sideband was aroused in 1960, and by the summer of 1961 operation had commenced on SSB, still using the original TA-12B, but with a Heathkit SB-10U Sideband Adaptor and the PA in the TA-12B run in the ZL1AAX mode. The receiver with this rig was a much-modified BC-1147, the modifications including an 85 kc IF strip and a product detector.

It was in June, 1962, that 9M2MC got on the air with the station illustrated here, and to date some 70 countries have been worked on 20-metre Sideband, including many old friends in Germany and the U.K. By about the middle of this year, 9M2MC will become G3NBM once again.

(We are indebted to the Chief Press Officer, Directorate of Public Relations, War Office, for the notes for this article and the photograph accompanying it.—*Editor.*)

VHF BANDS

A. J. DEVON

THE general opinion is that the tropospheric opening in the early part of December was one of the best, if not *the* best, yet experienced on the VHF bands—though your A.J.D. would not quite go along with this (over the years, there have been even wider and more sustained openings), the December occurrence was noteworthy for several other reasons.

In the first place, such conditions for EDX/GDX are comparatively rare in winter; secondly, propagation was efficient enough to give GDX from 4m. right up into the 23 cm. band; and thirdly, there was a much higher level of activity, both U.K. and Continental, than ever before during a sustained opening—this being enhanced by the fact that one of the best days was Sunday, December 2, when most people could conveniently be on.

Looking at the barograph trace, it is easy to see how conditions started building up; from about November 26 onwards, the glass rose to over 30·5″ and all the week until December 2 it was high and steady, with foggy days and clearing nights; the highest pressure noted in this period was during that Sunday, when it went up to about 1040 millibars (this was at A.J.D.'s—there would have been some difference from this figure in other parts of the country). After December 2, when the high-pressure area had become more stable and even more widespread, the persistent-fog condition developed over the greater part of the country, which further improved propagation, particularly on the centimetre bands. By the following week-end, December 9, it had all cleared away. The glass went down to less than 1016 mb, or 30·0″, which experience has suggested is just about the datum line when looking for a change from average to good conditions—though this is by no means a hard-and-fast rule, nor the only important factor in VHF propagation effects—and the weather had turned much milder, with more wind.

So much for the development. As to its result, reports have poured in from north, south, east and west, telling of GM's shouting into the London and South Coast areas; Scandinavians filling the two-metre band with S9+ signals; all Northern Europe available and easy to work with simple gear (provided you could identify yourself through the competition); EDX and GDX stations heard or worked for the very first time by the many newcomers to the VHF bands; the realisation that under real QRM conditions Rx selectivity is as important on two metres as it is on any other band; the unnecessary use of excessive power, and its effect on unselective receivers under exceptionally good conditions; and some surprising and most creditable results on both 70 *and* 23 centimetres.

GDX on 23 Cm.

One of the stations active on our 1250 mc band is G3KPT (West Bromwich, Staffs.), his gear consisting of a DET-24 tripling from 430 mc and running 10w. input; a converter using a crystal mixer in a trough-line circuit (from the *ARRL Handbook*); and an aerial made up of a dipole in a 90° corner reflector, hoisted to 60 feet. With this layout, G3KPT had CW contacts on December 4-5 with G2FN (Surbiton, Sy., 104 miles), G2RD (Watlington, Sy., 112 miles) and G3FP (Thornton Heath, Sy., 108 miles), signal levels either way ranging from 449 to 579, their QSO's being solid, with a full exchange.

All concerned are to be congratulated on these outstanding results, which represent an entirely new sort of GDX, in the sense that centimetric wavelengths are

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1962

Starting Figure, 14

From Home QTH Only

Worked	Station
58	G3BA
53	G3EDD
51	EI2W
48	G3BNL, G3CO
46	G3BOC
44	G4LU
39	EI2A, G3JXN
38	G3OXD/A
37	G2AXI, G3PBV
36	G3JYP, G3NUE
35	G3FIJ
34	G3OJY
33	G3JWQ, G3PSL
31	G3DVQ
29	G2BHN, G3HRH
27	G2DHV/P
26	G3NOH, G5QA
22	G3LQR, G3PTO, G5UM, G8VN
20	G3JHM/A, G3NPF, G3PKT
18	G3CKQ
17	G3GVV
14	GW3ATM

This annual Counties Worked Table will close on August 31, 1963. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. QSL cards or other proofs are not required when making claims. The first claim should be a list of counties with the stations worked for them. Thereafter, counties may be claimed as they accrue. Note: ***While new claims can be made at any time in the period from now to end-June 1963, all operators are asked to send in amended scores as often as possible, in order to keep the Table running up-to-date. After June 30, 1963, only amended scores from those already standing in the Table at that date will be accepted.***

involved over QTH-to-QTH paths far beyond line-of-sight. Of course, there can be no question that under amateur operating conditions (low power and relatively insensitive receivers) such contacts can only be expected when the state of the propagating medium is right for them—in this case, fog over the whole path, with high pressure and low temperature. However, the real point is that G2FN, G2RD, G3FP and G3KPT were there, ready and able to take advantage of an opportunity that may not occur again for a long time.

Reports As They Came

Having taken nearly 70 movements into the Tables, it seems to your A.J.D. that the best thing to do this time is to quote *verbatim* from the reports received, so here we go: "Sunday morning Dec. 2nd brought excellent conditions with what appeared to be a duct running NNE/SSW; the boys up north were giving GC2FZC 59+ reports; during the afternoon, the duct moved NW/SE and PAØ's were rolling in, most of whom seemed to be calling G4LU. At 8.00 a.m. on the Monday morning G6NB/SM6PU were in QSO on CW; I called SM6PU and he came back straight away; by that evening I had worked 11 OZ's, 9 SM's and LA8RB. Absenteeism from work on the Monday must have been very high amongst the VHF/UHF fraternity! Allah was with me for this opening, for of 34 DX stations called, only three did not come back at the first pass" (*G3EDD*) . . . "OZ9AC was worked on December 3 at 1906 for the first G/OZ contact on 70 cm, followed by SM7BAE; eleven other EU's in DL, ON and PA were also raised on the same band, with numerous bits of GDX" (*G3JMA*) . . . "Certainly the best conditions I have ever experienced here in N.E. Essex; on December 3, OZ9AC was worked on 70 cm, and on December 4 at 0115 I got LA9T for possibly the G/LA 'first' on that band; I finished with 123 different stations worked on 70 cm, in 29 counties and 8 countries" (*G3LQR*).

"I obtained my licence on October 4 and with a 3-ele Yagi, a CC converter tuning 3·5-5·5 mc on an Eddystone 840C, and 8 watts input to a QQ03-20A in the PA, I worked nine countries during the opening, all 100% on phone" (*G3RMB*) . . . "The period December 2-4 was the best-ever for DX on 2m. for me here in Leicester; I never thought I would hear EU's at S8/9 at this QTH; a station I called very many times was GC2FZC, but no luck" (*G8VN*) . . . "I've never known such conditions in my life, with S9+ EDX signals on 2m. at all times of the day; during December 2-6, I heard no less than 65 stations on 70 cm, and worked two DL's, ON4HC, OZ9AC, two PA's and SM7BAE on that band; this effort gave me four new countries, making it a total of 9C now on 430 mc; the summary for 70 cm during the opening is 34 stations worked and 20S heard from outside a 60-mile radius, and 11S more heard locally" (*G2CIW*) . . .

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
27	G3EHY
26	G3JHM/A
22	G5FK
19	G3BNL
18	G3OHH, G5JU
17	G3PJK
16	G3NUE
14	G3OKJ
12	G3LQR, G5DS
9	EI2W, G3IUD
8	G3AYT
5	G3PTO

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.

"I worked LA8RB, LA9T, twelve SM's, five OZ's and sundry other EU's on two metres, and had two very nice GM contacts in the shape of GM2FNF and GM2UU; I also worked GI3OFT and GI3RMD on December 1st" (*G3BLP*) . . . "You will possibly get some idea of my QTH when I tell that I have finally worked G5YV after several years of struggle" (*G2BDX*).

"Conditions began to show promise as early as November 22, when I raised G5HA near Hull for the first time; by the Sunday, December 2, I had worked what for me were some long sought-after stations, like G3IOE in Newcastle and GC2FZC; the rest of the DX during the next day or two included DJ/DL, F, GI, GM, LA, ON, OZ, PA and SM; although I have had Scandinavian contacts before, I have never found OZ and SM stations so plentiful and so easy to work" (*G3CO*) . . . "I am very pleased to write to you for the first time and to report a score to date of 171 stations in 23 counties and eight countries, including three PA's and two SM's worked solid on an indoor halo" (*G3PKT*) . . . "At last I have been in on a first-class opening; LA, SM and OZ all in one night; I never bargained for anything quite as good as this!" (*G3OHD*) . . . "My interest in two metres, still only three months old, was given fresh impetus by the opening; I concentrated on working GDX, which certainly paid good dividends; I did little beaming towards the Continent (on reflection, I think this was a mistake) but I did have the odd experience of having to stand in a queue to work F3NG, who marshalled us very efficiently and politely" (*G3GVV*).

"I made a few nice EDX/GDX QSO's during the December 2-4 opening, including EI4Q, EI7D, GI3OFT, GI3RMD, GM2FNF, LA8MC, SM6BCU, SM6CNP, and SM7DH; most of them were on CW" (*G5MA*) . . . "During the good conditions I managed to work two new counties on 70 cm" (*G6NF*) . . . "I found the best evening was Monday, December 3, with DL, OZ and SM stations worked from here on 70 centimetres; on two metres the QRM

was murderous and in a quiet spell I counted 56 stations in a quick tune across the band; it is a problem operating from Central London as in whichever direction the beam is headed, it is always on some S9+ over - modulated suburban station; an interesting feature of the opening was the reception of German UHF television on many frequencies between 500 and 750 mc, all there between December 3rd and 6th; these signals could be used as an indicator of EDX conditions on 70 cm" (*G3AYC/G3COJ/BBC*).

Round to The South

"During the four days of the opening over 100 different stations were worked, but my DX did not include GM nor any of the super-EDX" (*GC2FZC*) . . . "I found that two metres was wide open day and night, and on December 4 I heard PAØCOB and PAØFB on 70 cm" (*G3LTN*) . . . "On two metres many GDX stations were worked, with G3IOE for a new county; on 4 metres I raised 12 stations in six new counties" (*G3JHM/A*) . . . "With a 16-ele stack at 45 ft. and 60 watts to a QQV06-40A, I have worked 9 counties on 70 cm" (*G3NOH*) . . . "I was not able to take full advantage of the good conditions, but I was quite surprised to be getting 58 reports from the north with only 12 watts and a badly screened aerial" (*GC3OBM*).

Looking West

"On Sunday, December 2, 4-metre stations from every part of the country were pouring in as fast as one could work them; later in the afternoon the first EU's began to get through on two metres and by midnight on December 4 about forty QSO's had been made with DL, OZ, PA and SM, all solid contacts; never before have so many strong signals been heard from SM, nearly twenty being logged and several worked, on CW and phone" (*G3EHY*) . . . "During the period December 1-4 we experienced our first real opening down here, with ON, OZ and PA stations coming through very well; but we were unable to work them due to the activity on the band and the strength of the up-country stations with the EU's, so the Cornish stations missed out" (G3OJY) . . . "GC2FZC was a good signal wherever I had my beam and during the opening I worked DL1FF, OZ3M, SM7ZN and nine PA's, with PAØFB outstanding" (*G3NUE*).

From Up North

"Sunday, December 2, opened with GC2FZC being worked at S9 about 10.0 a.m. and he stayed like that all day; when the EU's started coming in, I was very pleased to work old friend DL2XM and also to make my first OZ/SM contacts on two metres" (*G4LU*) . . . "GC2FZC started coming through in the early afternoon of December 2 and came back to my first call; from up here in Westmorland I heard about thirty PA's and worked two of them; next evening I raised OZ5AB, OZ8ME, OZ9OR and SM7BCX; the amazing thing is that I never dreamt it would be possible to get into OZ or SM from here, because of ground rising to 2,000 ft. in that direction" (*G3JYP*) . . . "With me in Newcastle, the opening started about midday on December 2, when stations from south-east England suddenly burst in; from then on it was a day the like of which I've never heard before on two metres; at lunch-time on the 3rd I worked a PA on CW, and F8VN at 550 miles for my best DX; G5TZ was also rolling in fine but I couldn't raise him, nor OZ5AB, who would not tune HF of 145 mc" (*G3IOE*) . . . "We had a terrific 4-metre opening on December 2, with many new stations and counties worked" (*G3PJK*) . . . "The whole VHF spectrum seemed to open with a bang on December 2, with PA's romping in at S9+ on 70 centimetres, S8 phone being worked with PAØFP; next evening I had a 70-cm QSO with DL1PS,

70 CENTIMETRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1962

Starting Figure 4

From Home QTH Only

Worked	Station
29	G2CIW, G3KPT
25	G3LQR
20	G3AYC, G3EDD
14	G3BNL
13	G3LHA
9	G3NOH, G5UM
7	G5QA
6	G3BIK

This Annual Counties Worked Table is reckoned from September 1st, 1962 and will close on August 31st, 1963. All operators who work four or more Counties on the 70-centimetre (430 mc) band are eligible for entry. Counties should be claimed as they accrue, and otherwise the rules are as for the Two-Metre Annual Table.

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

20	G3HBW (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP)
19	G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OE, OK, ON, OZ, PA, SM, SP)
19	G3CCH (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, OE, OH, OK, ON, OZ, PA, SM, SP)
18	G3LTF, G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OK, ON, OZ, PA, SM, SP), ON4BZ
16	G3GHO, G3KEQ, G5MA, G6RH, G6XM, PAØFB
15	G2XV, G3AYC, G3BLP, G3FZL, G4MW, GM3EGW
14	G2CIW, G2FJR, G2HDZ, G3CO, G3FAN, G3HAZ, G3IOO, G3JWQ, G3KPT, G3WS, *G5BD*, G6LI, G8OU, OK2VCG
13	G2HIF, G2HOP, G3BA, G3DKF, G3DMU, G3DVK, G3EHY, *G3GPT*, G3NNG, G5DS, G6XX, G8VZ
12	EI2W, F8MX, G3AOS, G3GFD, G3GHI, G3JAM, G3NUE, G3OBD, G3PBV, G3WW, G5CP, G5ML, G8DR, GW2HIY
11	G2AJ, G2CZS, G3ABA, G3BDQ, G3GSO, G3HRH, G3IUD, G3JYP, G3JZN, *G3KUH*, G3LHA, G3OHD, G4RO, G4SA, G5UD, G6XA, OK1VR
10	G2AHP, G2AXI, G2FQP, G3BK, G3BNC, G3DLU, G3GSE, G3JHM/A, G3KQF, G3LAR, G3LTN, G3MED, G3OSA, G5MR, G5TN, G8IC, GC2FZC, GW3ATM, GW5MQ
9	G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BYY, G3FIJ, G3FUR, G3JLA, G3RBM, G4LX, G5UM, G8GP, GC3EBK, GM3DIQ, GW3MFY
8	EI2A, G2DDD, G2XC, G3AEP, G3AGS, G3BOC, G3EKX, *G3GBO*, G3HCU, G3HWJ, G3JXN, G3KHA, G3KPT, G3MPS, G3OJY, G3OXD/A, G3VM, G5BM, G5BY, G8SB

579 both ways, and by Wednesday 5th the DL's were thundering into Newcastle on 430 mc: GM3FYB was also heard on the band, but could not be raised" (*G3BIK*).

So there you have the story, and the feeling of it all, from those who have put pen to paper not only to stake their claims for the Tables but also to say how the December Opening affected them, on the various VHF bands they work. Though rumours have been floating about on two metres suggesting that some unknown-somebody also heard or worked EA, CT, I, OH, UP2 or SP, we have had no reports whatever for these areas. A glance at the propagation chart shows such possibilities to be unlikely (except for SP or UP2 as a remote chance), so some pretty solid confirmation would be called for to establish claims to having had two-way QSO's with these prefixes. The weather plot shows that EA, CT and I were not covered at all, and it is questionable whether OH, SP and UP2 could have been within range. And there are various checks other than the met. picture that can give a lead to the coverage for a two-metre EDX opening—not that your A.J.D. would not be delighted to receive authenticated claims from anyone able to prove contact with these areas!

Query the Beacon

This time, several people have drawn attention to the poor showing of GB3VHF since the recent overhaul. To quote: "What have they done to the beacon? I used to be able to hear GB3VHF regardless of conditions, but now I only get it when the band is open and even then not so strongly as before. G3ILD tells me he finds the same" (*G3JYP*). And from *G8VN:* "What has been done to GB3VHF? It is quite positively very much down in signal level here compared with its performance before the fault. I was a regular listener to it and found that it was only completely inaudible when conditions were poor; it used to be a good indicator of conditions to the south, but no longer so now."

Transistory on Two

G4LU (Oswestry) now has a transistor Tx running 22·5 mW input for an estimated 10 mW of RF output from the OC171 doubler; he has had easy contacts into the Birmingham area and has been heard by G3EDD (Cambridge). However, G4LU's best QSO was with G3NNG (Harwell) at 113 miles—this was very nearly an all-transistor contact, too, as G3NNG has both Tx and Rx using transistors throughout. And G3NNG himself might like to know that during the opening, his CW was 579 with G3EHY over in Banwell.

G3JHM/A (Worthing) is also going all-transistor, and has worked G2AIH (Epsom, Sy.), who is running a 200 mW job and a transistorised receiver on 4 metres.

Proposed CW Test

It may be remembered that this was talked of last time, and the suggestion has met with a fair degree of approval. The idea is to be on with CW only during *1000-1200 on Sunday, February 3,* and again for *1800-2000 on Saturday, 9th,* and to look for what could be GDX in the light of the band conditions prevailing. To keep it tidy, call "CQ Test."

To make the Test worth while—and note that it *is* a test, and not a contest—we shall need reports for discussion in this space and, unless they are of special interest like Ttx QSO's, stations worked should only be included if at ranges of over 100 miles.

And to Conclude—

That's about it for this time, and what a story it has made! Your A.J.D.'s sincere thanks for all the reports and operating data, and his apologies for not having been able to include a lot of interesting items extra to the EDX/GDX theme. It could be that we shall have more DX news for next time, because as this was going down, conditions gave signs of opening up yet again . . . Who now says "Two is dead in the winter"? The deadline works out as **Wednesday, January 16,** with everything addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1—and every good wish for 1963 to all who may have read thus far, *de A.J.D.*

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
40	G2XV
35	G2CIW, G3KPT, G6NF
34	G3JMA
33	G3JHM/A
32	GW3ATM
31	G3JWQ, G5YV
30	G3KEQ
29	G3LQR
28	G3HAZ, G3HBW, G3LHA, G3NNG
26	GW2ADZ
24	G3LTF
23	G3BKQ, G6NB
21	G3AYC, G3IOO
18	G5UM
17	G3BA, G3MPS
16	G2DDD, G3MED
15	G2OI, G4RO
14	G2HDZ, G3FAN
13	EI2W, G2BDX, G6XA
12	*G5BD*
11	G3BYY
10	G3HWR, G3IRW, G5DS
9	G3BNL, G3NJO/T, G5QA
7	G2HDY, G3JHM, G3OBD/P
6	G3FIJ, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G3LTN, G5ML
4	G3EKP, G3JGY

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

NEW QTH's

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

EI8AL/M, *QSL to* R. P. Moore, Ballycastle Cottage, Aghanloo, Limavady, Co. Derry, N. Ireland.

G3AHS, D. G. Thompson, 17 Fairoak Way, Baughurst, Nr. Basingstoke, Hants. *(Re-issue.)*

G3PXD, A. J. Hawkins, 9 Avon View, Devizes, Wilts.

GM3PZG, J. Lauder, 43 Lochpots Road, Fraserburgh, Aberdeenshire.

G3RFU, J. C. Snaith, Manders Close, Village Lane, Washington, Co. Durham.

G3RHJ, L. G. Fish, 12 Acton Lane, Sudbury, Suffolk.

G3RIA, S. G. Spiegler, 898 Garratt Lane, London, S.W.17. *(Tel.: BALham 7516).*

G3RIR, N. Ackerley, 5 Thornton Close, Eastern Green, Coventry, Warks.

G3RIR/A, N. Ackerley, 14 Sunny Bank, Spring Bank West, Hull, Yorkshire.

G3RJB, B. R. Edwards, 17A Wyelands Park, Hoarwithy Road, Hereford.

G3RKY, A. J. J. C. Stimson, 1 Moorhaven, High Birstwith, Harrogate, Yorkshire.

G3RMG, L. T. Taylor, 42 Ecclesbourne Gardens, Palmers Green, London, N.13.

G3RPD, G. Clinch, Newlands, Paddocks Way, Ashtead, Surrey. *(Tel.: Ashtead 399).*

CHANGE OF ADDRESS

EI5T, I. A. Lyon-Bowie, Moyard, Church Road, Ballina, Co. Mayo. *(Tel.: Ballina 319).*

G2AHL, J. A. Rouse, Priorswood, Compton, Guildford, Surrey.

G2BOX, G. E. Smith, 40 Rydalside, Kettering, Northants.

G2CGQ, P. B. Archer, 3 Rossall Road, Lancaster.

G2CKQ, R. S. Trevelyan, 2 Centry Court, Higher Ranscombe Road, Brixham, Devon.

G2FVX, S. A. Deverell, 54 Pepper Hill, Great Amwell, Nr. Ware, Herts.

G2HKU, E. H. Trowell, Hamlyn, Saxon Avenue, Minster, Sheppey, Kent.

G2SC, J. M. Scott, Chatsworth, Edward Road West, Clevedon, Somerset.

G3ATI, R. W. Pinfold, 9 Oaklands Road, Bedford, Beds. *(Tel.: Bedford 62226).*

G3BKV, L. H. Bower, 57 Broughton Crescent, Wyke Regis, Weymouth, Dorset.

G3BZG, D. A. Findlay, 323 Toms Lane, Bedmond, Abbots Langley, Herts.

G3BZU, Headquarters Station, Royal Naval Amateur Radio Society, H.M.S. *Mercury,* Leydene, Petersfield, Hants.

G3EJF, J. E. Hodgkins, Bridge House, Hunton, Bedale, Yorkshire.

G3ENB, W. E. Gates, 12 Mount Avenue, Wrenthorpe, Wakefield, Yorkshire.

G3GHL, F. T. Kimber, 230 West Park Drive, Roundhay, Leeds, 8.

GM3GNR, R. E. Short *(ex-G3GNR),* 5 Glenmhor Terrace, Lochy Bridge, Fort William, Inverness-shire.

G3HWX, B. J. Whitty, 59 Longfold, Maghull, Lancs.

GW3ICF, F. C. Redfern *(ex-G3ICF),* 6 St. Anne's Avenue, Penarth, Glam.

GM3IKD, H. S. Yorke, 158 Appin Crescent, Dunfermline, Fife.

G3JHM, D. T. Hayter, 333 Havant Road, Farlington, Hants.

G3JSB, S. B. Jeffrey, 5 Almsford Place, Harrogate, Yorkshire.

G3JZP, Mrs. J. Hodgkins, Bridge House, Hunton, Bedale, Yorkshire.

G3KIW, G. W. Jenner, 3 Pirrie Close, Shirley, Southampton, Hants. *(Tel.: Southampton 75280).*

G3KLI, F. C. Beadle, 7 Leander Road, Gravesend, Kent.

G3KSK, J. J. Phillips, 6 Parkfield Road, Ruskington, Sleaford, Lincs.

GW3LJN, E. A. Herbert, Police Station, Hay-on-Wye, Breconshire, *via* Hereford.

G3MML, E. G. Augood, Wychwood, Harbridge, Ringwood, Hants.

G3NRO, P. Gill *(ex-GD3NRO),* The Cobblestones, Station Road, Swavesey, Cambridge.

G3NVK, R. Winters, 245 Asfordby Road, Melton Mowbray, Leics.

G3OFS, C. J. Swain, The Priory, Walsham-le-Willows, Bury St. Edmunds, Suffolk.

G3OIJ, D. R. Blewett, 44 AMQ, R.A.F. Hospital, Wroughton, Wilts.

GM3OOI, S. L. Yeo, 18 Warrender Park Crescent, Edinburgh, 9. *(Tel.: FOU 3710).*

G3PET, A. G. Widdowson, 9-B Baker Street, Chasetown, Walsall, Staffs.

G3PMD, A. Tranter, 70 Asquith Boulevard, Knighton, Leicester.

G3PMT, J. S. Russell, Room 27, c/o Sgts' Mess, R.A.F. Scampton, Lincoln.

GW3PPF, P. A. Schorah, *(ex-G3PPF/T),* 11 Danygraig, Pantmawr, Cardiff, Glam. *(Tel.: Cardiff 66310).*

G3PSH, J. Coffey, 105 Walton Avenue, South Harrow, Middlesex. *(Tel.: BYRon 9307).*

G3RIK, D. Carden, 58 Beechfield Road, Milnrow, Rochdale, Lancs.

G5MF, F. A. King, 31 Langford Crescent, Thundersley, Essex.

G5RH, D. Q. Aldridge, 2 Tudor Close, 71 Sandy Lane South, Wallington, Surrey.

G8PT, A. G. Orchin, Kerajo, Marina Avenue, Appley, Ryde, Isle of Wight.

AMENDMENTS

G3RIT, A. Ball, 56 Wistaston Green Road, Wistaston, Crewe, Cheshire.

G6KR, E. R. Westlake, Ardlui, 177 Wenlock Road, Shrewsbury, Salop.

TRANSISTOR CONVERTER FOR TWO METRES

HIGH-GAIN LOW-NOISE CRYSTAL CONTROLLED FRONT-END UNIT

W. C. BRADFORD, A.M.Brit.I.R.E. (GM3DIQ)

Our contributor is a well-known exponent of the art and practice of VHF, and does much work on the bench. The converter he describes here emerged in the course of some experiments using various transistor arrangements, and the result is a practical design suitable for mobile, portable or fixed-station working.—Editor.

THE converter shown in the diagram started off purely as an experiment in the construction and operation of transistorised crystal oscillators and VHF multipliers. In the writer's stock of transistors were some type 2SA135 (Hitachi Corpn.) on which no information could be obtained, except that they were intended for HF work. These were used for the oscillator-multiplier chain.

Going through the circuit: TR4 is a Brush AF111 in a grounded-base overtone oscillator arrangement, operating on the 5th overtone of a 4550 kc crystal, giving output at near-enough 22·75 mc. TR5 is a 2SA135 used as a frequency-doubler to 45·5 mc, and is biased by the drive from TR4; the emitter resistor R16 limits the dissipation in TR5. Following is another 2SA135, TR6, working as tripler to 136·5 mc and, again, is biased by drive from the preceding stage with an emitter resistor, R18, to limit dissipation.

RF Section

For the RF section TR1, TR2, the transistors used are Mullard AFZ12, which actually became available before much data had been published on them. A good deal of experimental work had therefore to be done, and a circuit similar to that shown here was eventually developed—this was subsequently modified to incorporate the Mullard operating data on the AFZ12, resulting in a marginal improvement and the final design now given. This process of evolution made it clear that with the AFZ12 there is a reasonable tolerance in circuit values.

TR1 operates as a grounded-emitter RF amplifier. The input condenser C2 matches the 70-ohm input impedance tap on L1 to the 33-ohm base input impedance of TR1. The bias conditions are set to show 1 mA emitter current for the best noise-figure, and output is taken from the collector circuit *via* C6, which is of 2 $\mu\mu$F only. The collector circuit is tuned by C4, and C6 provides a match from the collector output into the 70-ohm input for the mixer, TR2. The bias conditions for TR2 are as for TR1, and the emitter side is taken *via* L12 for local-oscillator injection. The base input condenser C9 gives the matching, as in TR1. Correct oscillator injection is obtained with a 30%-40% increase in the emitter current of TR2, to 1·3 mA. The collector side of TR2 is tuned by L4 and C10 to the mid-frequency of the IF channel (which, in the writer's case, is 7·5-9·5 mc). An attempt was made to run TR3 as a tuned IF amplifier, but the main (transistor) receiver, forming the IF/AF section of the whole Rx assembly, did not like it at all, so the TR3 circuitry was modified to run as a passive IF stage.

No doubt a different oscillator-multiplier line-up could be tried, using other types of HF transistor now readily available, but as already mentioned, this converter started as an experimental undertaking. Considering that the multiplication of the circuit as given here is times-30 the fundamental, it was most surprising to find that the only beat obtained over the main Rx tuning range was in fact just outside the bottom end of the band—it serves as a handy check on the oscillator if the band sounds dead!

Construction

No very great detail on constructional procedure is called for, if only for the reason that most readers experienced in VHF will have their own ideas as to what form the final job should take. The main points to watch in laying out the work are to provide effective screening between the base and collector circuits, and equally complete screening between the oscillator section and the RF side.

Very little can go wrong in the constructional work if the usual rules are observed. The physical layout should be similar to the appearance of the

Table of Values

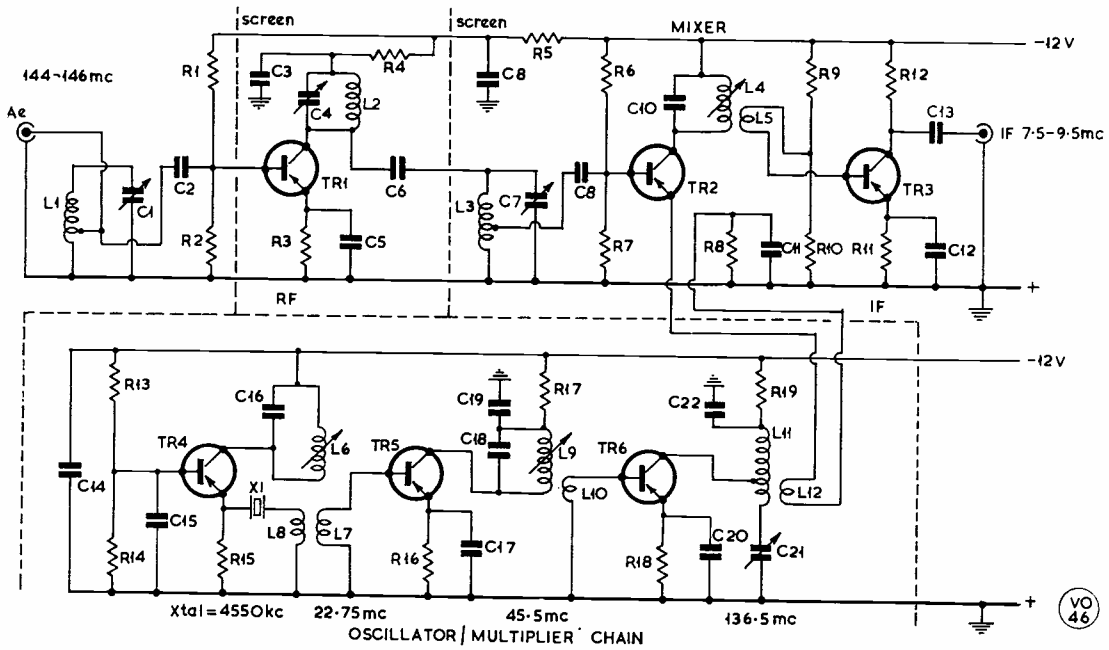
The GM3DIQ Transistor Converter for Two Metres

C1, C7	3-30 $\mu\mu$F, trimmer	R2, R7, R11	2,200 ohms
C2, C9	25 $\mu\mu$F, cer.	R3, R8	1,800 ohms
C3, C5, C8, C11, C12, C15, C17, C19, C20	.001 μF, cer.	R4, R5	220 ohms
		R9, R13	15,000 ohms
		R10, R14	6,800 ohms
		R12	10,000 ohms
C4	2-8 $\mu\mu$F, trimmer	R15, R16, R18	1,000 ohms
C6	2 $\mu\mu$F, cer.	R17, R19	100 ohms
C10	33 $\mu\mu$F, cer.	TR1, TR2	Mullard AFZ12
C13	680 $\mu\mu$F, cer.		
C14	.05 μF, paper	TR3, TR4	Brush AF111
C16, C18	10 $\mu\mu$F, cer.		
C21	0.5-6 $\mu\mu$F, trimmer	TR5, TR6	2SA135, or similar HF types
R1, R6	12,000 ohms		

TABLE OF COIL DATA

L1, L3	2½ turns 18g., wound to $\frac{5}{16}$-in. internal diam., spaced wire diameter, tapped at ½ turn.
L2	3 turns 18g., wound as L1, L3.
L4	40 turns 34g. enamel, on ¼-in. diam. former, with slug.
L5	4 turns at earthy end L4.
L6	20 turns 30g. enam., on ¼-in. diam. former, with slug.
L7, L8	1½ turns 30g. enam., overwound at earthy end L6.
L9	8 turns 30g. enam. on ¼-in. diam. former, with slug.
L10	1½ turns 30g. enam. overwound at earthy end L9.
L11	7 turns 18g., wound to $\frac{5}{16}$-in. internal diam., spaced wire diam., tapped at 2 turns from hot end.
L12	Single turn link for injection into mixer.

Crystal is 4550 kc, operated 5th harmonic.



The fully transistorised high-gain crystal-controlled converter for two metres described by GM3DIQ. The oscillator-multiplier chain is TR4-TR6, from a 4550 kc crystal, giving an injection frequency of 136.5 mc. TR2 is the mixer, and TR1 the tuned RF amplifier, using the new Mullard AFZ12. The transistor at TR3 operates as a passive IF stage and could probably be dispensed with, the input into the main receiver (IF/AF unit) being taken off by L5. The circuit should be built up in miniaturised unit form — osc. multiplier on one strip, with the RF and mixer/IF sections separately — to incorporate screening as shown, and laid out in accordance with the circuit sequence. Very good results are being obtained by GM3DIQ with a converter built to this circuit — see text.

circuit as drawn. At GM3DIQ, the converter is built on a strip of standard "Veroboard" about 6 in. long, with screens of thin tin in the appropriate positions. The final job was then mounted inside a small metal box, which can be fitted under the glove compartment in the car.

Adjustment and Tuning

Power drawn is roughly 25 mA at 12 volts. The oscillator circuit should tune to give output at 22·75 mc; the slug in L6 must be set to the point where there is little or no change in beat-note when listening on a monitor receiver, and when keying the 12v. supply, the oscillator should give a clean, steady beat; it is no use proceeding further until the oscillator is functioning properly.

TR5 collector circuit should now be adjusted to 45·5 mc, and then TR6 to 136·5 mc. As mentioned earlier, R16 and R18 serve to limit the dissipation in TR5 and TR6 respectively, and this means that they also affect the drive available into the following stages. The best way of setting the resistors is to start off with high values for R16 and R18 and then reduce them by means of parallel resistances until sufficient drive is obtained (in the case of R16, TR6) with the required injection level (for R18, TR2). The correct values can then be substituted as a single resistor in each case. By this method, only the necessary oscillator power is developed and harmonics on unwanted frequencies are kept down.

The collector circuit of TR2 is then tuned to the IF pass-band (in this case 8·5 mc) and final adjustment made for correct injection; this will be found to occur at a mixer-emitter current of about 1·3 mA.

Next, the RF circuits L1, L2, L3 are tuned up, using some locally-generated test signal on 145 mc, and aiming for maximum S-meter deflection on the main Rx. When doing this, it should be remembered that the RF stage TR1 should be loaded (by the aerial plugged in at Ae.) otherwise it will tend to take off. This is normal with most RF stages at VHF — they must be aligned in the operating condition.

Performance

Results with the converter as described here have exceeded all expectations. Using only a halo on the car, EI2W has been received at Stevenston, Ayrshire, a distance of about 180 miles. Comparison measurements of noise-factor have been made against he GM3DIQ main-station converter (consisting of 6CW4-A.2599-A.2521) which gives a rating of 4·2 dB; the transistor job measured 5·1 dB. The Mullard figures on the AFZ12 show that a stage gain of 12·5 dB should be realisable—though this has not actually been determined for the transistor converter, it might be mentioned that a comparison check at the home-station over a period of some weeks showed that any signal audible on the valve converter could be equally well resolved on the transistor receiver, irrespective of signal level.

SWL • • • • • •

AERIAL INPUT CIRCUITRY—MATCHING METHODS—READERS' NOTES, NEWS AND VIEWS—HPX POSITIONS

YOUR Scribe recently had occasion to test out a commercial receiver of excellent reputation and known performance. One, in fact, which he knew well and had been using for many months. The difference on this occasion was that it was installed in a place where the only aerial available was a long wire draped from the top of the building down to the room in which the receiver was being used. No form of coupler or ATU was available ; the wire simply had to be attached to the aerial terminal of the receiver. Its length was probably about 100 feet, and it was all outside, though rather close to the building.

Results were terrible. None of the weak DX signals normally heard at the home location were audible at all, and several very strong commercials, instead of reading S9 + 20 on the S-meter, were barely S9. In fact that implied drop of 20 dB was probably just about right. No one in his right mind would have bought that receiver after such a demonstration.

Now we turn to the other side of the picture. In an American club magazine there recently appeared an article called " A Table-Top Antenna Farm," in which a W5 listed the DX he had worked with " aerials " consisting of a four-foot broomstick wound with wire, a microphone stand, an open umbrella on the floor, a TV aerial 33 ins. long, a burned-out electric iron, and an AC-DC broadcast receiver loop aerial. The editorial comment at the end of the article is " His antennas are quite startling, but what an antenna coupler he must have ! "

And *there* you have the crux of the matter. On the one hand a passable outside aerial, doing nothing; and on the other all sorts of small pieces of junk doing quite a lot. The difference—nothing more than efficient matching into the receiver. (The W5's motto now is " You produce it, we load it.")

Loading and Matching

All our readers must know the importance of impedance-matching in other aspects of radio. Ever tried a 4,000-ohm speaker across 2·5-ohm output terminals, or *vice versa?* Or resistance-coupling an audio stage with a 100-ohm resistor in the anode circuit ? Or even trying to feed power from the mains into a load of 20,000 ohms or so ? Then you will know what we mean.

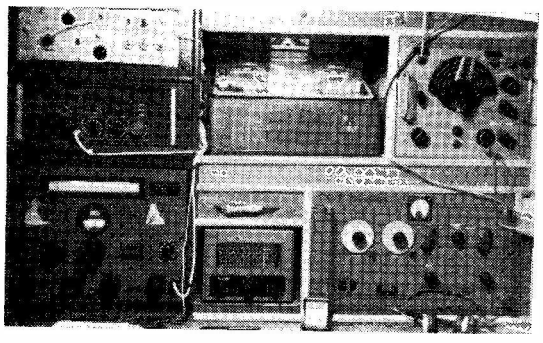
The matching of an aerial into the input circuitry of a receiver is every bit as important. But unfortunately one can't take a piece of wire (or even a properly designed aerial system) and say that its impedance is so-many ohms. It will be different over very wide ranges, according to the frequency on which it is used. Take a straightforward piece of wire, 67 feet long ; on Forty, Twenty and Fifteen metres its end will present quite a high impedance to the receiver, but on intermediate frequencies there will be cases where its impedance is low. The simple rule is that any *even* number of quarter-waves will look like a high impedance at the home end, while any *odd* number of quarter-waves will look like a low impedance. The far end, being strung up somewhere and not connected with anything at all, will always have to be regarded as a high-impedance point.

The chances are that if you are using an aerial in the piece-of-wire category, with no feeders, then on one or more bands it will have high-impedance characteristics where it meets up with your receiver. So, for the efficient performance of the Rx, which is most probably designed for an input impedance of 70 or 100 ohms, you will need some sort of transformer between the receiver and the aerial—a simple step-up device.

The simplest possible form appears in Fig. 1. It is nothing but a coil, tuned to the particular band you are working on, with the receiver tapped across a small number of turns and the aerial across a greater number. Any magnitude of stepping-up can be achieved in this way. Alternatively, you could couple the receiver by a one- or two-turn loop (untuned) to the coil, and tap the aerial and earth across the ends of the coil. Even a simple device like this would probably have added 10 or even 20 dB to the performance of the receiver mentioned in the opening paragraphs.

Centre-Fed Types

The only type of aerial which you can rely upon to match straight into the average receiver is a dipole, fed with coax. The *centre* impedance of a dipole is in the region of 70 ohms, and suitable coax can be used to connect it to the receiver, in which case the actual length of coax does not matter—but that aerial is only a dipole on *one* frequency-band. It's no use cutting one for Twenty and expecting good results to appear on Fifteen. (The one exception



The station of SWL W. S. Terry, at Orchard House, Ealand, Scunthorpe, Lincs. His gear includes a CR-100, a Minimitter amateur-band converter and an R.1392 for VHF reception. He also has a separate audio amplifier and control panel, with mixing facilities, for the tape recorder, and a W.1191 wavemeter for frequency checking.

Fig. 1. Simple but effective way of coupling a high-impedance aerial to a low-impedance Rx input; both the receiver tapping at the bottom end of the coil, and the aerial tapping at the top should be experimented with for best results. _Fig. 2._ The arrangement of Fig. 1 modified for band-switching; taking a coil with a sufficient number of turns to cover the lowest-frequency band required, taps are provided for the other bands, and the condenser connected at the appropriate point for each range; this can be satisfactory for 7-21 mc, but it is advisable to use a separate, and much larger, coil for the LF bands. _Fig. 3._ A pi-section aerial coupler which can be made to cover several bands; C1 need only be 100 $\mu\mu$F or so, but C2 should be as large as .001 μF, if possible; band changing is effected by the taps on L1. _Fig. 4._ The best-known ATU circuit of all is really identical with Fig. 3, except that the Rx is link-coupled to the coil; separate inductances for all bands are desirable, although probably 14-21 mc could be covered with one; the best position for the link is usually somewhere between the centre of the coil and the C2 end, and this should be found experimentally; if C2 is made to short at maximum capacity, true parallel tuning by C1 only can be achieved, when this is required.

here is that if you cut a dipole for *Forty*, it becomes roughly three half-waves on *Fifteen* and matches tolerably well.) If you want to use a centre-fed wire on several bands, you will have to use open-wire feeders and then an ATU will be just as necessary as it is for an end-fed wire.

The simplest all-band ATU is just a modification of the arrangement in Fig. 1. The condenser is tapped across various sections of the coil for band-changing, and the aerial is taken to the point where signals are best. And all the time the receiver is tapped across a few turns at the bottom end, or link-coupled in. Fig. 2 shows the general idea.

This can be improved by turning it into a *pi*-section circuit, as in Fig. 3. Here the coil is tuned by the two condensers C1 and C2. C1 will normally be quite small (say, 50 $\mu\mu$F) but C2 must be of large maximum capacity, 500 $\mu\mu$F or so. The aerial is tapped on at the C1 (high-impedance) side of the circuit, and the receiver feed taken off from the C2 (low-impedance) end. Or you can use a very similar arrangement (Fig. 4) but link-couple the receiver to the coil. This is the coupler which has been described so often before, and is most efficient with a separate plug-in coil for each band, the size of the link likewise being adjusted for best results on each band—*see* p.645, February, 1962 issue, SHORT WAVE MAGAZINE.

Bear in mind all the time that you are simply *transforming* the high impedance of your aerial down to the low impedance needed for the receiver input. Thus you could even do it with two untuned coils, tightly coupled together, with the aerial going down to earth through a large coil and the receiver coupled to a small one. An aperiodic arrangement can indeed be made on these lines, and will cover a wide range of frequencies, but the average SWL is interested in maximum efficiency on the particular band he is covering, and so an accurately-tuned arrangement is more what he needs.

With an aerial coupler of the type shown in Fig. 3 or Fig. 4 you should be able to couple anything (and we mean *anything*) into the receiver. Any of the gadgets mentioned earlier in connection with the "Table-Top Antenna Farm" can be made to resonate, if you have the correct range of coils and condensers available. You will get better results from an old garden spade, correctly coupled in

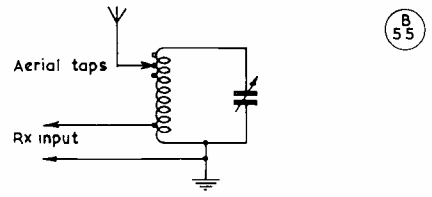


Fig. 1

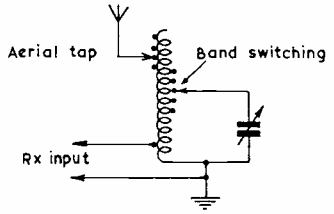


Fig. 2

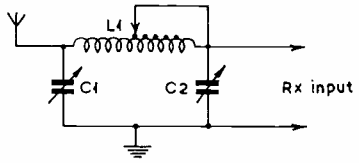


Fig. 3

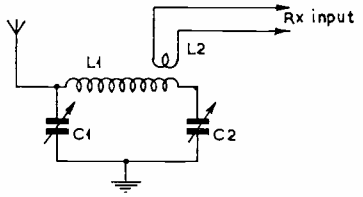


Fig. 4

through such a tuner, than from a random piece of wire just hitched on to the aerial terminal (unless you are supremely lucky and hit on just the right length of wire !)

An indoor whip aerial can be made to give surprising results when correctly coupled in. We recently tested one and must confess to being quite surprised. Every signal audible on the main aerial was still there on a 7-ft. whip inside the room—at somewhat less strength but with almost the same sig.-noise ratio, which is what matters. After all, you can always turn the gain up—there aren't many receivers left which have to be operated flat out all the time !

Coil Sizes

As many of our SWL readers are intending to sit for R.A.E. in due course, we suggest that they might as well build an ATU which will be good enough for use with the transmitter, when that blessed state is

attained ! It is no harder to make coils suitable for both transmitter and receiver than it is to make up small affairs which will do for one, but be unsuitable for the other.

The coil formers out of TU5B's and similar units are ideal; polythene water-piping can be bought at most ironmongers' shops and is quite a low-loss material. As well as being very cheap, it is ideally suited to use for coil formers.

For the 2-in. coil formers, using 16g. wire, you will need 7 turns to cover Fifteen and Twenty; 15 turns for Forty; 30-35 turns for Eighty; and about 55 turns for Top Band. In all cases they are spaced one diameter. The smallest (7-turn) coil need not be on a former at all—a coil of that size, wound with 16g. wire, will be self-supporting. For smaller diameter formers, increase the turn numbers in proportion.

The links may be of insulated wire, but use something a little better than thin bell wire. The inner from a short length of coax is very good—and the outer braiding will always come in handy for something else. One-turn links should do for the two smallest coils, and two-turn affairs for Forty and Eighty. Top Band may need three or four turns. But this is all a matter for experiment—use the one that works best ! If your tuning seems flat, your link is too big or too tightly coupled. Adjust it for a really sharp peak on the tuning control. If you use the Fig. 3 (*pi*-tank) circuit these remarks do not apply, as you make all your adjustments by the settings of the two condensers.

Whether you use links or not, the procedure is the same. Tune in a signal; resonate the aerial circuit by turning both condensers together, until you find a peak of signal strength. Then try reducing one condenser while increasing the other, until you find the best setting. (When the transmitter comes along, and you actually feed power into the ATU, you can make these adjustments with a standing-wave ratio meter . . . and then you will know that the receiver is really "bang on.")

Loading It Up

You will realise the necessity for an ATU if you investigate the end impedance of various lengths of wire. The *only* cases in which that impedance is moderately low are those in which it is almost exactly an odd number of quarter-waves. So, if we take the 40-metre band as an example, you might get away with direct coupling from an end-fed aerial to the receiver if the aerial happened to be 33 feet (or 99 feet) long. If it is more than ten feet off (in either direction) from these figures, you would certainly need an ATU to get a reasonable match. And for all the inside aerials (wire round the picture-rail, loaded whip, stray piece of vertical thing or any of the odd junk mentioned earlier on) the total length would be much too short for a quarter-wave and could therefore look like a very high impedance.

When you have made your ATU and got it going, just try a seven-foot whip, first properly resonated by the ATU, and afterwards simply connected to the aerial terminal of the receiver. The difference you will certainly observe will be sufficient answer to any doubts you might have had as to whether the whole thing was worth while.

READERS' FORUM

One of the things that makes the compiling of this feature so interesting is the constantly-changing population . . . old friends mutter darkly about "R.A.E." and then suddenly show up in our companion feature "DX Commentary" with a G3R--call-sign, but an equal number of new names come in to replace them. There is a small hard core of "perpetual SWL's" who frankly are not interested in transmitting and prefer their hobby as it is. However, the overall cross-section remains about the same, with absolute novices, well-advanced learners and really experienced old hands all reporting regularly.

One who is leaving the ranks is *G. W. Lawrence (Leamington Spa)*, who has been in the HPX Ladder for some time but is now known as G3RLI; however, he says he will continue to read "SWL" with interest. *Ken Staddon (Stroud)* has only just joined us, but is talking of R.A.E. already; he has a Hammarlund SP-200, an 80-metre Zepp and a 20-metre folded dipole, and is also interested in Top-Band mobile work.

Ralph Ashby (Hinckley), another of the regulars, is awaiting R.A.E. results even now, and we certainly hope he is not disappointed. *M. H. Saunders (Malvern College)* is a similar case; he tells us that up to date he has logged 220 countries, 48 /MM's and two /AM's.

Last in this group is *P. Barker (Redruth)*, whose story runs "crystal set, three-valver, R.107, mods.

HPX LADDER

(Starting January 1, 1960)

Qualifying Score—150

SWL	PREFIXES
PHONE ONLY	
H. G. Shaw (Heswall)	643
A. W. Nielson (Glasgow)	561
R. J. C. Coats (Cowie)	556
C. N. Rafarel (Poole)	447
D. G. Edwards (Birkenhead)	411
R. R. Loe (Colchester)	398
R. Hunter (Harrow)	385
D. A. Whitaker (Waddington)	366
R. K. Western (Torquay)	366
D. Smith (Stanmore)	354
B. Curnow (Plymouth)	348
D. Bell (Nottingham)	343
M. H. Saunders (Malvern)	340
P. J. Lennard (Wartling)	337
L. Birch (London, E.6)	333
P. Whipps (Enfield)	325
M. Warrington (Burnley)	324
M. Healey (Horsham)	323
N. H. Maeer (Sutton Coldfield)	312
S. Foster (Lincoln)	299
F. Bourne (Plymouth)	294
A. T. James (Exeter)	281
K. C. Staddon (Stroud)	268
C. Miller (Tayport)	267
W. J. Atherfold (Southwick)	266
J. F. Hobson (Emsworth)	263
D. Douglas (Edinburgh)	262
R. Ashby (Hinckley)	257
G. Steedman (Huddersfield)	254
D. J. Aldridge (Southend)	240
R. J. Howgego (London, E.11)	231
G. A. Lawler (Dublin)	221
G. Thomas (Salford)	217
K. A. Randall (Fareham)	205
D. Long (Barnehurst)	197
R. Mansell (Eastleigh)	197
R. J. Hudson (Loughton)	191
D. Hayes (London, N.3)	190
J. E. Pither (London, W.5)	190
R. G. Evans (Swansea)	181
B. J. Tarry (Warrington)	180
D. A. Williams (Budleigh Salterton)	166
A. J. Birch (Lichfield)	157
R. V. Coupe (London, W.3)	151
CW ONLY	
R. K. Western (Torquay)	479
C. Harrington (Hounslow)	447
P. J. Lennard (Wartling)	380
P. L. Stevens (Donnington)	262
P. Whipps (Enfield)	259
R. A. McEwen (Stirling)	215
K. M. Duggan (York)	162

(NOTE: *Listings include only recent claims. Failure to report for two consecutive issues of "SWL" entails removal from the Table. Next list, March 1963 issue, deadline January 25).*

S W L • • • • • •

continued

to same, and R.A.E. next May."

How Many Prefixes?

H. G. Shaw (Heswall) heads the HPX Ladder with the excellent score of 643 prefixes; however, he has been looking into recent *Call Books* to see how many exist which he hasn't yet heard, and makes that number about 180! As he says, "at my rate of progress of six new ones per two-month period, there would seem to be years of searching ahead."

Roger Western (Torquay) now heads the CW list with his total of 479, and is still amassing new DX stations. Top Band interests him especially, and CW listening up there is not unrewarded, for he has logged 5A3, OH, UB5, UO5, HC, VP2VL and several North Americans. He is also one of the very few SWL's to report hearing LH4C, the DX-pedition to Bouvet Is.—if you missed this one, you may never hear it again!

VHF Listening

From Top Band to VHF, another comparative rarity among our regular correspondents. *R. K. Towers (Nottingham)* is at Cambridge (in digs) where he is unable to do much listening, but is getting some gear built, thanks to excellent workshop facilities. He uses a two-metre front end (neutralised 6CW4) with a 10-element beam in the roof, feeding into an HRO at 8-10 mc. Now he has acquired a 416B valve (just about the ultimate for an RF amplifier) and is going ahead with a pre-amp. for 70, 144 and 432 mc. News promised after Christmas!

DX/TV

The other branch of VHF concerns the DX/TV specialists, of whom *Charles Rafarel (Poole)* is our outstanding exponent. He had a good time during the Sporadic-E conditions in late October, and on the 29th he logged more than 20 DX/TV stations in 10 countries. His total bag to date (doubtless increased by now, since VHF conditions are fantastic as we write these words) is 67 stations in 21 countries. But a late note from him conveys the amazing news that *Jacques Herreman*, the young Belgian "ace," has received confirmation from *Peking TV* on Band I (57·75 mc vision, 64·25 mc sound). This is his latest triumph, but he already has Japan and U.S.A. confirmed. The Peking reception was on May 29 last, at 0305 hrs.

Philip Stevens (Wellington) calls attention to the sad state of Forty, with barely 50 kc to play with, and even that badly jammed; however, CW is now his main interest, with R.A.E. taken and the Morse test coming up.

P. J. Lennard (Wartling) has also become very keen on CW, and derives a lot of enjoyment from Eighty and One-Sixty. He comments that not everyone on the bands behaves like a road-hog, and instances an example of courtesy by a G, who took some trouble putting a 4X4 through to ZL.

Vincent Lear (Wallasey) must be one of our youngest readers (13) and he, too, is very keen on Top Band, for which he recommends a 45-ft. aerial, loading coil (link-coupled) and 70-ft. counterpoise, which works well with a CR-100.

Phone DX

Even on Forty one can hear quite a lot of DX phone, especially on SSB. *Colin Miller (Tayport)* was listening to VK2AVA one morning, on 7100 kc SSB, and he was jammed by an adjacent station, who turned out to be JA2BAY! Peculiar noises, especially at night have detracted from the enjoyment of 80-metre SSB.

Several readers comment on the fact that Twenty is completely dead by the time they are able to start listening (at any rate on week-days). By the time you read this it may be opening up again

Correspondence for the next appearance of this feature, in the March issue, should reach us not later than January 25, addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1. Good photographs are always wanted for illustration, and are paid for on appearance.

SWL Alan Harlan runs this outfit at 13A Linden Road, Gosforth, Newcastle-on-Tyne, 3. The DX interest is 80/160m. and 20m. SSB, a total of 80 countries having been heard. His receivers are Eddystone S.840A and CR-100, with an RF-26 converter for 6 metres; also available is a Philips EL3538 tape-recorder.

SWL • • • • • •

continued

slightly, but on occasions the band has faded by as early as 1700 GMT. As we move into the spring (and it can't happen too fast for your Scribe) things will improve.

R. J. Howgego (London, E.11) has found Twenty very good for Malaya and "intermediate stops" such as EP2, MP4, SV, VU and the like; he runs an R.1155A with three converters . . . *Stewart Foster (Lincoln)*, another one beset by the early fade-out, has taken to BC listening, although he managed to add 17 prefixes to his score; he mentions good SSB reception from HZ1AB on 3790 kc. . . . *R. R. Loe (Colchester)* thinks there has been a lull between the HF and LF band conditions, with LF bands now beginning to pick up; on Eighty he has heard VP2ML, XE1CV and ZL's—and ZM6AW is his "most wanted station."

Eighty Metres

D. Hayes (London, N.3) appears in the HPX Ladder with the relatively low score of 190—but tells us that these were *all heard on Eighty!* Some of the unusual ones in his list (for that band) are HK4, HR3, PJ2, TG9, TI2, VQ4, YV, 3A2, 4X4, 5A3, ZS6 and XE1. Shows what you can do if you stick at it.

C. Harrington (Hounslow), one of our CW experts, keeps a card-index record of everything he has heard, using 3-in. by 2½-in. cards (five by threes cut in half). Since he re-started in 1955 he has logged nearly 25,000 different calls, and "the system" has grown through two biscuit tins, a four-drawer cabinet and now a very grand eight-drawer affair, of which he sends a sketch. The top houses the gear and is formica-covered—"worth nearly as much as the receiver!" And there are drawers for tools and all the bits and pieces that one has to have around.

Chris Boulton (Uttoxeter) is at Durham University and has little time for SWL work, but does run a converted 19-Set and a one-valve TRF receiver (the latter brings in plenty of DX on 14 mc CW). Christmas holidays will see some activity on Nuvistor front-ends, Q-multipliers and the like. Located in his present "bedroom shack" he finds it impossible to make an earth connection without a very long lead, and asks for advice. A connection to the nearest water-pipe would be worth trying, and if that is no good, experiments with counterpoises of various lengths would be interesting—simply odd lengths of wire allowed to dangle from the window, or even run round the floor of the shack.

Gerard Lawler (Dublin) reports for the first time; most of his DX was heard on a broadcast receiver, but he now has a 52 Set and intends to build an ATU to make the most of his 180-ft. wire "wrapped around the house." *Malcolm Healey (Horsham)* is on two metres, using a cascode crystal-controlled converter; he is in the middle of shifting his QTH, and asks whether he will have to start HPX-ing all over again. In his case, the answer is "certainly not"—he has only moved one mile! *J. E. Pither (London, W.5)* asks whether Air Mobiles are counted for HPX in the same way as Maritime Mobiles. *Yes*, they are.

R. J. Hudson (Loughton) runs an R.208, has his eyes on an R.1132A for VHF work, and is in for R.A.E. next May. *Dave Gray (Co. Durham)* has just acquired a Model 14 'printer and is all set for RTTY, which he thinks is a very interesting project for any SWL to embark on.

A. W. Nielson (Glasgow) was surprised to find that his log for the *CQ* DX Contest this year showed his best score for the past four years. This certainly doesn't mean that conditions were better, so it probably proves that he has become more proficient! This year he logged 26 Zones and 83 Countries—previous best was 25 and 74, in 1959.

Barry Curnow (Plymouth) has heard more than 40 countries on 3·8 mc SSB, including VP2, PZ1, M1, SU, KP4, CT3, LX and such; he has also found Twenty very good, and Fifteen open very frequently. Having read a remark, recently, to the effect that "many SWL's do not listen intelligently," he comes up with a counterblast about transmitting amateurs of whom the same might be said. He quotes a man on Top Band who constantly put out long CQ's (giving his call-sign only once). Despite this stupidity, he had several stations coming back to him, not one of which he heard, since he went straight off into another long CQ. He says, rightly, that there are many instances of unintelligent behaviour by transmitting types. (Of course, their mistakes are waved about on the band for all to hear . . . the SWL's can make theirs in private!)

And this brings us to the end of another session. The deadline for the next instalment (in the March issue) is *Friday, January 25.* Keep up the good work in 1963, and may it be a very Happy and Successful Year for all who are with us in this feature.

Miscellany

INCIDENTAL INFORMATION, AND ITEMS OF TOPICAL INTEREST

(The heading under which almost anything may appear)

Mobile enthusiasts should make a point of reading an article called "Optional Extra," in *Autocar* (November 30, 1962). Illustrated is the first known mobile (1901) with a cylindrical aerial comprising a zinc tube, 30 feet high and 2 feet in diameter, mounted on the roof of a steam wagon, with Signor Marconi in personal attendance. Also depicted is a "wireless telegraphy machine" surmounting an American car of 1910 vintage. In 1919 *Autocar* wrote of "SOS warnings coming from the ether, advising all and sundry of the lurking men in blue;" and in 1922 ". . . it should be understood that the driver should not participate in the listening-in. It would be liable to cause divided attention. . ." And in the same year a "motor vehicle set," marketed at 35 guineas, included an aerial carried on a large fishing reel, complete with cord and lead weight. You simply pulled up and slung the thing over the nearest tree. "Under adverse atmospheric conditions, signals were received from London at a distance of 19 miles."

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The Citizens' Band idea is not peculiar to the U.S.A.—it is also allocated in Argentina, Brazil, Costa Rica, Ecuador, Mexico, Panama, Peru and Venezuela. There are said to be 700 licences issued in the city of Caracas alone. They use a slice of the 27 mc band and powers are in the milliwatt region.

(Letter from G3HTC)

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"Although he was showered with honours, the American artist's contributions to the development of the telegraph were really a persistence born of ignorance, and a readiness to adopt other people's ideas as his own. Morse's partner, Alfred Vail, perfected the instrument and invented the 'Morse code.'" So runs the sub-title to an article on "Samuel Morse and the Electric Telegraph," by G. R. M. Garratt (G5CS) in *New Scientist* for November 15, 1962. Owing to the fact that Alfred Vail was ". . . entirely prepared to work away quietly and without public recognition, allowing Morse to receive all the credit for what, in fact, was mostly Vail's work" the legend of Samuel Morse has become perpetuated. Other scientists, notably Gale and Henry, contributed much technical guidance without which the "Morse" telegraph would never have become practical. (But it seems highly unlikely that we shall ever hear about new licensees going in for their "Vail Test." Fame, once established, dies pretty hard.)

Aerial enthusiasts are very well catered for in the November, 1962, issue of *CQ*, with articles on How to Measure Antenna Gain, A Self-Supporting Antenna Mast, A Sterba Curtain for the Low Bands, Optimum Antenna Design for DX, and Multiband Quads. Some very interesting ideas appear in the text, and those who would sooner add 6 dB to their signal by some outside work than by quadrupling their input would find that there is much to learn.

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Suggestion: That the telephony man who sprinkles his talk with CW abbreviations should go farther, and make a better job of it. Instead of "Queen Sugar Baker," what's wrong with "Quisby"? For those interested, "I will Quizzle direct" sounds quite good. And if you want to put the question "Are you receiving me?" what could be better or more economical than "Quirk?" (After all, it's only one syllable, compared with the present "Jewkahpi?" which has three.)

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That paper read in New York to the Society of Naval Architects and Marine Engineers, referred to in *New Scientist* (November 29, 1962) and commented on in many other journals, even including *Punch*, has started something. (For those who missed it, the authors pointed out that an "explosion" of electronics was virtually engulfing American ships.) A destroyer in 1937 used 60 valves; in 1944, 750; 1957, 4,000; and in 1961, 29,000. These figures indicate that in 1962 it might well be 40,000! But does a 12AU7 count as one or two units?

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A few curious-minded amateurs, after reading the foregoing, wondered how the figures for an AT station would compare. One came out with the following statistics for his own station: 1925, 3 valves; 1936, 24 valves; 1948, 28 valves; 1962, 41 valves. The others varied a little in the slope of the curve, but showed no substantial differences from this. So we have not yet reached the "explosion" stage—not even if we add the family broadcast receiver, the television set, the tape recorder and Uncle Charles's deaf aid.

[over

There are at least three articles of "off-beat" interest in *QST* for November, 1962. One covers a method of power-supply control and regulation with thyratrons —a useful means of building a variable-voltage unit handling up to 1,000 volts. "Amateur TV—The Easy Way" covers a complete 432-mc TV transmitter using very straightforward circuitry. And "Logic for Amateurs" is not what it might seem, but a very interesting article introducing the amateur to automatic switching operations by relays and fairly simple circuitry, leading up to a completely automatic control and monitoring system.

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QSL's have been received by G3IDG from Kim Novak (not the film star, but KN1LLQ); and from Ray Ellington (not the band leader, but G3PVK); also one in Russian looking as if it came from YU2BN, but as it did not check with the log, it was "translated" and turned out to be from UC2WP.

WØNFA is desperately in need of a mobile-to-mobile contact with Asia, but cannot find an Asian mobile. HZ1AB has suggested that he might load his rig into a jeep and drive up and down the airstrip with a long, long extension cord for power, but there seem to be some doubts on the matter!

(Reported in W4KVX's "DX")

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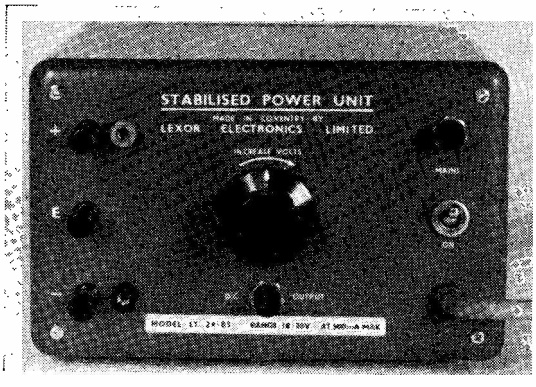
"Most organisations are started so that members can hear a few good speakers. But once the group gets going, the purpose quickly changes to trying to find a few good speakers to address the group. Once a speaker is obtained, however, the objective quickly changes again to trying to get enough members to attend the meeting so that the speaker will have someone to speak to." (This little gem of truth is quoted from *Readers' Digest*, November—it did not refer specifically to radio clubs, but most secretaries will recognise the situation only too well.)

FORMING A CLUB GROUP

There must now be very few districts in the U.K. where there is not somebody interested in Amateur Radio; in any populated area, there will be several such, probably quite unknown to one another. The easiest way to get a club group going is to put an advertisement in the local paper and then, having had a few replies, call a meeting—this first gathering should *not* be on licensed premises, if it can be avoided, because for one thing not everyone is willing to go to a pub, and for another the young are deterred. Having arranged the meeting, the very first thing to do is to get someone to take on the job of honorary secretary—for it is on its hon. sec. that every club depends for ultimate success! Having got thus far, the future will be largely in the hands of the membership, who should agree about meeting dates, time and place as a first step, followed by the election of a small committee to decide on plans for the club's activities. If the club is to prosper, a reasonable subscription should be fixed early on—and by "reasonable" is meant not making it too small, nor is it always necessary to reduce it for juniors unless they are not earning). Many clubs have foundered merely because they have never had a credit balance, making it impossible to finance activities like hiring a coach for a visit somewhere, or arranging a dinner. The membership should never be called upon to pay more than a proportion of the cost of some special event, if only for the reason that they then feel they are getting value for their subscription. Of course, the suggestions made here are for guidance only—not all clubs conduct their affairs in the same way, and in the end the success of a club depends as much on the calibre of the membership as on the enthusiasm and attention to duty of the aforementioned hon. secretary!

THE "NEW QTH" FEATURE

New callsigns as issued, and changes of address, should be notified to us without delay—not only for appearance in the regular "New QTH" feature, but also to enable us to keep the U.K. section of the international *Radio Amateur Call Book* up-to-date. The *Call Book* is the only directory in existence to the AT station operators of the whole world—and once you are in (and your address is the current one if you have moved since first being licensed) you can use *QTHR* with confidence, meaning "My address is correct in the latest *Call Book*," which is usually about all the chap at the other end needs to know.



The Lexor stabilised power unit for low VA supplies has a continuously variable output voltage control — in the ranges 5.5-14v. or 18-28v., depending on the model selected — and is capable of delivering output currents up to ½-amp. at any voltage setting within the chosen voltage range, with regulation better than 0.15% for a 10% mains voltage change, and within zero to full load. The finished mounting is a steel instrument cabinet 8ins. wide, in grey stove enamel.

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813, six at 45s. new. T55, two at 10s. HY-60, two at 2s. 6d. 866Jr., two at 10s. 808, three at 10s. 811, 15s. 832, three at 20s. 829B, three at 15s. HK54, at 20s. 805, two at 15s. 100TH, one at 40s. DET-12, two at 5s.; all prices single items. Two new Varley xtals 24080 kc, Bliley 28 mc, two at 10s. Two 150-watt band-switched AM Transmitters, rack and panel, £50 each. 40-ft. pylon-type mast, 20 metre beam, steel, dural, motorised, cost £150, £75. Bendix compass Rx Command BC-453, and 80-metre, offers? Many other items. Send s.a.e. list, photos of mast and Tx's on request.—Fawcett, G2HQ, 4 Woofindin Avenue, Sheffield, 11. *(Tel. 31022.)*

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WANTED: Oscilloscope Type 13A by Erskine and Hartley, or Cossor 339A, must be in good electrical and mechanical condition, state price.—R. Bennett, c/o 70 Park Lane, Chippenham, Wilts.

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AR88LF, SX-28, both perfect working order, £23 each for quick sale. B.29, 15-550 kc, £3 10s.—G3NKL, 64 Lexton Drive, Southport, Lancs.

FOR SALE or Exchange. Panda PR120V table top, 150-watt 5-band Tx, £40. WANTED : Hammobile 2m. mobile, or 70 cm gear.—G3MEO, 93 Thurlow Street, Walworth, London, S.E.17.

WANTED: R.1155 Receiver, must be in good working order, state lowest price.—Kemp, Rosedene, Tudwick Road, Little Totham, Maldon, Essex.

TELEPRINTER WANTED, complete and undamaged, prefer Creed 7B, good price paid.—G3EFD, Hillcrest, Leazes Lane, Hexham, Northumberland.

FOR SALE: Transmitter, Geloso VFO, 6146 PA, plate-and-screen modulation, £25. For more information please write—Box No. 2735, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CR-100 modified as April 1960 *Magazine,* plus built-in Q-Multiplier and 1000 kc crystal calibrator, £17 (carriage £1). Complete 10-watt Top Band Tx, CW/Phone (anode modulated) with power supply, all in case size 11 ins. x 7 ins. x 7 ins., 75s. Parmeko table topper transformer as advertised 25s. Collect or pay carriage. WANTED: Eddystone 898 dial, 50 kc xtal.—G3KGN, 126 Danescroft Drive, Leigh-on-Sea, Essex.

WANTED: Pair of transceivers, small pocket type, also any set or plans induction type, to work some feet from wires, or any gear suitable for investigation work.—Thomas, 50 Gypsy Lane, Marton, Middlesbrough.

SMALL ADVERTISEMENTS, READERS—*continued*

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WANTED: Hallicrafters SX28, preferably in original condition throughout and complete with manual, please state condition and price.—Hodgkinson, 19 Stoney Lane, Galgate, Lancaster.

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This is the new (39th) edition of the standard guide to the techniques and practice of Amateur Radio, which is sold throughout the world. As ever, it is a magnificent compilation of more than 740 pages, including 590 of extensively illustrated text (with diagrams and photographs on nearly every page), 33 pages of valve data, an 104-page catalogue section in colour, and a cross-reference index of 16 pages. The coverage is complete, from the beginner end to the most modern AT station equipment, in all departments from HF, Mobile, SSB and RTTY to UHF/VHF, Antennæ for all bands, and including Power Supply, Measurement, and Operating. The treatment throughout is practical, with the constructional work amply illustrated.

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813 35/0; two ceramic bases for same, 7s. 6d. each. Fil. trans. for 813, 230/250v. prim/10v. 6a. sec., 20s. include postage.—GM3BRF, Ambleside, Carberry Road, Leven, Fife.

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COMMUNICATIONS Rx R.1155N. This model includes Top Band, output stage, power pack, and speaker in small neat cabinet, £10. Bargain, buyer collects.—Openshaw, 516 Walmersley Road, Bury, Lancs.

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