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SHORT WAVE
Magazine

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VOL. XVIII

SEPTEMBER, 1960

NUMBER 7



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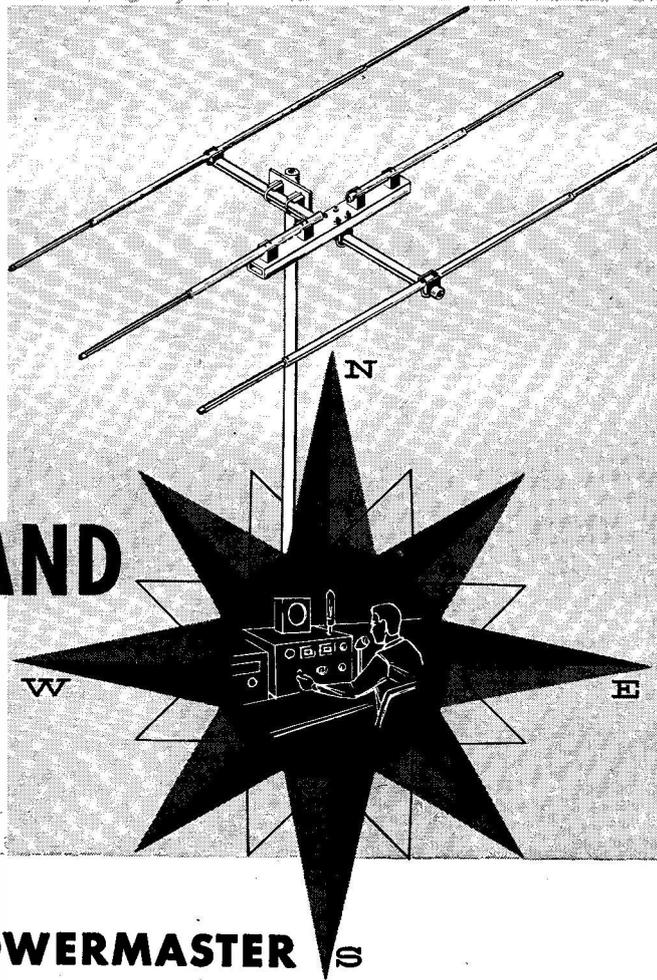
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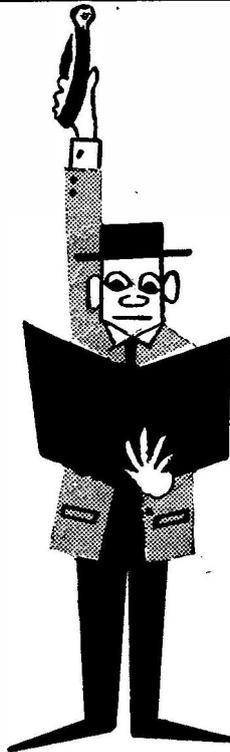
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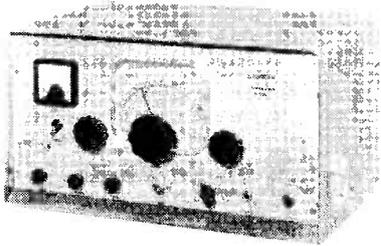
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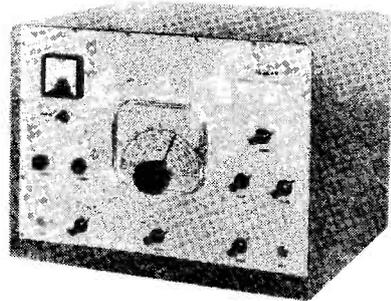
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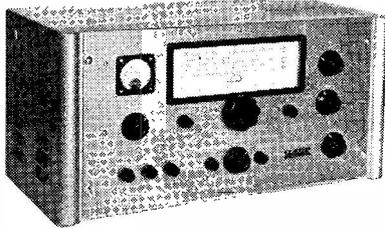
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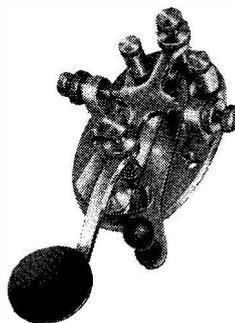
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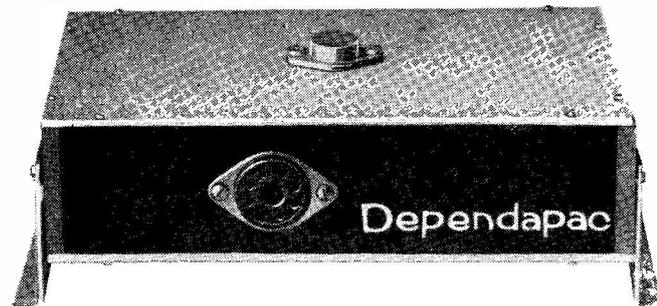
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The SHORT-WAVE Magazine

EDITORIAL

Organisation *Amateur Radio activity is on a world-wide scale and at the present time there can hardly be less than 200,000 AT stations on the air — with perhaps another 100,000 or so in various stages of suspended animation, retaining their interest and keeping in touch through the literature, itself an important sector of the field of radio publishing.*

In spite of the pressure of this activity and the global nature of our branch of the art of radio communication, the organisation of Amateur Radio, looked at internationally, is loose and indecisive, and therefore weak and ineffective. It is true that there is a body known as the International Amateur Radio Union but it has little real authority and is somewhat dominated by the stronger members — and, in any case, Russia and the Iron-Curtain countries generally are not members, which tends to invalidate IARU decisions affecting the use of our bands.

The need is, therefore, for a truly representative international body, with new aims and objectives, which will include as many as possible of the nations of the world irrespective of their political affiliations. As it would be impracticable to reconstitute the IARU (because of its restricted membership) or to form a similar new organisation from amateur resources (because large finance would be required) some other alternative must be sought.

A solution might be found to lie in making Amateur Radio, in the international context, one of the branch activities of UNESCO — the United Nations Educational, Scientific and Cultural Organisation. The advantages are manifold, and obvious. Operating under the charter of the United Nations, with its Headquarters in Paris, UNESCO is represented directly or indirectly in all the world's capitals, and is an international body of considerable authority. It disposes of funds totalling nearly £10m. annually, and one of its objects under its own charter is to promote collaboration among the nations by education, science and culture — and who could say that Amateur Radio is not at once educational, scientific and cultural, as well as being, by its very nature, almost forced to the ideal of international collaboration.

To be clearly identified with UNESCO would strengthen immeasurably the whole fabric of Amateur Radio, without in any way affecting the rights of individuals or the freedom of action of national groups within their own parishes.

The only question is — Would UNESCO be prepared to accept the commitment?

*Austin Fothergill
G6FO.*

Simplified SSB Generator

USING THE PHASING CIRCUIT

S. W. RICHARDS (G3CWB)

This is one of those practical articles that reduce what seems to be a matter of complication to its basic simplicity. The phasing-type SSB exciter described here is an excellent design for those making their first approach to Sideband working—indeed, the circuit is similar to that used in a well-known commercial SSB unit. It can be built up, adjusted and tried out on the bench, so that much instructive and interesting work can be done before it is put on the air.—Editor.

ALTHOUGH there have been some excellent circuit designs of single sideband exciters published in *SHORT WAVE MAGAZINE** they can be rather bewildering to the non-SSB fraternity, especially when shown in conjunction with voice-control and other circuits not directly concerned with the generation of the single sideband signal. For those who might be deterred on that account from attempting SSB, this article seeks to show how very simple a single sideband exciter can be. In fact the actual generator section need not use more than two valves to produce a signal having excellent carrier suppression and an unwanted sideband rejection of around -35 dB.

The circuit to be described is that of the phasing type, and is very widely used. The first requirement of any SSB exciter is the balanced modulator, its purpose being to produce a double-sideband suppressed carrier signal. One of the simplest but none the less effective balanced modulators is shown in Fig. 1. RF from a link winding is fed to the centre of the carrier-balance potentiometer, P. If the two diodes D1, D2, have approximately equal forward resistances and the potentiometer is carefully adjusted to electrical centre, no RF will appear in the output circuit L1, C2, C3, tuned to the input frequency. The carrier frequency

is therefore said to have been suppressed. Consider now what happens if an audio or modulation frequency is applied to the circuit by means of a transformer T1 (by-passed to RF by C4). Each half-cycle of AF will cause each diode in turn to unbalance the circuit, the result being RF in the form of a double-sideband *suppressed carrier* signal which appears in the output circuit, and can then be collected by a 1-turn link at the centre of the coil L1. If the circuit is unbalanced by means of P, the carrier will appear, and ordinary double-sideband-with-carrier (AM) will result. When producing AM in this way, negative peak clipping does not occur should occasional overmodulation take place, but severe overmodulation will cause distortion of the received signal. The carrier level should not exceed 50% of the maximum unbalanced output for correct operation.

Fig. 2 shows two balanced modulators with a common tuned circuit. If each is fed with RF components of equal frequency and amplitude but 90° out of phase, the audio inputs also being identical and 90° out of phase, the two resulting double-sideband suppressed carrier signals will combine. Fig. 3 shows that in such an arrangement the sideband components are at all times in synchronism, the two *upper* sidebands being in phase and adding, and the two *lower* sidebands being 180° out of phase and cancelling each other. The output from the centre link will now be a single (upper) sideband. By changing the polarity of either of the audio transformer secondaries the lower sidebands can be made to add and the upper sidebands to cancel, giving a single (lower) sideband output. If in addition carrier is now inserted by unbalancing potentiometers A or P single sideband AM can be obtained.

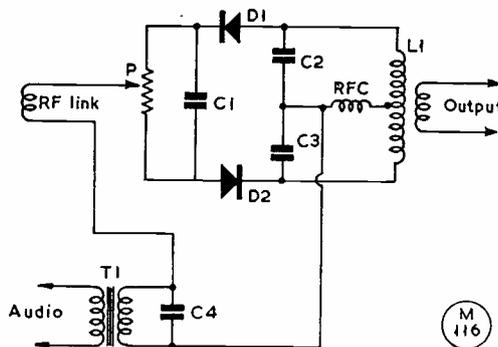


Fig. 1. With this circuit, the carrier can be balanced out by means of the potentiometer P; the output is then double-sideband.

* "Single-Sideband Exciter" (*Phasing Type*), October 1955.

"Inexpensive Sideband Exciter" (*Crystal Filter*), March 1957.

"G2NH Crystal Filter SSB Exciter," December 1957.

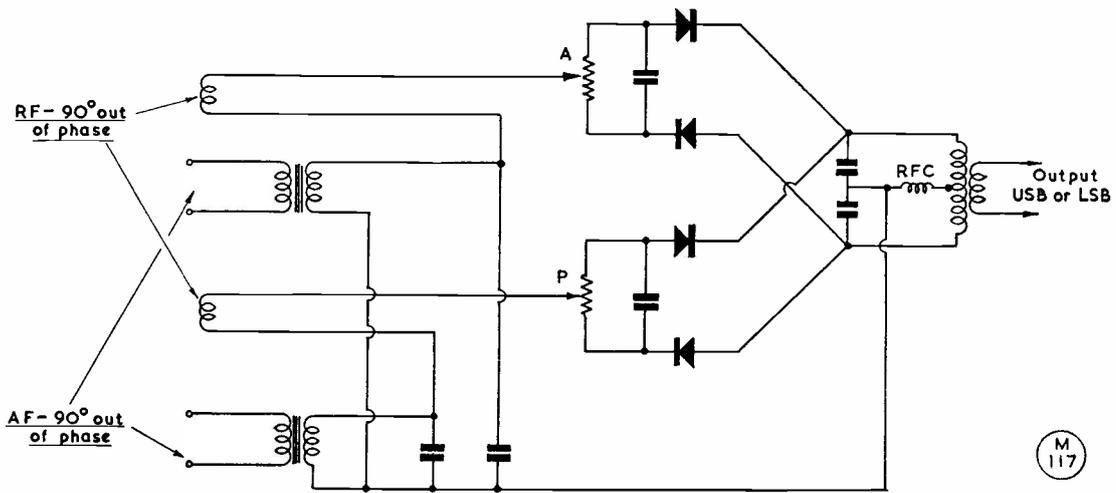


Fig. 2. Arrangement of the simplified balanced modulator, as discussed in the text. Potentiometers A and P are the carrier balance controls, the adjustment of which is explained in the article.

If either one of the two audio inputs is disabled, e.g., by switching out its transformer secondary, then by unbalancing the associated balanced modulator phase modulation may be produced. This is achieved by the addition of the double-sideband suppressed carrier to the unmodulated carrier 90° out of phase. As before, with both audio inputs working, unbalancing either of the balanced modulators will produce SSB AM. Double-sideband suppressed carrier is obtained when both the balanced modulators are balanced out and one of the audio inputs is working, the other being disabled. This may be used for transmission but for the best results the carrier inserted at the receiver must be in correct phase relationship with the signal and is a complicated business. The so-called synchronous receiver designed for DSSC working provides for this.

Practical Sideband Generator

We now come to the complete circuit which is shown in Fig. 4. V1(b) is a crystal oscillator on about 9 mc. If the plate circuit L1, C2, is tuned very slightly higher than its resonant frequency so that the voltage developed is 70% of maximum and the closely coupled circuit L2, C3, is tuned lower than resonance to 70% of maximum voltage, the two output voltages will then be 90° out of phase. It should be mentioned that in practice coil L1 must be tuned slightly higher than the crystal frequency in order to produce oscillation, after which only L2 need be adjusted to achieve the 90° phase shift—this simplifies the adjustment. With the

coils L1 and L2 about 1½ ins. apart, centre-to-centre, the output voltages will be about equal and these two voltages are then fed by means of 3-turn links L1a, L2a, to the balanced modulators. V1(a) is the speech input amplifier and its output is fed by step-down transformer T1 to the audio phase shift network; this has an effective range of about 300-3,000 c/s and provides each grid of V2 with audio 90° out of phase. These two audio components are then fed by the transformers T2, T3, to each balanced modulator via the switches S1, S2, and the two connections to the RF links. One of the switches, S2, is provided to reverse the polarity of one audio feed to facilitate sideband switching, while S1 switches out the other input when required, for AM or PM. For phase modulation potentiometer P is unbalanced and for AM—potentiometer A. VR2 and VR3 in the audio circuit are provided to ensure that

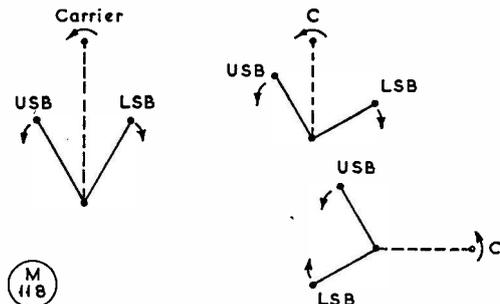


Fig. 3. Showing how, from the circuit of Fig. 2, the lower sideband is cancelled out.

the two audio voltages are of equal amplitude. A 12AX7 audio amplifier following a crystal microphone will provide ample input for V1(a).

The heptode section of an ECH81 with a VFO injection frequency of around 5 mc can be used in the normal way to mix the 9 mc output to either the 80- or 20-metre bands (9 - 5 mc or 9 + 5 mc) by employing an appropriate time constant at the anode, capacity coupled to a single 6AG7 in Class-AB1, using a plate and screen voltage of 300v. max. and a fixed bias of 10½ volts. This will provide ample drive for 807's or an 813 in AB1, as PA. L4 and L5 (Fig. 4) form a double tuned filter preventing any 9 mc harmonics generated in the balanced modulators from reaching the input of the mixer. The usual care must be exercised to ensure that the correct output frequency is selected, as other mixer products,

and VFO harmonics, will be present to some degree. The use of fairly hi-C tuned circuits at the mixer and amplifier anodes is therefore desirable.

Adjustment

Preliminary adjustment is carried out as follows: Set L1, L2, about 1½ ins. apart, turn the audio gain to zero and adjust L1 for oscillation of the 9 mc crystal by listening on the receiver. Ensure that the VFO input is set to produce the required output frequency. Now, temporarily disconnect the feed from the centre of potentiometer A and fully unbalance on potentiometer P. Peak L2, L3 and the mixer-amplifier circuits, in that order, to maximum output, using any suitable form of output indicator, e.g., the receiver S-meter. Repeat this adjustment making sure that each coil is

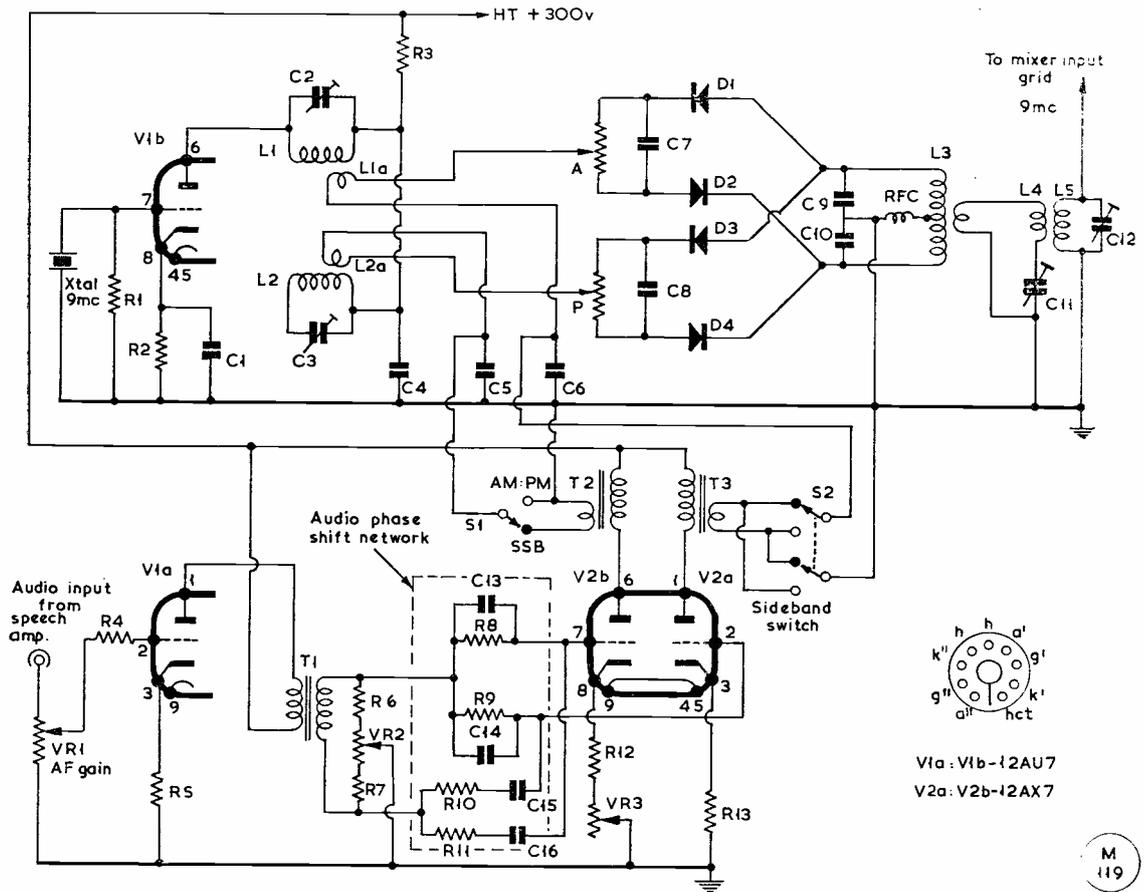


Fig. 4. Circuit complete of the SSB exciter unit described by G3CWB. To produce the SSB signal in the required band — either on 3.8 or 14 mc — the output of this unit is fed into a mixer stage, with which is a VFO tuning around 5 mc, to give a sum or difference frequency with the input at 9 mc. The output from the mixer drives a buffer amplifier, in turn followed by a linear PA. The present discussion deals only with the generation of the SSB signal using this circuit, all values for which are given in the table.

carefully peaked, re-connect the feed to potentiometer P and balance A and P for minimum carrier output.

Sideband suppression adjustment is best carried out with the aid of an oscilloscope and this method will be described first. Switch S1 for SSB working and set the audio gain to zero. Loosely couple the oscilloscope input to the amplifier output, using a fairly low time-base frequency, and balance A and P for minimum carrier output, when the trace should reduce to a horizontal line. Then feed a tone of about 1,000 cycles into the microphone socket, advance the audio gain slightly, taking care not to cause audio overload. A trace in the form of a modulated carrier should now appear. Finally, adjust L2, VR2 and VR3 for minimum modulation. As they are adjusted some carrier unbalance will occur so it will be necessary to re-adjust A and P slightly to maintain balance.

Aural Adjustment

Another method of adjustment is as follows: Switch S1 for SSB, connect a 3-turn link to a pair of headphones *via* a crystal diode and a simple high-pass filter (such as shown in Fig. 5) and then couple the link around the 6AG7 amplifier tank coil. Feed a tone of about 1,000 cycles into the microphone socket and advance the audio gain slightly so that the tone is heard in the headphones. By balancing out on A and P the 1,000-cycle note will become almost inaudible and it should then be possible to detect a higher tone of 2,000 cycles (this being

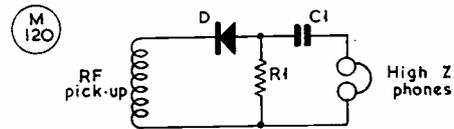


Fig. 5. A simple monitoring device for checking over the side-band generator; the RF pick-up can be a 3-turn coil, D is a crystal diode, R1 is 100,000 ohms, and C1 .001 μF.

the beat between the upper and lower sidebands). Now adjust L2, VR2 and VR3 for minimum 2,000-cycle tone. During this adjustment some unbalance will occur and the 1,000-cycle note will begin to creep in again; this should be kept at a minimum by balancing out A and P. The foregoing may seem a little more difficult than using an oscilloscope but if care is taken in distinguishing between the two tones, this method is capable of giving, with care and practice, equally good results. The receiver BFO heterodyning a strong carrier at some remote frequency can be used as a make-shift tone generator, the audio note then being fed acoustically to the crystal microphone.

Some further points worth mentioning are that the coils L4, L5 should be mounted side by side with their centre lines 3/4 in. apart, and L1, L2 similarly, about 1 1/2 ins. apart. A simple way of providing adjustment for this distance is to mount the former of coil L2 on a single fixing bolt.

It is hoped that this article will be of interest to those contemplating SSB working, and encourage others to take the plunge by showing how basically simple a sideband generator can be.

Table of Values

Fig. 4. Circuit of the Phasing-Type SSB Exciter

C1, C4,	R8, R9 = 133,300 ohms,
C7, C8 = .005 μF	1%*
C2, C3,	R10, R11 = 100,000 ohms
C11, C12 = 150 μμF	R12 = 560 ohms
C5, C6 = .001 μF	VR1 = 1 megohm
C9, C10 = .001 μF, 1%	VR2 = 100 ohms
C13 = .00243 μF, 1%	VR3 = 1,000 ohms
C14 = .006075 μF, 1%	D1, D2,
C15 = .001215 μF, 1%	D3, D4 = Matched xtal
C16 = .00486 μF, 1%	diodes
R1 = 100,000 ohms	RFC = 2.5 mH RF choke
R2, R5,	T1 = 3 : 1 step down
R13 = 1,000 ohms	T2, T3 = 10 : 1 step down*
R3 = 470 ohms	Pots A, B = 1,000 ohms,
R4 = 47,000 ohms	w/wound
R6 = 400 ohms, 1%	V1 = 12AU7
R7 = 1,430 ohms, 1%	V2 = 12AT7
	Xtal = 9 mc

(Notes: *Resistors R8, R9, can be made up of 1.2 megohm in parallel with 150,000 ohms. Xformers T2, T3 can be ordinary speaker type, but must be identical. All components marked 1% must measure accurately to the values given within that limit to ensure correct phase relationship.)

TABLE OF COIL VALUES

L1, L2	— 16 turns 22g. enam. on 13/32-in. formers, slug tuned.
L1a, L2a	— 3 turns p.v.c. at cold ends L1 and L2 respectively.
L3	— 8 turns 16g. enam., 1/2-in. diam. former, with slug.
	— Single-turn p.v.c. link at centre.
L4, L5	— Wind as L1, L2 but without link couplings.
	(Coil values are for 9 mc crystal)

AMATEUR TELEVISION EXHIBITION

The annual Exhibition of the British Amateur Television Club (hon. secretary, D. S. Reid, M.A., 149 Ongar Road, Brentwood, Essex) will be held at the Conway Hall, Red Lion Square, London, W.C.1, from 10.0 a.m. to 7.0 p.m. on Saturday, September 10. Admission for non-members of B.A.T.C. is 5s. all day, 2s. 6d. after 2.0 p.m. Tickets may be obtained in advance from: D. W. E. Wheele, G3AKJ, 56 Burlington Gardens, Chadwell Heath, Romford, Essex. There will be displays and demonstrations of ATV equipment, including slow-scan television. This is always an interesting and well organised exhibition for those who want to know about amateur television transmission and picture making.

USKA — NEW QTH

The address for USKA, Union Schweizerischer Kurzwellen-Amateure (or Swiss Union of Short Wave Amateurs) is now: USKA, Sursee.LU, Switzerland. The HB amateur journal is called *Old Man*, and appears in several languages.

Some Notes on Amateur RTTY Operation

PRINCIPLES AND PRACTICE OF TELEPRINTER WORKING

W. M. BRENNAN (G3CQE)

Our contributor is a keen amateur T/P operator who has been conspicuously successful in DX working by teleprinter. Though at present there are few AT stations in this country equipped for RTTY, it is a practical method of communication which can be of particular interest in the Amateur Radio context, and so will gain many more adherents.—Editor.

A RECENT addition to the list of amateur activities in this country is the operation of teleprinters by radio, a comparatively new interest for AT stations in this country, though it has been practised in the U.S. for more than ten years. There, groups of enthusiasts negotiated the purchase of large numbers of secondhand machines direct from the commercial users. The result is that there are now some 6,000 amateur T/P stations in North America.

At present suitably priced machines are not plentiful in this country but nevertheless Creed Model 3 and 7B ex-GPO and R.A.F. machines are available at prices ranging between four and twenty pounds, depending upon model and condition. The GPO recently disposed of a large number of Model 3 machines. As these were well maintained when in Post Office service, often all that is needed is cleaning and adjustment to restore them to good working order. One of these machines has provided the writer with many enjoyable QSO's with G, GM, W, VE, VK and ZL stations.

Little information has been published in this country on the subject of amateur teleprinter operation and the writer has received a number of queries on the subject. The following notes cover most of the points raised. It is hoped that they may be of help to those who may have ideas about embarking on radio T/P working, and of interest to others.

Amateur Radio teleprinter working is a method of communication by which the message is mechanically coded for transmission and at the receiving end is decoded and printed by the

same means. The machine is called a "Teleprinter"; in the U.S.A. it becomes a "Teletype machine" or a "Teletypewriter," and in amateur parlance the system is known as RTTY.

The message is printed either on a strip of paper tape or on an 8½-in. wide sheet of paper. Teleprinters can therefore be divided into two types, "tape (or strip) printers" and "page printers." Both types function in a similar manner using the same code. They are often used to work to each other. The machine has two main parts, the keyboard and transmitting mechanism, and the receiving and printing mechanism. The two are completely independent of each other and can handle different messages at the same time. When the two parts are connected electrically the machine behaves like an electrical typewriter. The only thing they have in common is a mechanical power supply which takes the form of an electric motor. Certain machines have no provision for transmitting, in that they have no keyboard or transmitting mechanism. The Creed Models 8 and 10 are two such receiving-only machines. However, a keyboard is easily added to the Model 8.

The code used for teleprinter operation is a five-unit combination one. A typical character is shown in Fig. 1. Each of the five code elements can assume either of two conditions, called "mark" and "space" respectively. The code elements are preceded by a "start pulse" (always space) which releases the printing mechanism. They are followed by a "stop pulse" which brings it to rest again. The start pulse and the coding elements are the same length; the stop pulse is one and a half times longer. Hence the term "seven and a half unit code."

Code Formations

The 32 combinations of the code provide for all the letters of the alphabet and for certain operational instructions to the machine; two of these are signals which cause it to change over from printing letters to figures and back again. This means that each five-unit combination can be used twice. The machine will print either the letter or figure corresponding to the combination received, depending upon whether the "letters" or the "figures" instruction had been received at some time prior to the selection being made. The figures are referred to as the "upper case" and the letters the "lower case." Other instructions are the "line feed," "carriage return" and "space." In addition to the figures 1 to 0, the

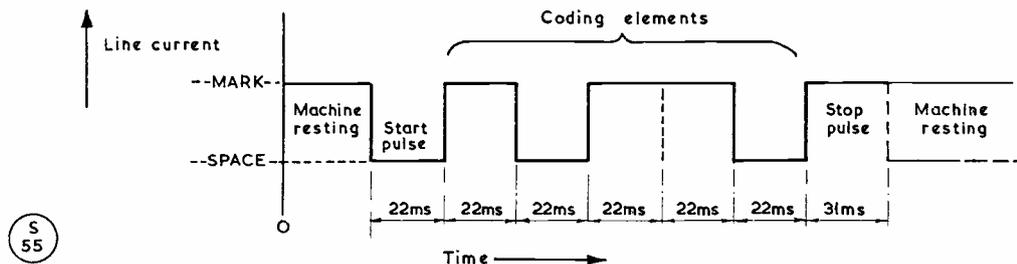


Fig. 1. The character of the 7½-unit teleprinter code, explained in the text. The pulse lengths given, in milliseconds, are those of the American configuration of the code.

upper case is arranged to provide various punctuation marks and to open and close contacts suitable for energising relays, bells and so on.

Inter-operation between British and American machines presents no great problem. In the main the code used is the same. The important difference is in the operating speeds used. The American machines in amateur use operate at a speed of 368 characters per minute and the British at 392 c.p.m. (Creed Model 3) and 400 c.p.m. for the Creed Model 7. The average word is said to be six characters long (five letters and a space). This gives the relative speeds in w.p.m. as 61·3, 65·3 and 66·7 w.p.m. In round figures the speeds are quoted as being 60, 65 and 66 words per minute. The whole matter hinges on the actual pulse length transmitted. This is in turn determined by the speed of the motor. American machines are mostly powered by synchronous motors. On the other hand, the majority of those made by Creed and Co., Ltd., use DC motors with a governor for speed regulation. Obviously then, it is much simpler to slow down the governed motor. For good printing, the speeds of the two machines must be closely adjusted. In practice it is not a difficult matter and once it has been attended to it will remain correct for long periods. The Creed Model 3 series (A, W, X, Y and Z), and Creed Models 7A, 7B and 8 will all adjust to the lower speed within the range of their governors.

Teleprinter Transmission

There are three main systems by which the RTTY signal can be transmitted. These are:—

- (1) By on-off keying a carrier (A1) in much the same way as CW Morse,
- (2) By frequency shifting the carrier in sympathy with the pulses from the teleprinter. F1, Frequency Shift Keying.
- (3) By modulating a carrier with two tones,

one for the "mark" and another for the "space" signals from the teleprinter. This is called "Audio Frequency Shift Keying" (AFSK), F2. It is widely used in the U.S.A. but on VHF only. Variations of this system are the use of NBFM or SSB instead of AM.

Of the three systems, FSK is much the best performer. It is used exclusively on the HF bands. The actual amount of frequency shift used is normally 850 c/s. However, 170 c/s has been used quite successfully and even half-a-cycle shift is at present in the experimental stage. Many commercial stations also use the 850 c/s for FSK RTTY and Morse. With FSK, signals that are actually below the noise level in the receiver can still be printed! This is due to the fact that although the noise is usually present on the "mark" and "space" frequencies at the same time instant, the actual keying signals are not. The noise can therefore be balanced out to a certain extent whilst still leaving the keying signals intact. In addition, limiting can be applied to chop down noise peaks and to iron out the QSB. As an instance of the efficiency of the system, the gear used at VK3KF will still produce good copy when the signal is 6 to 8 dB below the noise level.

Apart from the teleprinter, the only additional gear needed to receive RTTY at the average amateur station is a "Terminal Unit" (TU). Its function is to convert the RTTY signal into DC pulses of sufficient amplitude to operate the printing mechanism. There are two main types of TU—those that separate the mark and space frequencies at some intermediate frequency (a form of FM discriminator, in fact) and those that do this at audio frequencies. The latter are fairly simple to construct and produce good results. A typical circuit of this type of TU can be found in the current ARRL *Handbook*. An RTTY con-

verter design has also appeared in *SHORT WAVE MAGAZINE* — see “Converter for Radio Teletypewriter Reception,” March-April, 1960.

Normal amateur practice is to use the higher carrier frequency as the mark frequency and the lower as the space frequency. Using the audio type of TU to receive RTTY the receiver is first tuned midway between the mark and space frequencies. The BFO is then switched on and adjusted to produce a beat note of 2975 c/s when the mark signal is being received. The space frequency will then produce a 2125 c/s note. The signal consisting of these two tones is fed from the audio stages of the receiver into the TU. Here they are limited in amplitude and then separated by simple audio filters. They are then rectified and filtered to become DC pulses which are used to trigger a keyer stage which energises the teletypewriter operating magnet direct or *via* a polarised relay.

These same two tones of 2975 and 2125 c/s can be used to modulate the AFSK transmitter. The audio-filter type of Terminal Unit will therefore work with both systems. The receiver BFO merely has to be switched off in order to receive AFSK. Block schematic diagrams of both types of station are shown in Figs. 2 and 3.

Most amateurs these days use a VFO controlled transmitter. To add FSK to the station's facilities is therefore a simple matter requiring

at the most the addition of a single triode. Often a vacuum or crystal diode is used. DC pulses from the teletypewriter transmitting contacts control this form of reactance valve which in turn causes the VFO frequency to shift. With the type of transmitter that employs a multiplier chain after the VFO, the shift must be set up again after each band change. In an SSB/CW transmitter where frequency mixing is used to obtain the output frequency, the shift should remain constant from band to band. The addition of FSK does not impair the normal operation of the transmitter.

A useful addition is some means of tuning in the RTTY signal visually. Usually the same piece of gear will also help to set up the shift, too. Anything that will provide a simultaneous indication of the amplitude of the two tones in the TU will do. A common practice is to use an oscilloscope with the X and Y amplifiers connected to suitable points in the TU. (The writer uses a separate pair of audio filters together with a double diode and one of the R.1155 two-pointer D/F meters instead of an oscilloscope.)

Auto-Transmission

RTTY can be transmitted automatically by the use of a specially perforated tape and a machine called an “Auto-transmitter” or “Transmitter-distributor.” Another machine

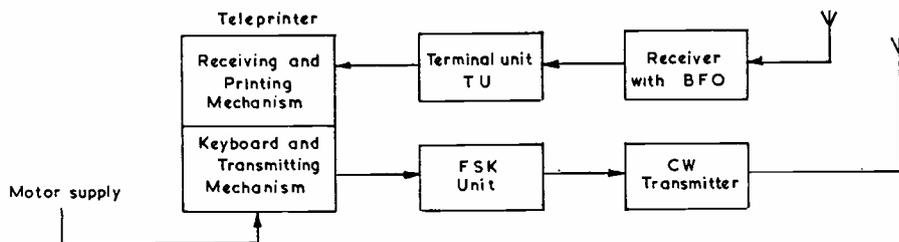


Fig. 2

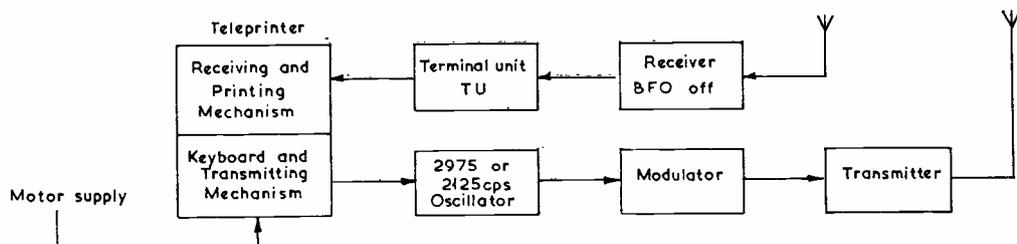


Fig. 3

Fig. 2. Block schematic diagram of the layout of an FSK RTTY station. Fig. 3 shows the arrangement of an AFSK radio teletypewriter station, transmit/receive.

called a "Perforator" is used to prepare the tape. It has a keyboard like that of the teleprinter. When a key is pressed, perforations corresponding to the correct five-unit combination for that character are punched into the tape. The auto-transmitter feeds the tape over a set of five fingers which "feel" for the perforations. When one is encountered a mark signal is produced. The start and stop pulses are automatically added. With this system, the tape can be checked for errors prior to transmission; the transmission takes place at the maximum operating speed and can be repeated as many times as required.

Another machine called a "Reperforator" will accept electrical signals from either a teleprinter or a receiver and produce perforated tape. Although many amateurs have all these items, they are all luxuries as far as actual amateur operation is concerned. With a little ingenuity a tape recorder can be made to produce automatic calling on RTTY.

Amateur T/P Procedure

Amateur RTTY stations usually commence transmission and sign with a brief burst of Morse using either FSK or CW. Even without hearing this, with a little practice they can be weeded out from the commercial FSK signals. RTTY and facsimile transmissions that haunt the amateur bands. Many amateur RTTY operators are two finger "hunt and peck" typers; the hesitation as he thinks of the next sentence (or even hunts for the next letter) is

quite distinctive! Even a long string of RTTY CQ's has a rhythm that is easily identified after a while. In order to avoid a lot of searching for each other, RTTY stations usually operate around agreed frequencies. These are not always the same in different countries due to varying licence regulations. For instance, a station in the U.S.A. will operate on 20 metres on approximately 14,340 kc but will look for a Canadian station on 14,090 kc because the Canadian regulations do not permit RTTY operation above 14,100 kc. Some common frequencies used are 28,090, 21,090, 14,340, 14,090, 7,140, 7,050, 3,620 and 3,600 kc.

Whilst most of the amateur RTTY operation is certainly in the U.S.A., there are now many countries active. Europe has lagged behind Asia, Australasia, South America and even Antarctica in this field. However, stations in Germany, Sweden and Malta are now joining in.

RTTY offers a new field to the amateur and calls for a new operating skill. To see the printing being produced on a machine by someone typing hundreds of miles away induces a sense of personal contact that is different from anything produced by a QSO on either the key or the microphone. The record that remains when the QSO is finished is invariably read more than once. In the amateur field at least, RTTY will never replace CW or phone as such, but a teleprinter can take its place alongside the key and the microphone as another means of communication among amateurs.



RAYMART BAND CHECKER

Shown at left is the new monitoring and passive circuit-checking device produced under the brand name of "Raymart" by Chas. H. Young, Ltd., of Birmingham. It is a refined version of the simple absorption wavemeter, incorporating a sensitive 0-500 "A microammeter for indicating resonance. A single switched coil assembly covers approximately 3.3-35 mc in three ranges, the amateur-band areas 3.5-28 mc being marked on the scale. The meter circuit has a sensitivity control, by which loose coupling can be used in a strong RF field—the looser the coupling, of course, the sharper and more accurate the indication, while giving the meter itself some measure of protection. For telephony monitoring, headphones can be plugged into a jack at the side of the box.

In addition to giving a check on output frequency, after the manner of absorption wavemeters, this instrument is sufficiently sensitive for neutralising RF amplifiers, tracing standing waves on feeder lines, and finding RF in equipment wiring. It is well made, in a light, strong metal case, with a clearly marked dial, and the coil assembly is in a protective cover.

MAKING THE MOST OF METERS—2

THE UNIVERSAL SHUNT — CIRCUIT TESTING—RF AMMETERS

By J. R. Bradshaw

THE previous article detailed the first of two methods of expanding the range of a milliammeter and the second method, described here, is known as the Universal Shunt. It is better suited to converting a milliammeter into a multi-range instrument than the simple shunt and, if mounted in equipment, the meter can be switched into any number of different circuits, demanding varying ranges, the limit being imposed only by the number of switch contacts available!

Furthermore, the resistance values need not be particularly related to the meter resistance, and this alone offers definite advantages to those who may not want to bother with the complex and tricky methods of finding the correct value for the milliammeter shunt already described.

The Universal Shunt

If the meter circuit is as shown in Fig. 5, and the current is in a circuit connected to the meter terminals, then resistor R replaces the milliammeter, and the circuit current produces a voltage IR across it.

(Re + Rm) represents a voltmeter connected across R and, as the value of R is known, Ohm's Law is applied to convert the observed voltage to read the correct current on the meter scale.

Without modification, therefore, the current range of the meter can be extended to any required value

by the ratio $\frac{Re + Rm}{R}$ and it can easily be proved

that this is actually the current multiplying factor. The numerical example following emphasises this point, and will also assist readers to construct their own Universal Shunts.

If a 1-mA movement is to be used to read 10 mA (a multiplying factor of 10) and an arbitrary value of R = 10 ohms is stipulated, then, if R is connected into a circuit through which 10 mA is flowing, the

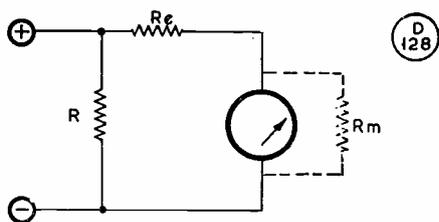


Fig. 5. The universal shunt, the advantages of which are explained in the text.

voltage drop V across R = IR = 0.01 mA × 10 = 0.1 volt. Now (Re + Rm) must be such that the meter (FSD = 1 mA) is fully deflected when 0.1 volt is applied across it. Therefore

$$(Re + Rm) = \frac{V}{I} = \frac{0.1 \text{ (volt)}}{0.01 \text{ (amp)}} = 100 \text{ ohms.}$$

and the ratio $\frac{(Re + Rm)}{R} = \frac{100}{10} = 10$; which is the

desired multiplying factor.

For other multiplying factors, it is only necessary to choose the correct ratio of (Re + Rm)/R. R should, of course, be as low as possible to minimise the voltage drop when it is inserted into a circuit, but, in practice, the minimum value of R may be controlled by other factors, e.g. the fixed value of Rm, for, if Re = 0, the multiplying factor becomes Rm/R and, as Rm is fixed, then R is also fixed for a given ratio.

Fig. 6 shows a DC milliammeter utilising a Universal Shunt to expand it into a multi-range instrument. Necessary switching for AC is shown, the only qualification for AC measurement being that the total resistance seen by meter and rectifier (= R + Re) must be constant for all ranges if a single, calibrated range for all except the lowest AC range is desired (the lowest range demanding its own calibration, as explained in Part 1). DC range expansion can be made compatible with these requirements, so that only the meter rectifier (which is matched to the meter) needs to be switched into circuit for AC measurements.

Circuit Checking

Fig. 7 shows how the Universal Shunt may be used in a transmitter or similar multi-stage apparatus to provide several metering points in different stages and with various ranges. The resistors R should be

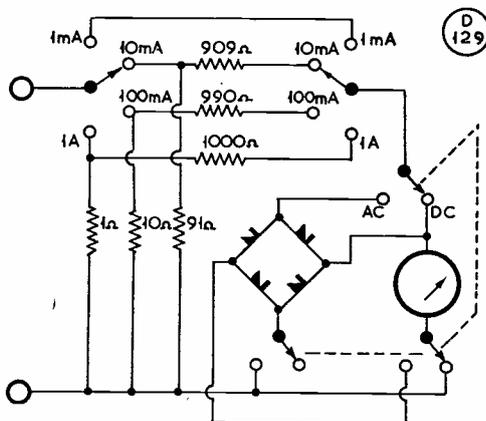


Fig. 6. Based on the Fig. 5 arrangement, a multi-range milliammeter utilising the universal shunt.

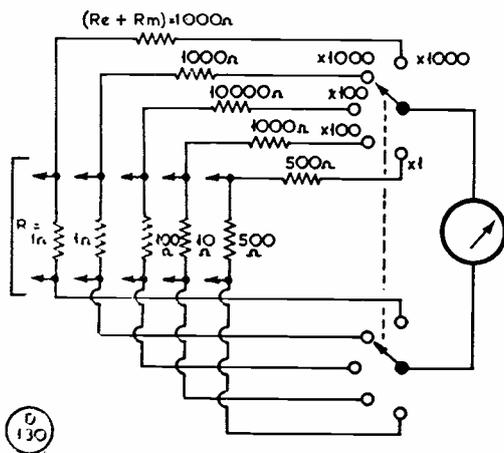


Fig. 7. The universal shunt employed for stage metering in apparatus, where the meter is switched into the required circuit.

permanently wired into the DC paths of their respective circuits (installation into "hot" parts of the circuit will upset operation due to the added resistance of R and the inherent capacity of the switch wiring), the meter switch picking them up for checking the various circuit currents.

A convenient valve-current check point is in a by-passed cathode circuit, although it must be remembered that in this case the meter will read total, not just anode, current.

Fault Diagnosis

The milliammeter is not widely favoured for fault diagnosis due to the disruption of circuit wiring that is inevitable when inserting it, such disturbance being particularly unwise in VHF stages.

However, the current meter does have its uses in testing. For instance, the installation of a cheap, moving-iron ammeter in series with your test bench power sockets is useful for automatically checking the input circuit, or lack of it, to faulty apparatus.

When an HT fuse is fitted in apparatus, it can be replaced by a milliammeter to check the HT current, a check rendered even more valuable if the HT current has previously been noted, i.e. with the apparatus working correctly.

Once a fault has been isolated, breaking into the relevant circuits for current measurements may be justified, although, again, the meter must never be inserted into "hot" parts of the circuit, for disturbing the wiring may itself cause needless trouble by inviting parasitic oscillation.

Of prime importance are current checks on valves. For instance, varying current in a Class-A amplifier, with a signal applied, indicates that the valve is being over-driven and is generating harmonics, due either to bias failure or the valve itself. If the current varies without any applied signal, then noise is being generated either in the valve or the components associated with it—probably in the grid circuit.

In the event of bad distortion, absence of grid current should be verified by inserting a sensitive milliammeter in the grid circuit. High valve currents indicate lack of bias—possibly due to a short in the bias by-pass capacitor, whilst low currents with ample screen or anode voltage indicates emission failure as surely as abnormally high currents indicate a "soft" valve.

Parasitic supersonic oscillation in audio amplifiers also causes distortion which is difficult to trace, routine examination producing little or no evidence of the fault. However, a milliammeter inserted into the anode circuit of a suspect stage will reveal oscillation in the stage by a slight change of anode current when the grid circuit is earthed.

Such oscillation can also occur in screen-grid circuits, and inserting the milliammeter into the screen-grid line will reveal them in the same way.

As only the milliammeter provides evidence of the oscillation, it must be kept in circuit until the fault has been cleared.

Backed Off Milliammeters

It is sometimes difficult to detect small changes in a comparatively large standing current such as may be necessary when testing for parasitic oscillation. The current change may be minute, of the order of a few microamps, and difficult to detect on a meter which has an FSD high enough to accommodate the total circuit current of, say, 10 milliamps.

However, if a 1 mA meter can be used, the current change will be a greater percentage of the total deflection and therefore easier to observe. This can be done by "backing off" the milliammeter, using the adaptor shown in Fig. 8 to apply a battery voltage in reverse polarity through the meter, VB being varied until the combination of circuit and neutralising currents permit mid-scale deflection (to observe a current increase or decrease) of the meter.

Care must be taken to ensure that neither circuit nor neutralising-battery current alone is applied to the meter and, to insert the meter into circuit, the apparatus under test must be switched off until the meter is connected, when the neutralising current should be adjusted to back off M slightly beyond zero (negatively) before the apparatus is switched on again. With mains apparatus, the circuit current will rise gradually as the filaments heat up, and the meter deflection must keep pace with it by reducing VB to increase the neutralising current and so keep the meter needle on the scale; final adjustment is made when the circuit current reaches stability. [over

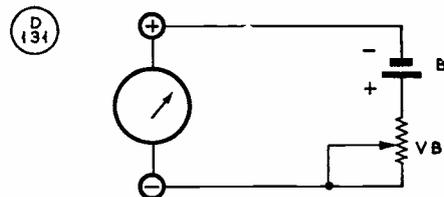


Fig. 8. An adaptor arrangement for backing-off a milliammeter.

To remove the meter from circuit, the apparatus must be switched off and VB increased to *reduce* the neutralising current as the circuit current falls.

The meter should preferably be fitted with an overload trip in case of accidents; extreme care must attend the use of a backed off meter in battery-operated apparatus, with its almost instantaneous current, but the problem is somewhat simplified by the smaller currents involved.

Condenser Tests

Inserting a milliammeter in series with capacitors will readily reveal leakages under the acid test of working conditions, and this is particularly important in the case of coupling condensers, which should not pass any DC, as the biasing of the following stage will be upset. Similarly, ordinary decoupling capacitors (*not* electrolytics) should not pass current.

An electrolytic capacitor can be tested under its correct working conditions and voltage by connecting a milliammeter in series to check the leakage current, which should not exceed $I(\text{microamps}) = 0.15CV$, when C is in microfarads and V is the voltage normally applied to the capacitor. When the capacitance is greater than 100 microfarads, then the maximum permissible leakage current is given by $I(\text{microamps}) = 0.05CV$.

Absence of leakage current indicates that the condenser is open-circuited, no longer functioning as a capacitor, and requires replacing.

Before attempting to measure the leakage current, the capacitor must be allowed to settle down to its working conditions, because until it does so the leakage current will be high, even high enough to damage the meter, and it is best to rig up an adaptor consisting of a 250,000-ohm variable resistor, shunted by a toggle switch (Fig. 9), in series with terminals to connect both adaptor and meter in circuit. With VC at maximum, surge currents from a 250-volt line will be about 1 mA and, as the capacitor settles down, VC is reduced in value and finally shorted out by S. An added safeguard with this adaptor is that the gradual reduction of VC to zero allows the meter to reveal any excessive currents passed by faulty capacitors long before VC is at minimum.

Condensers up to 16 μF can be checked with a 1 mA movement, larger capacitors demanding a 5 mA meter.

Thermocouple Meters

Consideration of these meters has been deliberately delayed because of their specialised application, but no treatise on current-measuring instruments would be complete without them.

Briefly, they are moving-coil instruments used as voltmeters and connected to a thermocouple which may either be mounted inside the meter case or as a separate plug-in capsule which can be changed in the event of damage.

Thermocouple operation is that current passing through a resistance wire heats a junction of two dissimilar metals, so producing a potential difference

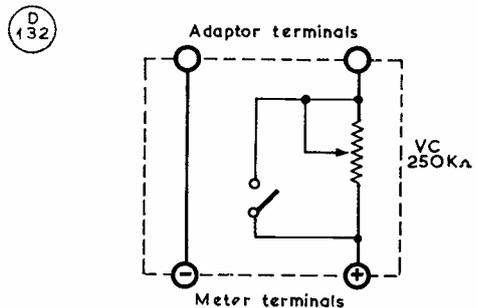


Fig. 9. An adaptor for safeguarding the meter while measuring the leakage current of electrolytic condensers.

between them. This voltage is applied to the meter, and so is read in terms of the current heating the wire.

Sensitive instruments which use a vacuum-enclosed thermocouple and heater measure currents from 1 mA up to 1 amp., but for currents above 100 mA the thermocouple is usually mounted inside the meter case, and operated in air.

All thermocouple instruments are of great value in measuring alternating currents up to radio frequencies after their initial calibration on DC (the heat generated being proportional to I^2R and independent of frequency so long as skin effect is negligible). They are widely used for audio-frequency measurement, being highly accurate and reliable.

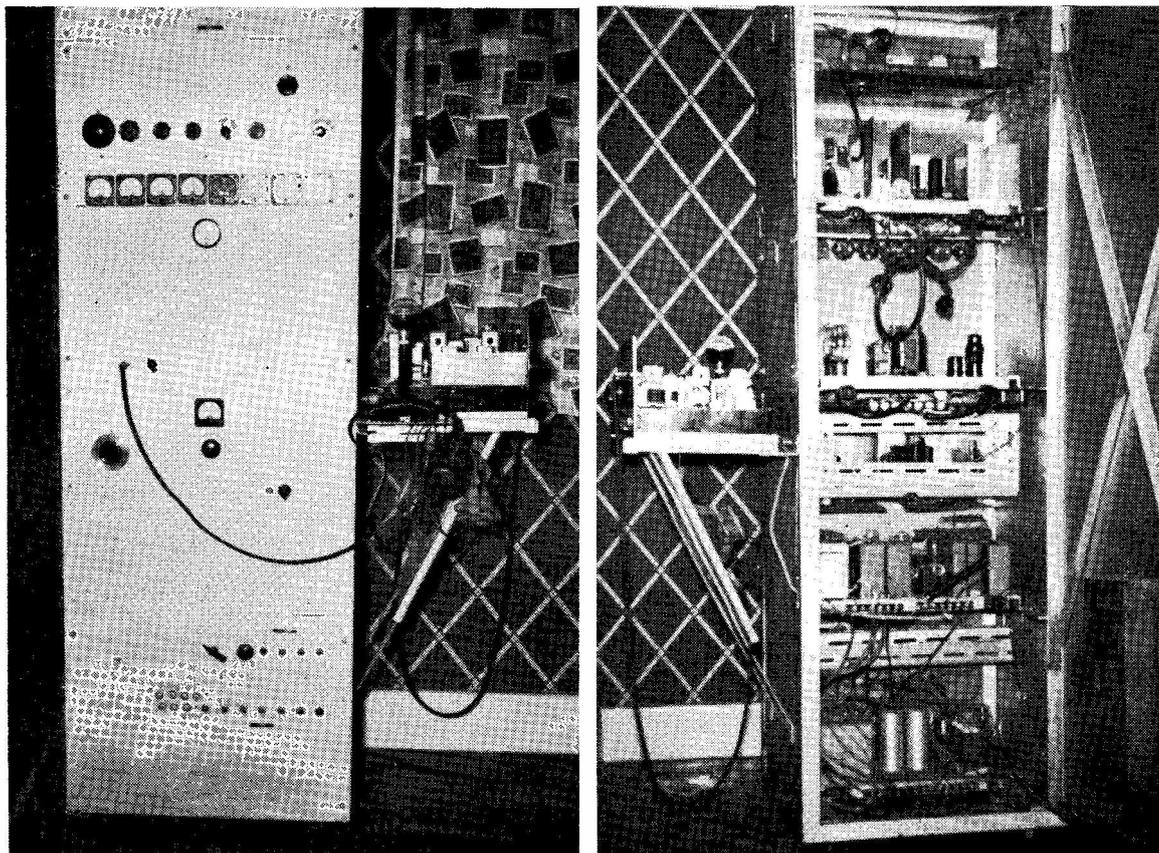
Disadvantages are that their response follows a square law, similar to a moving-iron meter, being cramped at the lower values and extended at the top end of the scale. The movement itself can also be sluggish (which may not be unwelcome for certain uses) and the thermocouple itself has a very small safety factor and is easily destroyed, because the heating wire is normally operated very near its fusing point to produce heat. It will probably be appreciated, therefore, that a slight overload will burn out the heating element, so destroying the thermocouple.

These instruments are best known as transmitter aerial ammeters, the thermocouple being built into what is basically a very sensitive milliammeter which can be used as such if the thermocouple is disconnected.

(To be continued)

GETTING THE STUFF IN

The front cover of the August issue of *QST*, the American radio amateur magazine, has a picture of WICUT (who is a technical assistant on the *QST* staff and a well-known mobile operator over there) gazing pensively at a small car outside his garage, surrounded by items of mobile gear, including a 12v. battery and two mobile antennae. His worry is, apparently, how to get it all in—the car is an Austin A.40, left-hand drive and all. Incidentally, his registration number is—WICUT. The American authorities make no difficulty about these special "callsign" registrations for cars.



The station of G2HFG, 21 Alderton Road, Horfield, Bristol 7, is entirely home-built. The left-hand view is of the transmitter assembly from the front, the receiver being carried on a shelf at the side. The right-hand photograph is from the back of the transmitter cabinet, with the door open. The power packs are built on the lower-deck chassis, and at the top level is the aerial tuning unit.

Notes on a Home-Built Station

ENTERED FOR OUR
RECENT CONTEST

The illustrations show the layout of the entirely home-built station designed and constructed by W. B. Edwards, G2HFG, of Horfield, Bristol. The transmitter assembly is contained in a steel cabinet, two views of which are shown, with the receiver and control switching on a shelf fitted to one side.

Contained in the Tx cabinet are two separate transmitters, one for 10-80 metres, and the other for Top Band, with their modulators and power supply units. The HF band transmitter consists of VFO 6AG7 with 6F6 buffer-doubler

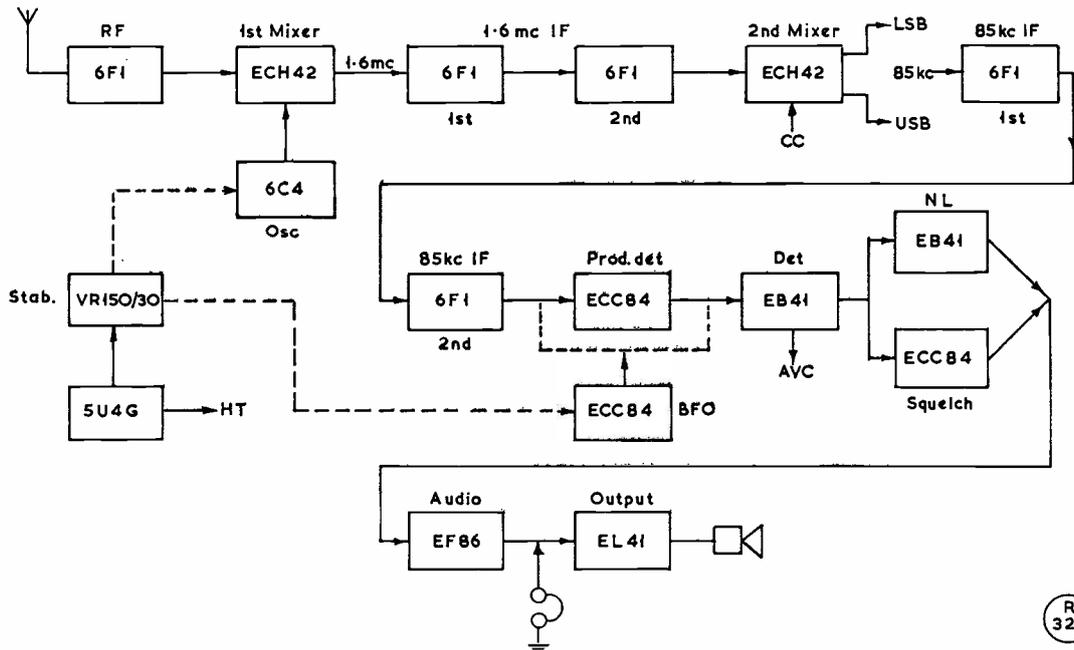
80-40m. into 6L6's as frequency multipliers to 20, 15 and 10 metres; the PA is a pair of 807's running 140w. input, and cathode keying is used for CW. For this transmitter, the modulator is 6SJ7-6J5-6J5-6V6 into push-pull 807's in Class-AB2.

For 160 metres, the transmitter is VFO 6SH7-6SH7 tuned buffer with a 6L6 PA running 10w.; the speech amplifier-modulator for the Top Band rig consists of 6SH7-6J5-6J5 into a 6N7 in Class-B. A crystal microphone is used with both modulators.

The cabinet carries, on the lower decks, the power and bias supplies for transmitters, modulators and the receiver. The power packs are fed through a mains filter for TVI suppression.

The G2HFG Receiver

This is a 17-valve double conversion super-het, entirely home-constructed. From the block diagram, it can be seen that the IF's are 1.6 mc

R
326

Block diagram of the home-built double-conversion superheterodyne receiver for the amateur bands designed and constructed by G2HFG; this receiver is illustrated in one of the accompanying photographs.

and 85 kc, and there is provision for SSB reception, either USB or LSB, by switching. The second mixer is crystal-controlled for side-band selection, and the product detector is an ECC84, with the BFO. Noise limiting and squelch stages are incorporated, and there is ample audio gain. The first oscillator, a 6C4, and the BFO, have stabilised HT supply.

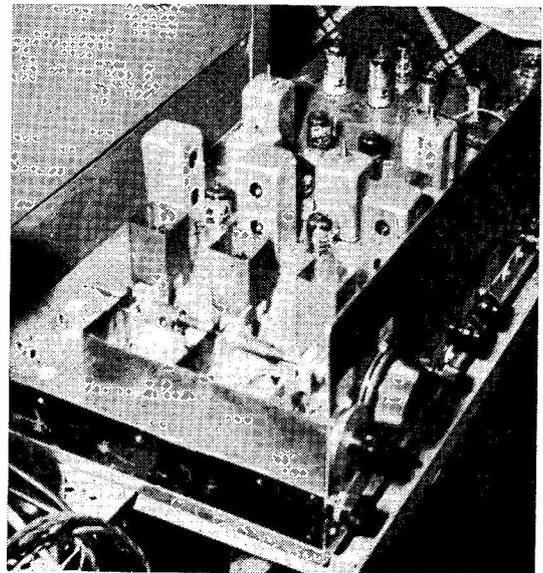
Aerial System

Horizontal dipoles are used for the 15-20-80 metre bands, each fed with 75-ohm balanced line. For Ten, a three-element fixed indoor beam, in the roof space, is available and is set up to fire west.

All continents have been worked; the main operating interest is just QSO'ing, and contests are strictly avoided.

SUCCESS IN THE R.A.E.

We hear from A. W. H. Wennell, G2CJN, hon. secretary of the Grafton Radio Society (Holloway, North London) that they had another 23 passes in the Radio Amateurs' Examination held last May. This makes a total of 134 passes in the seven years they have been running their course, and is an achievement of which Grafton can be very proud. Details of the course for the 1961 R.A.E. were given on p.298 of the August issue.



The 17-valve receiver built by G2HFG is a double-conversion arrangement, with 1.6 mc first IF and 85 kc second IF. The second oscillator is crystal-controlled — see block diagram.

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DX COMMENTARY

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

THERE is no doubt that the phone DX is passing more and more from AM to SSB; and what is so surprising is that the SSB fraternity continue to occupy such very narrow slices of the bands. This state of affairs will not last for long, but of course it is at present in their own best interests for the sidebanders to stay in regions where the only QRM comes from their own kind.

One of the inherent disadvantages of having to listen with the BFO permanently switched on is, of course, the appalling mass of squeaks and whistles caused by a few intruders. Even so, it is probably much easier to break through with an SSB transmission than with a carrier.

It must be obvious to all that the sidebanders will extend their territory as they multiply, but the die-hard owners of carriers will be with us for generations, even long after SSB has become accepted as the modern means of phone communication. (For confirmation of this, examine the 1925-type transmissions still rampant all over the CW bands!)

It's a grim thought that in the 1980's we shall most probably still hear people trying to "communicate" with 300% modulation imposed on an unstable, unsmoothed carrier.

Meanwhile, however, the state of affairs for the SSB types is not too bad—at any rate, we don't hear many grumbles from them. They are too busy quietly working the DX, and new countries come up on SSB almost daily.

Not long before these words were being written, the news of the American satellite-balloon came through. It is too early to assess the implications of this, but



CR9AH

CALLS HEARD, WORKED and QSL'd

with the promised *twenty* of these "ten-storey-buildings" floating around the world, there should be plenty of scope. Maybe the time will come when that "low angle of radiation" will no longer be so highly desirable. We look forward with great pleasure to writing-up the first "Balloon-DX" column; and with considerably less pleasure at the thought of reading about the "Worked All Balloons" Certificate which someone is bound to dream-up.

The new layout of this Commentary seems to have met with approval, and it will be kept in the present form for the time being. Probably Eighty and Forty will have to be separated out, when the brave spirits really start cracking on Eighty . . . but at the moment there is little sign of them. It certainly seems to be an advantage to segregate the CW, AM and SSB doings, since the number of people who work even two of those modes are in the minority.

One more point: For every reader who suggests we include the time and frequency of every QSO reported (and how could we,

anyway, if the reporters don't mention them?) there are seven or eight who say they prefer things kept in their present form, so that this feature looks like something to be *read*, and not a page from Bradshaw. Even the listing of the DX worked, as started last month, has mildly annoyed a few of them, who say they can't be bothered to wade through lists of call-signs. (Think of us; we have to make sure they are all correct!—*Ed.*) On the other hand, this presentation is more economical of space and enables us to give more news in the same number of pages, which is surely an advantage.

DX Gossip

PX1PF made 4712 QSO's this year, including 47 new countries, which, added to last year's score, brings them up to 117 countries worked. DL9PF himself still needs a PX contact!

Strange things have been happening in the Yemen, where MP4MAB has turned down a chance of further operation because of somewhat malicious remarks on the air about "unlicensed operation" and

piracy. The fact is that he *did* operate from the Yemen and has the documents to prove it, but he doesn't feel like putting himself out to repeat the performance for an unappreciative audience.

MP4MAB himself (who also signs MP4BDA, 4TAE and 4QAO on occasions) explains that the jurisdiction of the British Political Resident in the Persian Gulf covers Bahrain, Qatar, the Trucial States and the Sultanate of Muscat and Oman (including Masira Island and the Hadramaut). The authorities in Aden have no powers to issue a licence for any of those areas. Hence, strictly speaking, VS9O and ZB2A/VS9 were illicit; and others latterly signing VS9OA, 9OC and 9OM, although operating with permission of the CO of the R.A.F. base, did not hold *official* licences, and never applied for them (Officially-licensed stations in Oman would sign MP4M . . . *not* VS9.) Rundy of OD5CT and W3ZA has been officially licensed and holds the calls MP4BDD, 4MAG, 4TAI and 4QAA for operating in the four areas this autumn.

YAI1W has packed up and now signs 5A5TR . . . VK9HC is another who has gone QRT . . . And yet another is VR3V, now signing G3MKG.

W8UTQ/3V8 has been causing a stir, mostly 14310 kc SSB. He will be there until 1961 . . . VK9RH is on Norfolk Island, sometimes around 14 mc CW at 0700 . . . VK9DJ is on Cocos Is., but not very active . . . ZL3VB is usually around 14050 kc—he's on Chatham Island, of course—and has been heard as late as 0830.

FK8AH, 8AT and 8AU all show up now and then . . . VKØPM and ØWH are both on Macquarie . . . Iran activity continues with EP3RO, to be joined by EP1AA and 3HS . . . VR2DO hopes to be operating from Pitcairn, VR6, during October (mostly AM).

Good Pacific DX reported from various quarters (not many of them in Europe, though) includes VR1D (14 AM), KH6DLE/VR3, K6CQV/KS6 (14 SSB and AM), KW6DA/KM6, KM6BI (21 CW), KJ6BV, KG6NAA (7 mc SSB!),

ZK1AK and 1BS.

Hunters of WPX and WVKCA should look out for VK5BP and 5NQ, who will be working from Alice Springs and signing /VK8, between September 3 and 14; they will run 150 watts, CW only, all bands Ten to Forty.

VQ4GQ and VQ4HT will be on from VQ1, September 8, for about ten days (for details see "News from Overseas") . . . EL4A promises lots of operation on 7 and 3.5 mc this season (also 50 mc on occasions) . . . 9N1TB is back in the U.S.A.; 9N1MM is active (Box 50, Khatmandu).

Latest news on *Yasme III*, from G2DC: They will have been signing HC2VB in late August and later HC8VB (Galapagos), from September 5 for ten days; after that, possibly Clipperton and

then Nukuhiva (Marquesas). K4IGR has replaced ZL1AV as second op.

Many of the former VK5's have become VK8; VK8AE and 8EW are in Alice Springs; VK8AS, 8GU, 8OW, 8NE, 8PL, 8ST, 8TF, 8ZG and 8ZDW are all in Darwin . . . KC6AQ (Western Carolines) works 14 mc phone on Thursdays, 1130-1300 GMT . . . The following nice ones are around: VR1E (14050), VR4JB (14020), VR4CW (14015), ZC5AE (14085), VK9MV, Christmas Island (14083 kc and 14108). VR1B works CW on 14087, SSB on 14303-7 kc.

The entire family of the former OQ5IE are safely out of the Congo; OQ5GU, equally well known, is also out of it; many of the others are still signing 9Q5, apparently without interference.

FIVE BAND DX TABLE
(POST WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	DXCC	Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	DXCC
G3FXB	848	77	134	230	236	171	272	G2BLA	351	38	67	80	87	79	133
G2DC	838	89	123	245	212	169	274	G8DI	349	36	67	106	77	63	136
G3FPQ	815	74	118	231	228	164	258	G8VG	349	37	79	133	61	39	155
G5BZ	797	66	121	272	206	132	281	G3JUL	348	27	66	87	75	93	142
G3DO	697	25	51	253	188	180	280	GB2SM	347	20	33	85	101	108	186
GW3AHN	680	16	55	206	253	150	271	G3DNR	324	11	30	94	104	85	138
G3BHW	663	15	45	211	223	169	255	G3LKJ	303	8	20	48	111	116	153
GI3VJ	660	41	70	189	197	163	236	G2DHV	301	22	36	139	71	33	161
G3ABG	606	56	90	191	141	128	215	G3WP	301	17	34	103	35	112	155
G2YS	541	73	93	171	120	84	190	G3BHJ	298	8	29	46	140	75	165
G3LET	538	41	123	192	127	55	212	G3MCN (Phone)	297	4	9	63	146	75	182
UR2BU	512	25	57	154	150	126	192	VO2NA	295	19	39	122	74	41	131
GI3NPP	493	25	48	124	177	119	206	G3GHE (Phone)	281	13	29	42	116	81	151
G3IGW	493	51	83	118	123	118	176	G2CWL	276	21	29	78	117	31	154
G6VC	482	40	60	160	132	90	191	W3HQO	262	4	9	95	120	34	210
GM2DBX (Phone)	433	34	31	162	105	101	178	G3JSN	257	32	48	56	64	57	103
W6AM (Phone)	430	23	62	285	49	31	285	G4JA	237	36	50	80	53	16	124
MP4BBW (Phone)	412	1	5	192	134	80	207	G3NAC	232	17	38	65	77	35	107
UR2BU (Phone)	410	12	33	112	134	119	169	G3NFV	204	12	23	26	56	87	120
G3KMA	406	33	83	129	94	67	163	G3LZF	179	11	20	54	46	48	117
G3DQO	404	22	52	183	105	41	192	G3JJZ	169	26	41	72	21	9	89
G3LHJ	373	18	39	109	140	67	175	G3IDG	168	15	18	41	48	46	77
G3NOF (Phone)	362	8	16	76	140	122	172								

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



The equipment at ON4QX, Antwerp, includes B & W 5100 and Hallicrafters HT-32 transmitters, the receivers being SX-100 and SX-101; for the 14-21-28 mc bands, a three-element beam is used. Working CW only — ON4QX is an ex-sea going operator and was with the British forces at Dunkirk — he has had over 15,300 contacts, mainly on 20 metres, and the countries total stands at 215C. He is particularly keen on working /MM's, and has accounted for more than 40 ships so far. ON4QX also holds the call 3A2CZ and operates from Monaco during May every year. With other members of the Antwerp group of ON4's, he runs a CW-only club, with its own QSL bureau and DX award (WOSA).

New Ones

For DXCC purposes, the following will count as new credits as from November 1, with the restrictions mentioned: Marcus Island; Mali Federation, FF8 (QSL's after June 20, 1960); Mauritania, FF7 (same date); Ruanda-Urundi (same date); Somalia (after July 1, 1960); Cayman Islands (reverts to its former status as separate from Jamaica). To balance, there are five deletions—British Somaliland, Italian Somaliland, Karelo-Finnish Republic (UN1), Tangier and Wrangel Island. So several of the Top People will now be well over the 300 mark.

Our very own Rockall Island, 'way beyond the Outer Hebrides, has now attracted the attention of would-be DX-peditioners, and we gather that as soon as the ARRL approve it for DXCC purposes (for which it would appear to qualify, judging by their rules) someone will try to get there. We seem to remember that a certain

V.I.P. was once landed on Rockall by helicopter, and it didn't seem as though any other approach was feasible, from the pictures published at the time!

DX-Peditions — Future

As we write these words, W4BPD is still in Europe (possibly in the region of Andorra). From the time you read them, his schedule is due to look like this: *September 1-7*: With IC1IN (new for WPX), Campione de Italia. *September 9*: At HV1CN. *September 10-17*: With I1IN in San Marino. *September 18-20*: With YU1KC. *September 21-22*: With SV1AB. *September 23-24*: With OD5LX and OD5CT. *September 25*: With YK1AT. *September 26-30*: With SU1IC.

Having despatched this little lot, Gus then hopes to be spending the first week in October with ST2AR and ETE3CE; then ten days with the VQ4's; and from October 20-22 operating VQ9HB in Seychelles. (October 23, Platte Island and October 24, Coetivy Island.)

October 25-30 is booked for Agalega Island (VQ8 but a new one for DXCC). We will hold up his November-December itinerary until next month, but it's good!

From December 8-12 there should be some operation from the rarish FL8 territory, as Rundy, W3ZA, hopes to be signing FL8ZA at that time . . . VQ4AQ intends to spend one month, starting early September, around VQ7-8-9 . . . 9N1GW plans to take SSB to AC3 and AC5-lands during September and October . . . AP2CR, meanwhile, should be operating from East Pakistan.

At the end of the year we gather that the following might happen: VU2NR and Co., from VU4 (Laccadives); HK0TU (Malpelo) —another attempt; and Socorro Islands (XE4B), with a promise to try to work Europeans this time!

The following are not DX-peditions, but promises of *regular* operation from some of the more attenuated spots . . . Tori Island (JA1ACB); KJ6, by KH6OR;

Cozumel Islands, XE6A; and possibly Franz Josef Land, with UA1KEA resident.

Late Flashes

9U5VS and 9U5DM both very active, 1700-2200 on 21 mc . . . VR1D now on 14110, 14136, 14160 and 14190 kc; VR1E (Tarawa) and VR1F (Ellice Is.) both expected on almost at once . . . Socorro (XE4) will be put on the air in January 1961, 14180 kc SSB and also CW; VE7ZM will be among the ops.

9N1GW's East Pakistan trip delayed (non-arrival of gear) . . . SU1KH's proposed sortie to the Yemen is off . . . CR8AC active on 21250, CR8XG on 14100 kc . . . XS5A said to be in Shensi Province, China . . . W2AYN now holds the calls EP2AYN and EP5X.

Strange one heard by a few G's—HM9A "on Danger Island, off South Korea." Phone on 21 mc and much too strong to be genuine, most of them suggest; not worked by anyone as yet, though.

CR6CA's expedition may be either past, present or future—we don't know at the time of writing. Supposed to take in Sao Thomé (CR5), Ajuda Island (CR5), Annobon Island (EAØ) and Sao Thomé again. 5A5TR hopes to operate SSB from Algeria, September 20-25.

DX-Peditions, Past and Present

The following were known to be operating, or were due to be active, during August: XE5A, Isla de Mujeres, SSB and AM; WØNWX, from British Virgin Islands, CW only; PX1RC, AM only; FP8BH, CW and SSB; VQ9TED, SSB.

News from Malaya

From the *Malayan Radio Amateur* we quote the following items: The 9M2/VS1 40-metre Club are getting seriously interested in VHF, thanks to their "discovery" of Army receiver Type R.216 . . . 9M2GS, active from Penang, was formerly VS1GG . . . 9M2GT is ex-VK2, 3 and 4 . . . VS1EA has returned to the U.K. . . . VS1KM is ex-G3KZJ and 4S7JM . . . VS1KN has acquired an LG.300, and hopes

to make himself heard in the U.K.

9M2DM, 2EH, 2EJ, 2FJ, and 2JF have all been cancelled, also VS1EA, 1HT and 1HU. There are many new ones to replace them, in some cases with old calls re-allotted. VS1AP is ex-G2AVP. And also from the same source, we gather that several of the VS6 types have had to pull down their masts because of the construction of a new airport at Hong Kong.

News from Overseas

VQ4GQ reports that he and VQ4HT will be signing VQ1HT and VQ1SC from Zanzibar during the period September 8-18. They will be on CW only, and mostly on Twenty. They will have ground-planes up, and will operate from the roof of their hotel. QSL via VQ4 Bureau, VQ4GQ or VQ4HT.

GW3NUO (Swansea) has been allotted the call DL2BD and hopes to be on the bands shortly; if there's enough interest in his unit, he intends to form a Club group with station. The QTH is Minden.

W3HQO (Philadelphia) is "an exile from Kidderminster," and hopes to round up more ex-G's now resident in the States. For this purpose he will be looking around 40 metres on Wednesday evenings (2030 EST) — 7280 kc, lower sideband. He would like to form a real net of ex-G's, along with WA2EVH, who is from London. Whether they have ever held G licences is immaterial, so long as they hail originally from the U.K.

ON4IB (Bruges) tells us that he has worked 80 prefixes this year on Forty CW only. But we can't put him on the WPX Ladder, as we stated firmly that entries had closed, 'way back in April. Next year, perhaps? He asks: "What is the status of ON4DZ/A, a station officially authorised in the Netherlands for a Field Day last June?" We should say he was just a PA!

Top Band Topics

W1BB says that the skeds between ZL3RB, W8GDQ and W8ANO "are going beautifully." Stew has been listening to a tape with recordings by ZL3RB of

both CW and phone contacts. He wants to pay tribute to the pioneering work of W6KIP, who "opened the path" and paved the way for these contacts; Alex, of course, is still going strong and joining in.

ZL3RB himself reports that only about ten stations in ZL work Top Band at all, and then mostly on QRP phone. So far, no one in the parts where they have quiet background has become interested in DX; those whose signals are good enough to

TOP BAND COUNTIES

LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	98	98
G3JEQ	97	97
G6VC	96	96
G3JHH	94	94
G3KOR	90	94
G3APA	85	90
G3ABG	80	82
G3JJZ	78	80
G3MCY	74	75
G3JVL	73	83
G3FS (Phone)	68	72
G3NFV	65	68
G3MXJ	63	70
G3NBT (Phone)	61	64
G3NNO	60	76
G8VG	58	67
G3NTI	58	60
GM2HIK	57	64
G3NVO	54	65
G3JBU	52	52
G3NJQ	43	47
G3IDG	40	45
G3NMZ (Phone)	39	52
G3LZF	34	53
G3NAA	33	46
G3NNO (Phone)	28	48
G3MXJ (Phone)	16	33
G3ABG (Phone)	16	32
G3NOW (Phone)	12	31
G3NPB (Phone)	1	20

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

get out seem to be in towns and cities and suffer from a high noise level.

DL1FF was the outstanding European 160-metre station this year; he worked 25 W's, two VE's, heard VP5FP and was heard by KS4AZ. Cross-pond conditions were not outstandingly good, and the 10-watt G's had a rough time.

SWL N. C. Smith (Orpington) showed that summer listening on One-Sixty is worth while; he recently heard W2TR at 0355 GMT; this was very close to sunrise, which, according to WIBB, is *always* the peak time for DX. It is a good omen for the coming season; and another SWL (D. W. E. Powell, of Gibraltar) has suggested to WIBB that 1964 should be a "World Top Band Year," the real peak in One-Sixty conditions being expected then.

G3NPB has moved from Yorks. to Northumberland, and finds things a bit difficult. His aerial is 140 feet long with three right-angle bends in it! However, he is starting his WABC chase all over again, having ended up at the previous QTH with 66 worked, 61 confirmed, all phone. Look out for him if you want Northumberland—or even if you don't, as he might be glad of your county.

Those who have lamented shortage of activity from Cornwall should look for the Cornish nets nearly every evening at 2100; frequencies are 1921 and 1970 kc. Stations available include G3AET, 2BHW, 4IV, 2DDR, 3NVJ, 3IJI, 3LPB and 3NK; in the winter G2AYQ and 3GQS are also around.

G3APA (Coventry) has now worked 90 counties, thanks to GM3NNE/A in Fife and GM3NPM in Ayr. He tells us that G3JEQ will be working from GM, but that little sortie is probably all over when you read these words.

G3NNO (Leeds) has applied for WABC (CW) and is now chasing again on phone. He recently raised OK1KGG on 2½ watts—a prototype for his mobile rig, which will be used on the way up to Scotland (his GM expedition was timed for August 26-30, with G3OGZ and 30MH as co-



K6BX is at Bonita, Calif. and is particularly keen on DX Certificates—in fact, he produces a publication called "Directory of Certificates and Awards." As our photograph shows, he holds a good many of them himself! The rig consists of a 1 kW transmitter, a 75A-4 receiver and tri-band beam. The sword on the wall is a memento of the fact that K6BX is a Commander, U.S. Navy, retd.

operators).

G3NVO (Middlesbrough) is well over the 60 mark but can't get the cards in—still six short. He and G3NVN went portable in Westmorland for a few days, but didn't get out very well, even with a 300-ft. wire, 1300 feet a.s.l.

And those who work either GM3OM/P or GM4QV/P during the first week-end of this month will have given themselves West Lothian, as the Falkirk group organised a field-day, at a fine site 1000 ft. a.s.l., not far from Bathgate. Full QSL drill is promised.

THE DX ON SSB

This mode continues to grow in popularity, and SSB stations are now spread all round the world in the most surprising manner, compared with the state of affairs a year ago. MP4BBW (Awali) recently put up a beam, and the immediate result was contacts with 83 countries in 22 days (464 QSO's!) That just shows . . . and he doesn't think he will even have to build that linear now.

G3WW (March) points out that British representation in the Fourth Annual SSB Contest, organised by CQ, was even less bright than in the DX Contest. In fact, only GI3CWY and G3WW represented the U.K. at all. G3WW now has a Labgear 3-band

Cubical Quad, which seems to have boosted results no end. First CQ (beamed on N. America) produced a reply from VK3AHO; and while swinging the beam back, VQ4ERR was collected. Finally, G3WW says: "Look for me on SSB (21,410 kc) from the U.S.A., September 3 to 23."

G2CWL (Fareham) is another who is going strong on SSB; nice new ones worked on *Twenty* were MP4MAB/4W1, W3ZA/EP and HB1TL/FL; on *Fifteen* he raised CP1CJ, EIØAA and OD5CT. Several /MM operators have visited G2CWL at his home; and W4CQC/MM and K5RZZ/MM brought with them his Maritime Mobile certificate. Their ship puts into Southampton every six weeks or so, and G2CWL says: "These personal meetings *make* Amateur Radio."

G3DO (Sutton Coldfield) added to his total with TI9SB and KG6ICD (last month), and this month's list (*see* below) includes some fine DX, but no new ones. G3NOF (Yeovil) also sends an interesting list of DX.

SSB DX WORKED

14 mc Band

MP4BBW: W3ZA/EP, 7G1A, UA9CM, KG6ICD, BV1USC, MP4QAO, 9N1GW, MP4MAB/4W1, K W 6 C P, W 8 U T Q / 3 V 8, AP2CR, VU2MD, EL1K, OHØNC, 9Q5AG, PZ1AX, PX1PF, Z57P, FR7ZD

RULES : 1960 "CQ" WORLD-WIDE DX CONTEST

I. CONTEST PERIOD :

Phone Section: 0200 GMT October 29 to 0200 GMT October 31.
CW Section: 0200 GMT November 26 to 0200 GMT November 28.

II. BANDS :

The contest activity will be in the 1.8, 3.5, 7, 14, 21 and 28 mc amateur bands.

III. TYPE OF COMPETITION :

(1) PHONE SECTION. (a) Single Operator. (b) Multi-operator, single transmitter. (c) Multi-operator, multi-transmitter. (2) CW SECTION. (a) Single Operator. (b) Multi-operator, single transmitter. (c) Multi-operator, multi-transmitter.

IV. EQUIPMENT :

There is no limit to the number of transmitters and receivers allowed and competitors may use the maximum power permitted under the terms of their licence.

V. SERIAL NUMBERS :

1. Phone stations will exchange serial numbers consisting of 4 numerals, the first 2 being the RS report and the last 2 their own Zone number.
2. CW stations will exchange serial numbers consisting of 5 numerals, the first 3 being the RST report and the last 2 their own Zone number.
3. Stations in Zones 1-9 will prefix their Zone number with Zero. (01 and etc.)

VI. POINTS :

1. Contacts between stations on different continents will count 3 points.
2. Contacts between stations on the same continent, but not in the same country, will count 1 point.
3. Contacts between stations in the same country will be permitted for the purpose of obtaining a Zone and/or Country multiplier but no QSO points are credited.
4. Only one contact with the same station is permitted per band.

VII. MULTIPLIER :

Two types of multipliers will be used.
1. A multiplier of 1 for each Zone contacted on each band.
2. A multiplier of 1 for each Country worked on each band.

VIII. SCORING :

1. The score of each Single Band is the sum of the Zone and Country multiplier for that band, multiplied by the total contact points on that band.
2. The total All Band score is the sum of the Zone and Country multipliers of all bands, multiplied by the sum of the contact points on all bands.
3. Those sending in logs for a Single Band are eligible for a Single Band award only. If a log is sent in for more than one band, indicate which band is to be judged, otherwise it will be judged as an All Band entry.
4. A station is not eligible for more than one award.
5. Single operator contestants must show a minimum of 12 hours of operating time to be eligible for an award. If a contestant operates more than one band and wishes to be judged for a specific single band, he must show a minimum of 12 hours on that band.

6. Multi-operator stations must show a minimum of 24 hours of operating time to be eligible for an award.

7. Multi-operator stations will only be judged on the basis of an All Band score.

IX. ZONES and COUNTRIES :

The CQ Zone map, the *Short Wave Magazine* DX Zone map and the ARRL and WAE country lists will be used as standards. The continental boundaries used for WAC will also be recognized. Should any question arise as to the positive location of a station, the official definition will be final.

X. AWARDS :

Certificates will be awarded in each section as follows:

- To the highest scoring Single Operator station on each Single Band in the following areas:
 - Each call area of the United States, Canada and Australia.
 - All other countries.
- To the station having the highest All Band score (more than one band) in the following areas:
 - Each call area of the United States, Canada and Australia.
 - All other countries.
- Awards to multi-operator stations will only be made in the No. 2 ruling.

XI. SPECIAL AWARDS :

In addition the following special awards will be made:

- A cup will be awarded to the highest scoring Single Operator, on a Single Band, Phone Station in the world. (*Donated by W6AM*)
- A cup will be awarded to the highest scoring Single Operator on a Single Band, CW Station in the world. (*Donated by W7KVU*)
- A cup will be awarded to the highest scoring Single Operator, All Band, Phone Station in the world. (*Donated by W2SKE*)
- A cup will be awarded to the highest scoring Single Operator, All Band, CW Station in the world. (*Donated by W9IOP*)
- A cup will be awarded to the highest scoring Multi-operator, All Band, Phone Station in the world. (*Donated by K2AAA*)
- A cup will be awarded to the highest scoring Multi-operator, All Band, CW Station in the world. (*Donated by K2GL*)
- A plaque will be awarded to the affiliated DX Club (not a national body) submitting the highest aggregate score of the scores submitted by its members. (*Donated by CQ*)
 - For a club to enter, an officer of the club must submit a list of its participating members and their scores.
 - This list may include scores of single operator and multi-operator stations; both phone and CW.
 - Stations that are members of a competing club therefore must indicate this fact on their report forms.

8. At the request of the donors, previous winners are not eligible for the 1960 awards. In other words the trophy cannot be won more than once by the same station. This does not apply to the plaque.

9. Also such special or additional awards as the Committee shall choose to make. In countries or sections where the returns justify second and third place certificates will be awarded.

XII. DISQUALIFICATION :

Violation of the rules and regulations pertaining to Amateur Radio in the country of the contestant or the rules of this contest will be deemed sufficient cause for disqualification.

XIII. LOG INSTRUCTIONS :

- In keeping a log, fill in Zone number and Country, **ONLY FIRST TIME** it is contacted.
- Use a separate sheet for each band and a tally sheet or report form.
- Keep all times in GMT.
- All contestants are expected to compute their scores. Logs should be checked for contact duplications and proper point credit before they are submitted.
- Make sure name and address is clearly noted on each log. Print or type.
- Each contestant must sign a pledge that all rules and regulations have been observed and that the report is a true one. Note sample contest report form.
- If official log forms are not available, use a duplicate form as indicated. The size is 8½" x 11" with 52 contacts to the page.
- Copies of the necessary log sheets and report forms are available from "CQ" address below. Send a self-addressed envelope, large size. Include sufficient postage; in the case of overseas stations IRC coupons are acceptable. Make sure to indicate how many sheets are needed.

XIV. RULE CHANGES :

- Note Par. VIII No. 7 and Par. X No. 3.

The Committee feels justified in making this change. It does not require the efforts of more than one operator to cover a Single Band during a contest period. Especially now that the active time of the higher frequency bands is becoming shorter. Therefore there will no longer be Single Band awards for multi-operator stations.

- In the multi-operator division, (b) single transmitter and (c) multi-transmitter under Par. III, the separation as made last year will be retained. Therefore it is important that multi-operator stations indicate under what classification they are operating.

XV. DEADLINE :

All logs must be postmarked NOT LATER than December 1, 1960 for the Phone section and January 15, 1961 for the CW section. In rare isolated places the deadline will be made more flexible. Send logs directly to:

CQ Magazine, 300 West 43rd St., New York 36, N.Y., U.S.A.
(Att: Contest Committee).

9M2DB, FB8CM, HB1TU/FL, VK9NT, IM1RIF, KG6NAA, WA6GMM/KG6, VE6AEE/SU, YS1JR.
G3NOF: CN8MB, EL1K, ET2US, HB1TU/FL, HV1CN, OD5CT, PX1PF, SV0WV, VQ5FS, W4WYI/MM, 5A5TA.
G3DO: EL1K, FB8CM, HB1HK/HE, HB1TU/HE, IM1RIF, KA2YA, PX1PF, PZ1AG, OH0NC, VK3AHO, 3HG, VQ2RB, VS4JT, YO3GK.
 21 mc Band
MP4BBW: MP4QAO, OD5CV, CT3AV, W8UTQ/3V8, ZP6BB.
G3DO: OA5G, OD5CV, VE4MP.
G3NOF: CE3DY, K3GXR/MM, KZ5WZ, PX1PF, VQ2AB, VQ4RF, 5A5TA.

The DX on AM Phone

G2DC (Ringwood) made one of his rare excursions on to AM, and worked one new one (9U5JH). Others hooked were ZS3FF and 3DM. G3GHE (Reading), still leading the WPX Phone ladder, lists what he calls "the best of a poor bunch."

GM3NQB (Thurso) collected

WPX MARATHON

(Starting January 1, 1960)

CW Only		Phone Only	
G6VC	291	G3GHE	270
G8DI	288	MP4BBW (SSB)	265
G3JVL	265	G3DO (SSB)	215
VU2XG	234	G3LAS	164
G3LAS	223	G3LHJ	150
G4JA	192	G3BHJ	118
G8VG	182	GM3NQB	107
G3LZF	164	G3MCN	101
G3NWF	151	GM2DBX	92
G3JSN	141	G3NFV	83
G3DQO	137	UR2BU	80
G3LHJ	130	G8VG	77
G3WP	110	G3JSN	67
G3JVU	109	G2FQW	66
G3MGL	108	VO2NA	54
G2BLA	103	G3DNR	49
G2BP	95	G3NWF	47
G3DNR	91	G4JA	41
VO2NA	90	G6VC	40
G3JFF	84	G3MGL	17
UR2BU	79		
G3GMK	71		
G3NTU	61		

(Stations not reporting for three consecutive months will be deleted)

PX1PF on 14 mc, which band he has found pretty good between 2100 and 2300. At the moment he has only a temporary aerial at his new QTH.

G3FXB (Southwick) used his phone mostly on 21 mc, to good effect; a solitary QSO on 14 mc was with YN1WW. G3IGW (Halifax) also reports one single contact on that band — with VP2DU.

G3NOF, despite his SSB activities, used AM on 21 and 28 mc— see lists following.

AM PHONE DX WORKED

28 mc Band
G3NOF: PX1PF, PY2AHV, VQ2HA, ZS1B.
G3BHJ: CR6CA.
 21 mc Band
G3BHJ: FF7AB, KG4AO, PX1PF, ZD2JKO, LUBDB, UQ2AN 5A3's.
G3NOF: EA8DD, KG4AO, PX1PF, VP9BN, 9BO, ZD2AMS, 2JKO, ZE7JK, ZS1BV, 9G1BA, 1CC.
G3GHE: CR7FN, FQ8AF, 8HL, HP1SB, IM1RIF, KG6AIY, PX1PF, PZ1BK, T15RV, VE0NB, VR2DE, 2DS, ZD1AW, 4S7YL, 9G1DP.
G3FXB: CR7BC, FF4AB, FF8AP, 8CK, FB8XX, IM1RIF, KJ6BV, K6CQV/KS6, OA1W, PX1PF, PZ1AW, OR4TX, YA1AO, XE3AF, VR2DE, ZK1BS, ZS3X, 4S7YL, 6O2GM, 9N1MM, 9Q5FD (Katanga).
G3LJK: MP4BBA, VR2DE, ZS3L, VP8DW, FF7AB, HK1XT, HP1SB, PZ1BE, VU2BK, VP4MM, PX1PF.
G3NWT: VS5GS, 9M2GV, VU2BK, 4S7L, TF5TP, YA1BW, EA3AQ, PX1PF, TI2CMF, ZS3BC, 9K2AD, LX1DV, 9U5JH, VS9MB, VP8EM, VR2DE.
 14 mc Band
G3BHJ: CT2AK, PX1PF, UA1KBB.
G3FXB: YN1WW.

The DX Bands on CW

G2DC, complete with a new Vee-beam, found things quite good. Even 28 mc proved to be open for North-South contacts around noon, and he raised PX1PF and ST2AR thereon. Others were ZS's, CX and OA. The 21 mc band he found erratic, but sometimes with good openings in the evenings.

G2FFO (Burnley) complains about the "dreadful noise" which appears most evenings and wipes out 14025-14050 kc; sometimes, however, it is absent. G2FFO is still chasing Zone 39 but never hears anything therefrom.

G3NOQ (Tynemouth) comments

on the current fashion of "tail-ending" and the fact that stations with moderately attractive call-signs get away with it! He raised quite a bit of DX with an indoor wire and 20 watts to a doubler.

G3KMA (Hampton) worked PX1PF on all five bands on CW, also on 7 mc phone; otherwise he thought things were pretty poor. G4JA (Baschurch) worked his old friend ZL4JP on 14 mc at 0010 GMT—very solid but with plenty of QRM.

G3DNR (Broadstairs) got going from the new QTH with a temporary dipole for 21 mc and raised ST2AR and MP4BBL (both new) as well as YV, VQ3. 9G, VE and W.

G3WP (Chelmsford) seems to have collected a whole bundle of VE8's, and is a bit perplexed over some of the call-signs. We, too, have noticed that the old VE8A-L and VE8M-Z rule no longer applies to everyone. G3WP also worked PX1PF, and was delighted to get his card from VU2ANI.

G3GGS (Chorley) has a new QTH which is better and quieter than his old one in Preston, and his activity, as listed, is on a temporary aerial only 15 ft. high.

CW DX WORKED

14 mc Band
G4JA: FY7YI, YIIRK, KV4AA, CE3DV, ZL4JP (0010), KL7AL, VE4PK.
G3KMA: FG7XG, FP8BM, HK3RQ, PJ2AE, PX1PE, VE6AAE/SU, VP2VA, YN4AB.
G2DC: FP8BM, HK3RQ, KH6BLX, GDMF, KL7PI, 7MF, VK1-6, VE0MK, ZK1AK, 1BS, EA9AP, UF6AS, UG6AW, UJ8AC, UL7HB, UA9OK, W8UTQ/3V8, ZS6BL, RAEM.
G2FFO: FP8BM, FQ8AG, 8HV, HZ1AB, YN4AB, VS9ARF, ZS7M, 4S7EC, 6O2AB.
G3NAC: EL4A, PX1PF, VQ4HT, FP8BM, TF5TP, ZB2AD, PY's.
G3LJK: FA8TT, PX1PF, FQ8HW, OX3JI, OD5CO, KL7AR.
G3WP: OA4KF, OD5AI, PX1PF, EL4A, VE6AAE/SU, VK's, ZL's, VE8's.
G3GGS: K4ORQ/EP, E14A, HB1UB/FL, DU7SV, 6O2AB, FP8BM.
 21 mc Band
G2DC: EA6AM, CR6CA, CR7BO, PY1-7, LU's, ZS's, VQ2-5.
G3KMA: CE1BD, JA1ACB, MP4BBE, PX1PF, ST2AR, SV0WZ, VK9XK, VP2VA, VP5BL, OA3D, XE1PJ, YN1CRU, 6O2AB, 9Q5IG.
G4JA: HH2JV, PX1PF, VP2VA.
G6VC: HH2JV, ZE3JO.
G3LJK: CX2BT, ST2AR, YA1BW.
G3NAC: CX2BT, ST2AR, HH2JV, EL4A, VP2VA, UA0BC, PY's.
G3GGS: KZ5TD, ST2AR, OD5CT.

Eighty and Forty

Still not much around on *Eighty*, although almost any part of the world *could* be worked by pre-arranged skeds. PX1PF handed out quite a number of welcome QSO's, and G3KMA raised him as well as HB1UB/FL, UQ2, UR2, 3V8BA and PY2BKR.

Forty could be absolutely bulging with DX—if the activity were there. As it is, just look at the lists from G3KMA, G3IGW, G3LET and others! G2DC worked two new ones — FP8BM and IS1MM — the latter has a daily sked at 0645 and is open for contacts afterwards. TA1PR (QTH "Ancara") was probably a dud.

SWL Peter Day (Sheffield), covering *Forty*, heard PZ1AX/SSB (0100), and SVØWC, UA9BO, KV4CI/MM and PY1-7 on CW. G3NAC worked LX1CF (CW) for a new one.

CW DX on 7 mc

- G3KMA:** CE3AG, CN2BP, CN8MB, CT2BO, CX1OP, HC1IT, HB1UB/FL, K P4's, KV4CI/MM, LX2GH, OX3's, PY7LI, VO1BD, VP9AK, PX1PF, UF6, UL7, ZAIKC and 2BAK.
- G4JA:** CT2BO, PX1PF, PY8ZH, UL7AA, ZB1FT.
- G3NOQ:** (With 25 watts) OX3RH, PY7. (With 5 watts) OY1R.
- G3LET:** CE3AG, CN3QR, CX1OP, HB1UB/FL, HE9LAC, OR4TX and 4TZ, PY7LI, VK3AHO, VK5NO, ZD2ATU, ZP9AY, ZS1A, 6AJH, PY1-8, K4OKM/M.
- G3IGW:** CE1AD, 3AG, PX1PF, VK3MR, VS4ER, W2AIS/KV4.

Miscellany

G3LEQ (Tunbridge Wells) with G3MDR and G3MIK, has just completed a "ham-hop" holiday through eight European countries, covering 3,200 miles in two weeks. They met several OZ's, DJ's, LA's and an SM and a PA. An interesting personal contact was made with SWL Eskil Eriksson (SM5-2086)—see p.259 July SHORT WAVE MAGAZINE. G3LEQ adds that he will shortly be all fixed for RTTY.

GW3AHN (Cardiff) points out that ZL4JF (Campbell Is.) is not isolated, QSL-wise, because there is no mail service. ZL2GX "manages" him and many QSL's have already been received in the U.K.

GB2SM (via G5CS) sends

some interesting gen. on the Scandinavian Activity Contest, 1959, gleaned on a visit to Finland. Briefly, in the CW (single-operator) class G3KZR was 14th in the World Rating, with G3LHJ just behind. In the CW (multi-op.) category G3JUL/3LGA were 2nd —fine work. In the Phone (single-op.) class G3MCN rated 10th, and for Phone (multi-op.) GB2SM was 5th. There were 1,500 entries from 50 countries. Note that the 1960 Contest will run as follows: CW, September 17, 1500 GMT to September 18, 1800; Phone, same times September 24-25. Logs to SSA, Stockholm.

SWL C. N. Rafarel (Poole) located two of the QRM stations in the 21 mc band—Radio-telephone tests from St. Pierre & Miquelon, and from Madagascar. Both just above 21000 kc—why?

G3NWT (Sandiacre) vituperates about DX stations who actually *encourage* bad manners by coming back to those who take no notice of their instructions. One such called "CQ G, London area only" for about five minutes—and then went back to a DL1! As we have often said, the rare DX man holds all the cards—he should get out a plan and stick to it ruthlessly, both for his own sake and out of consideration for those who do use their common sense.

G3NWT adds that recent apparitions on *Fifteen* include a genuine spark transmission and a Thing calling itself "Pix Shai" which actually does transmit pictures after a preamble on CW! And then there are the Fruit Jellies from Russia on *Ten*... Ah, well, as he says, it adds to the gaiety (or something). In any case we ourselves had a chuckle at the thought of G3NWT working Fruit Jellies with his Birdcage...

Teleprinter Topics

From the latest issue of G2UK's B.A.R.T.G. *News Sheet* we get it that a radio T/P net is now operating on about 3750 kc from 11.30 a.m. on Saturdays, among the participants being G2UK, G3BST, G3CQE, G3FHL, G3NES and PAØFB; it is proposed to have another session from 3.30 p.m. on Sundays. DL1GP is also operating RTTY and has

been printed by G3KOY.

In the DX context, G3CQE has worked ZK1BS (14104 kc)—yes! —on RTTY. ZL3HJ and W6CG can be found on about the same frequency. W6TPJ is a strong T/P signal on 15 metres, and MP4BBL will be a new radio teleprinter station, expected on shortly.

Contests

Scandinavian Activity Contest: CW, September 17 (1500) to September 18 (1800). Phone, September 24 (1500) to September 25 (1800).

VK/ZL Contest: Phone, October 1 (1000) to October 2 (1000). CW, October 8 (1000) to October 9 (1000).

"CQ" *WW DX Contest:* Phone, October 29 (0200) to October 31 (0200).

CW, November 26 (0200) to November 28 (0200). See rules in full herewith.

"CQ" DX Contest

We are publishing the rules in full for this Contest to encourage better U.K. support for an event which is organised in such a way that entries are classified right down to single-operator one-band stations, by countries and continents. This means that efficient DX operators with quite modest equipment, working CW only, can make a good showing if they take the Contest seriously—and not only take part for the fun of it, but send in an entry into the bargain.

There is also plenty of scope for the big station, which can be entered in the multi-operator multi-band category, and for Club entries.

Altogether, the *CQ* World-Wide DX Contest is one of the few for which the rules are drawn so as to make it of interest to everybody keen on DX working.

For various items in this month's news we have to acknowledge assistance from the *WGDXC Bulletin*, W4KVX's "DX," the *Western Radio Amateur*, the *FEARL (M) News*, and the Polar Bears Radio Club's "DX'er." And, of course, our own faithful correspondents who will, we hope, continue to send in all their news

and views for a long time to come. For next month's issue will they please note the deadline — **first post on Friday, September 16.** Address everything, as always, to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street,

London, S.W.1, to *reach that address by that date.* We mention this because obviously some of our correspondents think that if they post on the Friday they will be "in." They will far more likely be too late! So post your

stuff on the Thursday, please— and first post at that, if you live a long way from London. And overseas writers must do the best they can, as always. With this we sign off once more, wishing you Good Hunting, 73 and — BCNU.

QRP FROM MONACO

HOLIDAY WITH 10 WATTS AND
7 HORSEPOWER

G. R. Haynes (G3CWL/3A2DA)

Apart from the radio aspect, this account of a trip abroad in a 25-year-old baby car will interest many readers. Indeed, the heroine of the 3A2DA affair was his 1935 Austin Seven for, as G3CWL shows, holiday operation from Monaco is quite easily arranged by anyone holding a U.K. AT station licence.—Editor.

WHEN holidays abroad were considered for this year it was thought that it might be worth while getting permission to operate from Monaco. (Not a particularly novel idea, certainly, as others have blazed the trail over the past few years.) The writer's wife did not share his enthusiasm for the venture but, nevertheless, she agreed to suffer in silence, so plans were formulated. The initial licensing arrangements with the authorities in Monaco were completed by post and the call-sign 3A2DA provisionally allocated. Matters were complicated by the fact that an extensive tour of Europe was envisaged and the ancient 1935 Austin Ruby Saloon—yes! —was to carry two occupants with all their luggage and the radio gear *via* France, Germany, Austria, Italy and Yugoslavia before arrival in Monaco.

Letters to these various countries seeking permits to take the radio equipment across their territories brought favourable replies from France and Germany. The Austrian and Yugoslav authorities stated that the equipment should be declared at their frontiers; from Italy, the reply is still awaited! In the event no difficulty was experienced anywhere.

Consideration was given as to the type of gear to take and it was decided right from the start that this would have to be lightweight, inexpensive and that no tears would be shed if it were lost, stolen or confiscated *en route.* In order to keep everything as simple as possible, it

was decided to work on one band only, and 14 mc was chosen as giving the most likely chances for success.

Equipment Used

The receiver proved somewhat of a problem, as it was not thought wise to take the main station receiver, so the choice was either to build a special Rx or procure some surplus item for modification. An ARC5/R26 was eventually selected and the coils rewound for 14 mc. Other modifications were also made, the outcome being a very useful one-band receiver. The selectivity was not all that it might have been but sensitivity and stability proved to be very good.

A special transmitter had to be built and it was here that the boat was, literally, nearly missed. Construction was started at least ten weeks before the departure date but unfortunately the work got mixed up with an overhaul of the car which the writer was undertaking, in parallel, so to speak. This took somewhat longer than expected, with the result that the transmitter was not completed until the early hours of the day of departure! In fact it almost looked at one time as though the radio side of the holiday would have to be abandoned altogether.

There was no time left in which to air-test the transmitter and it was with hope only that G3CWL and his wife set off in the heavily laden Austin Seven.



3A2DA (G3CWL of Leatherhead) was on the air during June 18-22, with 10 watts to a 5763 and an ARC5/R26, modified for one-band operation on 20 metres, as receiver. With a dipole on the roof of the hotel, some 50 contacts were made in a total operating time of about 15 hours. The gear, specially contrived for the trip, was part of the luggage in a vintage Austin Seven.

(Incidentally, the car hadn't been properly road tested before departure either—but that's another story.) All the radio equipment including spares and test gear were packed in a box measuring 18in. x 14in. x 7in., except the power supply for the transmitter.

The journey south was blessed with good weather and all went well across Northern France, through the Black Forest, up the Alberg and Brenner Passes and so to Yugoslavia, the farthest point east. In spite of this lengthy, and for her magnificent journey of some 1,680 miles, the old Ruby Saloon rumbled proudly into Monaco exactly on schedule during the afternoon of Friday, June 17.

No time was to be lost, so the writer was soon off to keep an appointment with M. Passeron, of the Bureau des Finances, who is the local licensing authority. A most cordial meeting took place, at the end of which M. Passeron stated that the actual licence could be picked up at his office the following morning.

Establishing 3A2DA

It had been arranged previously that operations would take place from the Hotel Le Siecle, and a room on the fourth floor had been reserved. The management was most helpful and, after much deliberation, Room 39 was selected. This was not ideal from the strictly radio point of view but it has to be remembered that G3CWL and his wife were on holiday and that the radio activities were to be incidental to the enjoyment of the sunshine and beauties (of all kinds!) of Monaco and the South of France.

Early on Saturday morning the licence was duly collected and the single dipole aerial was erected between two 16-foot poles on the roof of the hotel. The electricity supply was found to read 130 volts and as the transformer of the transmitter power supply had liberal tappings from 100-250 volts this presented no problem. A small auto transformer stepped up the volts for the receiver.

It was soon discovered that the VFO would not function. As a quick check did not reveal the cause of the trouble, in order to save time doing repair work it was thought simpler to go on crystal control. Here a snag presented itself, for it was found that the licence did not allow use of the first 50 kc of the 14 mc band. Four crystals had been brought but unfortunately three of them fell in the prohibited area. One crystal would have given a figure of 14,048 kc so 3A2DA/G3CWL was prompted to get down on his knees and grind a little off the face of the crystal, using the stone floor of the wash room! After this rough treatment it was most surprising that the thing actually perked on a frequency 5 kc higher!

Results

With two crystals now available, it was at 1140 GMT on June 18 that the first contact was made, with I1MIL. Thereafter, 50 QSO's were completed until the station closed down on Wednesday morning, June 22. This may not seem a particularly large number of contacts, but when it is realised that each was a full-length QSO with the usual chatter,

and not just exchanges of reports, and that the total operating time was not much more than 15 hours, to the writer the results seemed highly satisfactory for an input of less than 10 watts to a 5763. Furthermore, conditions were very poor most of the time.

Monaco is not ideally situated from a radio point of view owing to the fact that hills rise up steeply north-westwards behind the town, which is any case built on a slope, terrace fashion, bringing buildings close to, and on a higher level than, the hotel; this tended to mask signals in the direction of U.K. There was a great deal of QRM from local electrical apparatus and the noise of cars and lorries climbing up the road outside was terrific.

After leaving Monaco the holiday was continued for a few more days further along the coast, basking in the glorious sunshine and bathing in the warm waters of the Mediterranean. Reluctantly, the South was left behind and in due course an uneventful journey brought the Ruby Saloon, its occupants and its contents safely back to Leatherhead, to complete a remarkable holiday and the old car's sixth successful Continental tour since 1955! Useful lessons have been learnt for the next DX-pedition, needless to say.

Many thanks are due to M. Passeron, in Monaco, to G5MP, who gave a great deal of useful advice during the planning stages, and to M. Mateille of Le Siecle, who had to put up with so much while 3A2DA was in his hotel.

EMERGENCY WORKING IN INDIA

VU2XG (Bombay) reports that during the strike of Indian civil servants, when the Posts and Telegraphs department collapsed, the Amateur Radio Society of India, from Delhi, offered the Government the services of the VU's to help maintain communications. This was accepted, the rule about traffic-handling and passing third party messages was relaxed, and for a week from July 11, the VU's were hard at it. Two channels were kept open between Delhi-Calcutta, Delhi-Bombay, Bombay-Madras, and Bombay-Calcutta, using the 14 mc band; one station in each centre was for reception, and the other for transmission. Duty hours were 0700-1000 and 1700-2300 local time, and between them the VU AT stations concerned kept the urgent traffic moving. Operation was on both CW and phone, but VU2XG says that CW was found to be speedier and more reliable. VU's taking part included VU2AJ, VU2AK, VU2CQ, VU2LL, VU2PI, VU2RX and VU2SL, with the three F.O.C. members in India: VU2JG, VU2MD and VU2XG himself. As he says, there were many more of the 200 or so VU's involved in the operation who are not listed here; they came on as the situation developed and opened further traffic channels. It is to be hoped that the A.R.S.I. had the official thanks of the Government of India for the help that the VU's were able to give.

*Short Wave Magazine covers the
whole field of Amateur Radio*

SWL • • • • •

ABOUT THE HRO — AERIAL TUNING UNITS AND THE FEEDER CONNECTION—READERS' NEWS AND VIEWS — UP THE LADDER

WHEN your contributor was a good deal younger, there was a time when the mystic letters "HRO" meant the absolute ultimate in short-wave reception. This fabulous receiver was so far ahead of anything else in its day that it really was the Rolls-Royce of radio to which every SWL aspired, although few acquired!

Its price, when it was first introduced, was considerably more than one's entire station (transmitting and receiving) had cost. But there it was—just "The HRO," and the initials carried a kind of mystical significance. Whenever someone heard a really record-breaking piece of DX, the usual ribald query was "What on earth's he got—an HRO?"

And now these same old HRO's are available, as a glance at the Small Ads. any month will show, at around £20, at which price they are a very good buy. Many conversions have been dreamed up and described in the columns of SHORT WAVE MAGAZINE; but it is not to be sneezed at if you can locate an HRO that is in good condition and use it just as it was originally designed.

The chief feature which distinguished the old HRO from all other receivers was its unique dial and the tremendous bandspread which it gave. Rotatable through 500 divisions and representing about ten feet of scale length, it gave (with the bandspread coils) a spread of roughly 1 kc per division on the amateur bands.

The 14 mc band, for instance (400 kc wide in those days) spread from 50 to 450 divisions on the dial; and the 3.5 and 7 mc bands gave the same order of control. Nowadays this excellent bandspread has come into its own again with the advent of SSB, where it makes all the difference between easy tuning and touchiness.

In case anyone is reading this who has never seen an HRO, we should explain that the coils are mounted in packs of four, side by side, which slide into position as a single unit. From left to right they are 1st RF, 2nd RF, mixer and oscillator coils,

and the valves performing these functions are mounted directly behind the four-gang condenser which tunes them. Thus you have the desirable shortness of leads both in the tuned circuits themselves and between these tuned circuits and the stages concerned. The gearbox driving the four-gang condenser (which, of course, is mounted at right-angles to the actual dial spindle) is in the centre, with two sections of the condenser on either side of it. Band-change by switching is eliminated by the use of the plug-in coil pack.

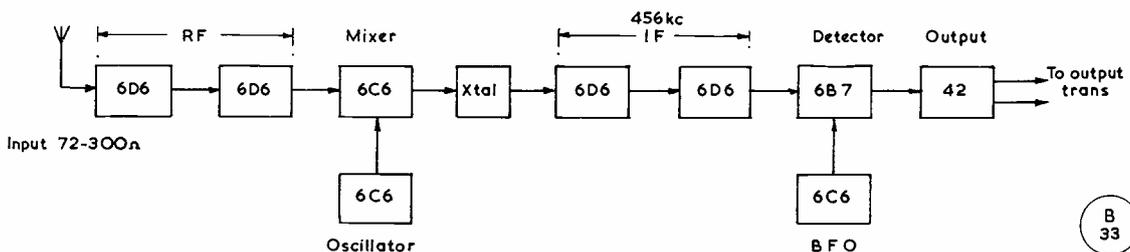
This eminently sensible layout doubtless had much to do with the HRO's superior performance when it was first introduced, and, so far as we know, has never been emulated by any other manufacturer.

The Block Diagram

Fig. 1 shows the schematic layout and the original types of valves. Looking down into the receiver from the front, the aerial entry is at the left, and we then proceed through the two RF stages, mixer and oscillator, until we have reached the right-hand end of the front panel, where the crystal filter is mounted. After this we retrace our steps along the back through the two IF's, BFO, detector and output stages, finishing up again practically on the aerial terminals. The receiver is of compact size and very light, thanks to the fact that the power-pack is completely separate.

On the front panel is a phone jack operating from the detector-cum-first-audio stage and cutting the output stage out of circuit; also an S-meter with switch, and the other usual controls, including, on the right, an HT switch (which is always switched off when changing coil packs).

Coils are available for the following ranges: 14.0-30.0 mc, 7.0-14.4 mc, 3.5-7.3 mc, 1.7-4.0 mc, 900-2050 kc, 480-960 kc, 180-430 kc, 100-200 kc and 50-100 kc. The four first mentioned are also available as *bandspread* coils; by changing over one screw in each of the four sections of the coil-pack, the arrangement of padding and series condensers inside the pack is altered so that the ranges of these four coils become, respectively, 28.0-30.0 mc, 14.0-14.4 mc, 7.0-7.3 mc, and 3.5-4.0 mc. When they are used as general-coverage coils, you will note that each one of them covers *two* amateur bands, one occupying roughly the upper 50 divisions of the dial and the other the 50 lower divisions; whereas in the



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Fig. 1. Block diagram of the HRO Receiver, applicable to the pre-war models HRO, HRO-M and also the types suffixed MX, M/RR, M/TM, SR and JR. Certain later models use octal valves (6K7, 6J7, 6Q7 and 6V6), but the general schematic layout is unchanged.

bandsread condition the amateur band concerned occupies the middle 400 divisions of the 500-division dial. Truly a triumph of ingenuity, when you reflect that the date of the HRO's first appearance was around 1936.

The Controls

The RF gain control adjusts the bias on the second RF and both IF stages; the audio gain controls the signal input to the pentode section of the 6B7, thus controlling volume level both at the phone jack and at the loud-speaker terminals, which are at the rear.

The Phasing Control and Crystal Switch is used to balance the crystal gate circuit, to eliminate an unwanted signal, and also, when set to zero, to disconnect the crystal filter altogether; above it, the Selectivity control varies the IF coupling and gives a wide range of selectivity, with the minimum-selectivity position (maximum receiver noise) in the middle.

The IF is 456 kc, and with a signal generator the alignment is simple, although the frequency of the crystal should be carefully checked in case the crystal has been changed at some time.

Trimmers for the RF stages, mixer and oscillator are located on each coil unit, and are reached through holes in the chassis immediately behind the front panel. A long, slender screwdriver is needed to get down between the front panel and the variable condensers. The bandsread coils have two trimmers to each section.

Additions

Some readers fight shy of the extensive modifications carried out on old HRO's by the experts (usually involving entire re-valving and therefore complete re-alignment). But there is another way of revitalising some of these veterans—by adding a Q-Fiver and/or a Q-Multiplier. One failing of the original HRO is sometimes that the BFO is not terribly stable. This matters little for normal purposes, but can be a trial when SSB is being copied. In such cases the built-in BFO in the Q-Fiver is used instead of the internal one, and all is well.

A Q-Multiplier is very easily added (it is connected across the primary of the first IF transformer) and much improves the performance of the receiver from the selectivity point of view; naturally, there is little point in using the crystal when a good Q-Multiplier is available as an add-on unit.

The pre-war HRO is readily identified by the 6D6, 6C6, 6B7 valve line-up. During the war

a modified and somewhat "utility" version was produced, using metal valves with octal bases; RF and IF stages had 6K7's, oscillator and BFO 6J7's, second detector 6Q7. This receiver was comparable in most ways with the original model, although rather more flimsy in construction. Its chief disadvantage was *drift*—which could appear enormous when the bandsread coils were used. One such model that we owned for some years would "creep" 25 or 30 dial divisions on warming up, and was not really stable until after some hours. Nevertheless, apart from this failing, it was an excellent receiver.

Any of these old models can be converted into something more in keeping with modern ideas by a complete re-valving (using miniatures and a sub-chassis to mount them on); but the subsequent re-alignment needs an expert and a good signal generator, and is not to be undertaken lightly by the kitchen-table fraternity.

It seems that there will be a plentiful supply of old HRO's for many years to come, but the price seems to have stabilised at about £20. At this, we should say that they are still a good buy; and they are, perhaps, the most universally useful of communications receivers—if you are lucky enough to acquire a full set of coils.

AERIALS, FEEDERS and ATU's

There seems to be an insatiable demand for information on this subject, so we make no apology whatever for harping on it again (why *harping*? Memo—we must find out!)

This time we start with the ATU, which is merely a convenient housing for coils of various sizes, tuned by condensers either in series or in parallel with



John Farrar, Delamar, St: Hilary, Goldsithney, Penzance, Cornwall, started SWL operations on the amateur bands about a year ago; he now has a Hallicrafters S19R and Minimitter MR-44 as receivers, and has logged some 120 countries; aerials are dipoles for 21 mc and a 67-ft. wire; tape recordings are made of some of the more interesting transmissions.

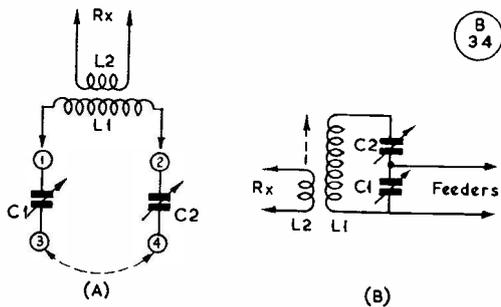


Fig. 2 (A) Basic arrangement for a simple universal ATU, for series or parallel tuning of a feeder line—see text. At (B) is another arrangement explained in the article, where one plate of C2 is bent to make a short-circuit in the maximum position.

them, the purpose being to match the aerial to your receiver (or transmitter). If the bottom end of your feeders (or aerial) looks like a lowish impedance, then series tuning will be essential; if high, parallel. It's as simple as that. But what so many fail to realise is the equally simple fact that the same aerial and the same feeders will give a low impedance on some frequencies and a high impedance on others.

The tuner shown in Fig. 2 consists simply of a plug-in coil (you can make plenty of these in the course of one evening's spare time) and two condensers, which should really be of about $350 \mu\mu\text{F}$ if you intend to cover all bands. In the form shown in Fig. 2 (A) you can change from series to parallel with the greatest of ease. For parallel working you connect a "jumper" across points 3 and 4, and connect your feeders across points 1 and 2. For series operation, omit the jumper and connect your feeders to points 3 and 4. If your feeders are symmetrical, then whichever mode you use, the link L2 should be mounted at the *centre* of the coil L1.

Fig. 2 (B) shows a more popular arrangement, in which the condensers are permanently connected together, and the feeders across one of them (C1). The other, C2, should have the corner of one of its outer plates slightly bent so that at full capacity it shorts itself.

It is now obvious that if you do just that—short-out C2—the other condenser is in parallel with the coil. On the other hand, if you set C1 at its minimum capacity and do all your tuning on C2, you are operating in the series mode. *But*—since you do not now have symmetry, as you would have had with the arrangement in Fig. 2 (A), with *two* series condensers, the centre of the system will not coincide with the centre of the coil L1. Thus, the link should be movable, or should be mounted in the correct place for each coil and each band.

Obviously, the damping effect of the feeders upon the coil will be greater at what appears, in the diagram, to be the bottom end; that feeder goes directly to the coil, whereas the other goes through a series condenser, the capacity of which, at resonance, may happen to be quite small. The link

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continued

coil, L2, will in that case need to be quite near the "bottom" end of the coil also. Don't treat this as a trivial matter—it makes quite a lot of difference to the balance of the system and the sharpness of tuning obtainable.

Standard Arrangements

For your guidance over the matter of aerial and feeder lengths, here are a few examples. Take a 67-ft. aerial, end-fed (Zepp fashion) with 33 feet of 600-ohm line. On *Forty* the home end of the feeders will present a low impedance, being a quarter-wave from the point of contact with the aerial. Likewise on *Fifteen*, when the length is three quarter-waves. On both these bands you will find series tuning necessary, or at least preferable. On *Twenty* and *Ten* the impedance will be high, and parallel tuning will be used.

On the other hand, take the same aerial, and the same length of feeder connected at the *centre* of the aerial. Now, as you can easily work out for yourself, the impedance will be *high* on *Forty* and *Fifteen*; and also high, as before, on *Twenty* and *Ten*. You will be able to use parallel tuning for all four bands. This seems an anomaly, but just sketch out an aerial and draw the voltage/current curves for the various bands, and you will see the reason why. (As a clue, the change on *Forty* is due to the fact that you are feeding the centre of a dipole with high-impedance feeder a quarter-wave long; whereas on *Twenty* you are at the centre of a full-wave aerial with a feeder half-wave long.)

In many ways it is preferable to use a feeder of some odd length, such as 45 to 50 feet. You will then never strike the awkward high-impedance condition in which the feeder is truly voltage-fed; that set of circumstances sometimes makes it quite difficult to get a true balance. Certainly for transmission purposes it isn't nice to have a voltage-feed point inside the shack, and the same must apply to reception, in reverse.

The ATU arrangement of Fig. 2 (B) can also be used for truly end-fed aeriels—meaning those which have no tuned feeders at all, but come right down to the receiver point. In such cases, connect the aerial to the "bottom end" (the point where C1 joins the coil) and connect an earth or counterpoise to the common point of the two condensers.

In these circumstances, if the aerial is of a total length of a half-wave, or any complete number of half-waves, it will look like a high impedance and

Correspondence from short wave listeners is welcomed for this feature, the next appearance of which is in the Nov. issue. The closing date is Sept. 30 and all mail should be addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

demand parallel tuning. Under these conditions, you will probably find that the earth connection can be omitted altogether. On the other hand, if the total length of wire comes out at any *odd* number of quarter-waves, series tuning will be the order of the day, and the earth connection will be essential.

If you use a longish wire (say 135 ft. or 270 ft.) its end will present quite a high impedance on the band for which it is cut (in this case, either 80 or 160 metres) and possibly the next one down. But after that it will probably be out of resonance for the higher-frequency bands and may even be quite low in impedance, necessitating series tuning. To take a particular case, we have found a 270-ft. aerial presenting some thousands of ohms to the receiver at the LF end of One-Sixty, but on Fifteen or Ten it has looked more like 150 ohms.

As you add more and more dipoles end to end (which is what you do when you put up a long wire) not only does the centre impedance of each dipole cease to be 72 ohms, and rise to a considerably higher figure, but the *end* impedance becomes much lower. In other words, a dipole cut for one band is quite sharply resonant, and may be much better at one end of the band than the other; but an antenna cut for either One-Sixty or Eighty will, by the time you get down to Twenty, be quite flat in its tuning. This does not mean to say that its efficiency will have been ruined—it will simply operate in a different way. It will also have to be much more loosely coupled, to either a transmitter or a receiver, than would a true dipole.

Remember all these simple facts, and use a generous ration of common sense, and you will be able to solve most of the aerial problems that come your way. We assume that all who read this are beyond the stage in which they try to use a 20-metre dipole on Forty, or *vice versa*. In fact—forget dipoles unless you are a one-band-per-aerial man. Long wires may be cut to resonance or deliberately left at an indeterminate length; you can always make them work by correct coupling into the ATU and the receiver.

Detailed practical designs for aerial tuning units were given in the January 1957 ("End-On Aerial Tuner") and August 1958 ("Simple Aerial Tuning

Unit") issues of SHORT WAVE MAGAZINE. Though primarily intended for transmission, they are equally applicable to reception. If you have not got these copies, or cannot borrow them locally, we can supply at 2s. 9d., post free.

For a very complete treatment of the whole complex subject of Aerials, we can recommend the A.R.R.L. *Antenna Book*, which devotes some 300 pages to antennæ of all types, with numerous diagrams and tables—in fact, there is an illustration on practically every page. The price of the latest edition of the A.R.R.L. *Antenna Book* is 19s., post free, obtainable from our Publications Dept.

READERS' NEWS and VIEWS

N. May (Dunster) is one of several readers who comment on the interesting listening made possible by the emergency traffic in and out of the Congo. He comments on the third-party aspect of the matter—but the handling of messages is a matter for the discretion of the various licensing authorities (the USA allow it, of course) and in an emergency the licence conditions often go by the board. He would like to read more about getting on Two Metres and the best surplus equipment to buy for the purpose: the R.1392, R.1132 and BC-624 are the standard items in this category, but they require modification. We must try to cope with this in a future instalment. Meanwhile, G.C.E. being over, SWL May, like many others, is getting seriously down to the RAE syllabus!

Bob Griffiths (Ventnor) puts in the very fine HPX score of 436 (Phone) and asks whether anyone knows of a phone or SSB station in Zone 23. He now has an AR88, also a five-valver covering 160, 40, 20, 15 metres and medium and long waves, a 5-valve converter and a 9-valve ex-RAF set for VHF which is marked ZC-12038; lots of other ancillary gear is also in use, with more on the way. SWL Griffiths finds that his double-Zepp for 15 metres is the best aerial he has ever used on that band.

They start 'em young in Eire. Last month we had *Frank Malone (Dublin)* asking if he was our most junior SWL (age 13). Back comes *Ken O'Brien* (also of Dublin) who is a regular reader at the age of eleven, and hopes to get his transmitting licence very soon!

B. Gaunt (Maidenhead) is very keen on aerials, and doesn't think it possible to write or say too much about them. He's trying to find the ideal for Top Band, without too much space; and also wants more gen. on ATU's, which he will find herewith. At present his wire is 90 feet, end-fed, and he covers mostly 160 and 80 metres with it.

J. W. Lee (Alnwick) asks us to comment on the merits of a multi-band dipole compared with a long wire. It's personal preference, but on the whole we prefer the long wire: especially as J.W.L. is contemplating dipoles at right-angles, which might mean that he even has room for two long wires at right-angles. Two wires of 135 or even 67 feet, running in different directions, and end-fed through an ATU, take some beating—especially when one can use the two in combination.

HPX LADDER

(Starting January 1, 1960)

Qualifying Score — 100

SWL	PREFIXES	SWL	PREFIXES
<i>PHONE ONLY</i>		<i>PHON ONLY</i>	
R. Griffiths (Ventnor)	436	A. Griffiths (Solihull)	171
J. Wooden (Kingston)	403	J. M. Smith (Grimsby)	167
H. G. Shaw (Heswall)	363	D. F. Catherwood (Huyton)	147
C. N. Rafarel (Poole)	340	M. Higgins	
J. E. Kennedy (Widnes)	328	(Sutton Coldfield)	115
G. V. Moss (Greenhithe)	291	C. J. Smith (Huddersfield)	109
C. D. Barr (Harrow Weald)	271	H. F. Bottomley (Halifax)	108
M. T. Bland (Oakham)	240		
M. H. Davies (Norberth)	204	<i>C.W. ONLY</i>	
P. G. Martin (Durham)	181	C. J. Thomas (Cyprus)	235
C. J. Thomas (Cyprus)	180	J. Wooden (Kingston)	185

(Note: Listing includes only those reporting for this issue. To keep on the Ladder, claims should be made for each appearance.)

C. J. Smith (Huddersfield) suggests an article on Coil Construction, which we will certainly consider . . . *R. Lester (Highgate)* wants to know if anyone has an Instruction Book for the S.20R (Hallicrafters "Sky Champion"); he would be very glad to borrow or buy it. (R. Lester, 10 Southwood Avenue, London N.6.)

V. E. Batchelor (Sutton) complains about careless "netting" by amateurs, and several readers remark on the slackness of operation of SSB stations, who cut in and out without giving call-signs and make recognition well-nigh impossible.

J. M. Smith (Grimsby) suggests that aerials are not as important as sometimes supposed; and that when people grumble that they can't hear the DX, it often means that they are on the wrong band at the wrong time (and also, may we add, that they haven't the faintest idea of how to listen for really weak signals!)

C. J. Thomas (BFPO 53, Cyprus) writes to say that he has available two CR150's, an AR88D and an HRO (minus coils at present!) Aerials are a 10-metre ground-plane and a 20-metre dipole. He sends in a welcome score for HPX on CW—they are pretty scarce, and we are beginning to think that CW listening is becoming a lost art amongst SWL's.

E. J. Kelly (Edinburgh) has modified his 358X receiver, using a 6AC7 in the first stage, with separate RF gain control fitted, and a Q-Multiplier (using half of a 12AX7) mounted on a sub-chassis above the RF valve. There is also an S-meter, using half a 12AU7; and the aerial trimmer is now an external 50 μF condenser.

C. N. Rafarel (Poole) is one of the many who kept their ears glued to the exchanges between ON4 and 9Q5 during the emergency. He adds that the neighbouring stations in CR6, VQ2, VQ4 and VQ5 also played a large part in handling the traffic. He would like to see something done about all the teleprinter stations spread around the amateur bands—and wouldn't we all!

M. H. Davies (Norberth) recently heard M1AG and wonders whether he was genuine. No reason why not—he was probably one of the many Italian stations that operate from time to time in the Republic of San Marino. *J. Wooden (Kingston)* has only been an SWL for a year, but has logged 177 countries in that time. He hopes to have his licence by the end of this year (October RAE permitting!)

H. F. Bottomley (Halifax) is one of many who mention the strange call IM1RIS (21 mc phone); this was an Italian operation from Monte Cristo

SWL • • • • •

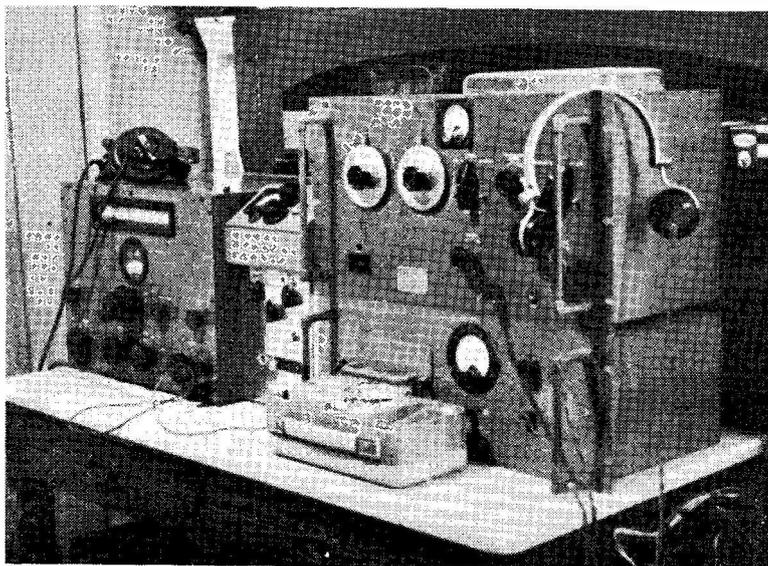
continued

island, but probably will not count for a separate country. H.F.B. uses an R.1475 with an RF-24, and would like to know the IF of that receiver, also details of a modification for Top-Band operation.

R. C. Barnett (Nottingham) will be "going mobile" with a modified 19 Set and a 12-ft. whip installed in a Morris Traveller—incidentally, a vehicle that might have been designed for amateur /M working. He was listening all through August from different parts of the British Isles and was even /P from the Shetlands.

A. Griffiths (Solihull) now runs a CR-100 with S-meter and noise limiter instead of his former R.208; he recently lost two dipoles in a gale, but has put up an 80-ft. wire, fed through an ATU. *J. Barber (Reading)* is one of those who don't like "slick tactics" on SSB, especially as he tunes them in with an unmodified R.1155 B. After hanging on like grim death, it's a poor reward to hear someone sign off with "Cheerio, Frank"!

M. Box (Weymouth) started his SWL career by hearing a local on a crystal-and-transistor set; somewhat belatedly he found that his own uncle was an amateur! So now he's well away, and aiming at next May's RAE. *J. R. Hey (Leeds)* is patiently awaiting the results of the last one, and running a home-built 8-valver. He asks whether we recommend a first IF of 1.6 mc with high-gain, low-noise pentodes . . . we certainly do. Prefixes he queries are as follows (for general information): 9N1, Nepal; 7G1, Guinea; MP4B, Bahrain; OR4, Antarctica (Belgian); WH6, Hawaii (Novice); VE7



SWL R. W. Howe of 162 Victoria Road, Wood Green, London, N.22, has a CR-100 receiver for general short-wave coverage, and also an R.1392 for VHF reception. So far, about 60 countries have been heard, of which 23C are confirmed.

SWL • • • • •

continued

and VE8, Canada (British Columbia and Yukon or N.W.T.); UW, USSR; RAØ, Siberia (Novice).

A. Heath (Swindon) now runs an R.107 with an all-band ATU, and also has RF-24 and RF-25 units, an R.1132 and R.1155. He is 15 years old, and would like to correspond with others of his own age, preferably keen on Top Band and Forty. (Adrian Heath, 17 Montgomery Avenue, Pinehurst, Swindon.)

HPX Ladder

The mystic sign HPX stands for "Heard Prefixes," meaning different prefixes logged on the amateur bands only, each such prefix counting as one. What constitutes a "different prefix" was explained on p.145 of the May 1960 issue of SHORT WAVE MAGAZINE. The starting date is January 1st this year—that is to say, when compiling your score (either Phone or CW, but not a mixture of both) you may only count those heard this year. Prefixes logged on any amateur band may be included, *i.e.* there is no segregation by bands. However, some of the specialists, as well as those who like to set themselves some sort of target, aim to compile a score taking one band only.

To claim your place on the Ladder, all you have to do is to let us know your total, remembering that the minimum figure we accept for Ladder purposes

is 100 prefixes logged. To keep on the Ladder, send in your claim for each appearance.

Conclusion

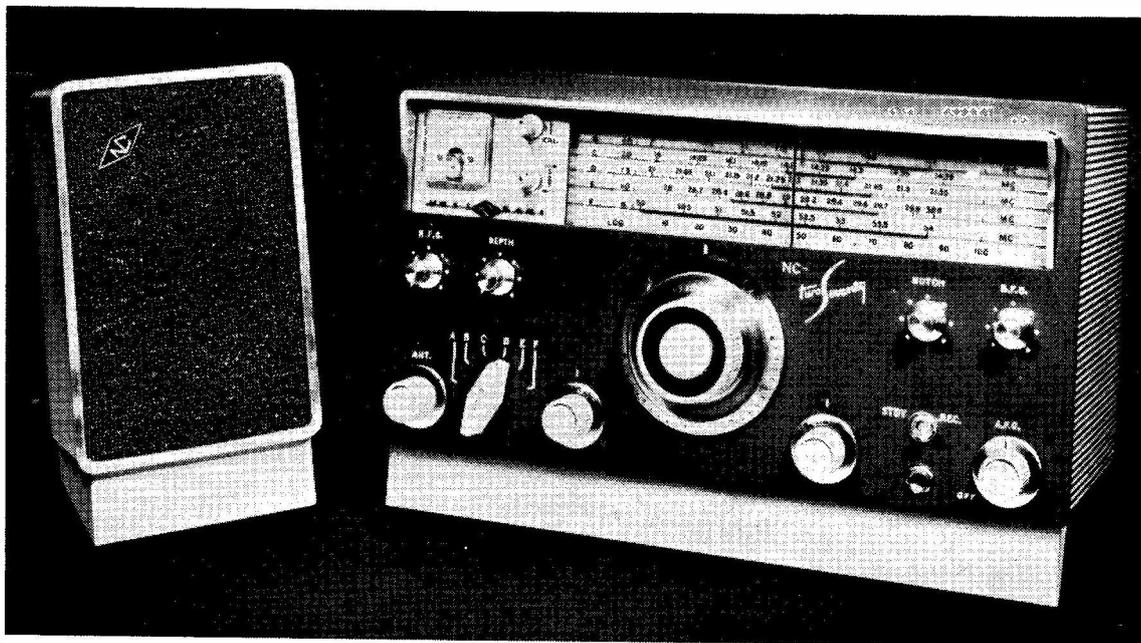
Further additions to the table of SWL Station Details—the last appearance of which was on p.256 of our July issue—will be given in November's "SWL." Listeners interested are asked to let us have the information on a separate slip, set out as it is on p.256, July.

Remember, also, that we are always glad to see good SWL station photographs for possible publication in this feature; "good" means clear, sharp prints; they can be of any size, but please do *not* send negatives. An easy way of checking on the clarity of a print is to see if the call-signs on any QSL cards in view are readable.

For the next "SWL," in SHORT WAVE MAGAZINE due out on November 4, let us have your notes and comments by September 30 latest, addressed "SWL," c/o The Editor, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Till then, 73.

LET US KNOW

Immediately you receive your new call-sign, so that it can be published in the "New QTH" page of SHORT WAVE MAGAZINE. This also ensures appearance in the *Radio Amateur Call Book*, the only world-wide directory. Similarly, amateurs already licensed should notify changes of address to us, so that the *Call Book* can be kept up-to-date.



The new National NC-270 incorporates their famous "velvet vernier" dial assembly for easy SSB tuning, and a high degree of selectivity is given by a ferrite filter combined with a bi-filar T-notch. The frequency coverage is amateur band only, 80m. to 6m., and a 100 kc crystal calibrator is built in. A forward prop tilts the receiver slightly for more convenient operation.

STILL we are waiting for one of those real EDX openings which would bring Northern Europe into the U.K.—though the season is now well advanced, it is not too much to hope for a spell of fine, warm weather during September or early October. It has happened before (though not very often!) and it is certain that unless we do get some such weather development there will be no widespread tropospheric opening. The barograph trace for the last month has been “steady, low” for most of the time, until the week beginning August 15, when it became irregular while remaining generally low.

It is true that there are those who say that far too much attention is paid to the barometer when evaluating VHF conditions—in other words, that conditions are often fair or even reasonably good when the glass suggests otherwise. The fact is, however, that though the well-placed and higher-powered stations can nearly always “get through,” for the generality of VHF operators to be able to work even GDX, good tropospheric conditions are required; this is indicated first by high barometric pressure, then the development of a widespread high-pressure area, with warm days followed by cool evenings—and it is the barometer that gives the clue to all this.

During the period, the BBC issued an “abnormal propagation” warning, on the evening of August 11; as the glass was low at the time and there did not appear to be anything unusual happening on two metres or even on Band II, this might have been sporadic-E, or possibly Aurora, though there have been no reports of either—or could it have been the Perseids? (See later.)

In spite of generally poor conditions as regards what might be called the conventional propagation modes, activity has been good and there are quite a number of very interesting happenings to discuss.

Reflections from Space

We have all read about the Russian cosmic space ship and the safe return of its living cargo

VHF BANDS

A. J. DEVON

**G3BDQ works F9QE by
Passive Reflector—**
**G3CCH/OE6AP make Meteor
Scatter Contact—**
Results during Perseids Shower—
Increasing VHF Activity—

after 17 circuits of the earth—surely one of the most significant developments in the present phase of space exploration—and we have also heard about the recovery by the Americans of the nose capsule of their *Discoverer 14* space vehicle, again after 17 circuits. All these operations were controlled and directed by VHF radio.

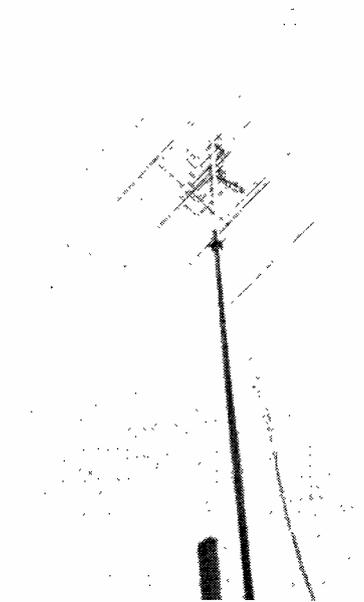
However, what is of even greater interest to AT operators active on VHF was the successful launching by the Americans of their passive reflector *Echo 1*—“the balloon the size of a 10-storey building”—which took place on August 12. Reports of successful results by reflection were immediately being put out from various commercial sources, and it also seems that an amateur VHF contact VK/ZL was obtained; at the moment of writing we have no exact details about this.

What we have got is a very interesting report from G3BDQ, of St. Leonards, Sussex. Hearing on the BBC News on August 12 that *Echo 1* should be visible about 10.20 p.m. that evening in the S-E sky, he headed his beam in that direction, and at 10.0 p.m. started listening on two metres; there were no signals at all to be

heard, but at 10.18 p.m., after a CQ, G3BDQ was called by F9QE, located 70 km south of Paris, at a distance of about 200 miles from G3BDQ. They had a short CW contact, with reports of R5 and QSB S7-3 both ways, holding it for about five minutes till 10.23 or so; until 10.30 p.m. G3BDQ was hearing weak phone carriers, after which the band went dead again.

The significant facts are that though G3BDQ, being well placed for them, has worked many F's in the past, this was the first time he had even heard F9QE; that normal band conditions that evening were poor, with no evidence of any tropospheric effect; and that G3BDQ's beam heading, being S-E, was a good 40° off the direction for F9QE.

G3BDQ runs 70 watts and his beam is a 6/6. The slide-rule boys could prove that this system would be insufficient to get a reflection off such a target at a range of something over 1,000 miles; the path-distance for the



G3MPS of Farnborough, Hants., has a composite array for the VHF bands. Between the sections of two 4-element Yagis at full-wave spacing is a 24-element stack for 435 mc. Both beams are fed by 80-ohm semi-air spaced coax, through λ -wave matching transformers. The array is motor controlled from the operating position and mean height above ground is 35 feet.

signal would actually be about twice this. But when one remembers that, in fact, VHF/AT stations, using even less power and smaller beams, can work Europeans by reflection off the Auroral curtain, entailing path-distances much greater than 2,000 miles, it begins to look much more reasonable.

In view of all this, and the very good time correlation, it seems pretty certain that the G3BDQ/F9QE contact at 2118 GMT on August 12 was by *Echo 1* reflection, and that this is the first such QSO authenticated for the European Continent. In any event, we intend to book it as such!

Meteor Test Results

Still on the theme of reflections from outer space, we have three most interesting reports this time on results during the appearance of the Perseids Meteor Shower, August 11-14.

One of these is from G3CCH (Scunthorpe). For long one of the most efficient and consistent operators on the two-metre band, he works quietly away up there, and for the Perseids had his usual schedule with OE6AP—they have been trying for an MS contact for about 18 months. On August 12 they made it with a solid QSO, which puts G3CCH up to 17C in Countries Worked. He also had a Perseids schedule with OH1NL; they heard one another but could not exchange reports, so it was no-QSO; this result is of particular interest because Finland is one of the few EU countries not yet worked from the U.K. on VHF. And, as if this was not enough in the way of MS/EDX, G3CCH listened on the OK2VCG/G3JHM schedule and heard parts of both call-signs during the half-hour he was able to be QRX on August 14. G3CCH has a 40-element beam, runs full power, and for accurate frequency setting has a 1 mc crystal in a thermostatically-controlled oven, which runs continuously; used with a multivibrator, this gives him markers at exact 10 kc intervals throughout the two-metre band. He is very anxious to hear from European stations interested

in arranging further meteor-scatter tests.

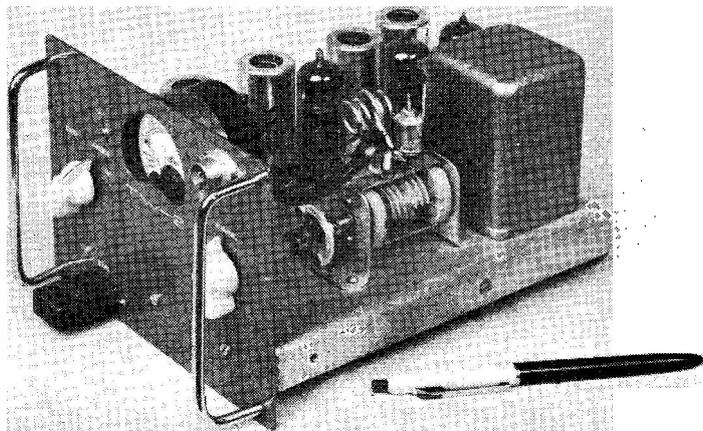
G3JMH (Worthing) kept Perseids schedules with OE3SE, OE6AP, OK2VCG and SM3AKW. Results were, on August 14, reception of a full group "G3JHM de OK2VCG S2" at 2304, lasting 16 secs. at S6-3, and reception in Austria of "OE6AP de G3JHM," but with no report of signal strength. G3JHM said he had some trouble getting the frequency right—he started by being 6 kc LF and, with G3GDR, made OK2VCG's frequency 144.415 mc, instead of 144.412 as arranged. On August 12, G3GDR heard OK2VCG, who runs 400w. with an 11-ele beam. G3JHM asks for MS schedules with EDX stations, including EA, YU, ZBI and ZB2 if they have QRO and can get on the frequency with sufficient accuracy. This is one of the important factors in successful MS working, as communication can only be in bursts of a few seconds; there is no time to search, so that frequencies must be set up to within a kc at both ends.

G3HBW (Bushey), who has pioneered MS working in the U.K. and has already had great success, had a very near miss with OH1NL (Nakkila) on August 11, when,

between 0940 and 1044 GMT, bursts had got call-signs and reports across both ways, all except Arnold's final "R" to complete the contact—bad luck! In subsequent correspondence clewing up these results, OH1NL said that at one moment G3HBW's signal was up to S9; the path distance is 1,075 miles. Again on August 11, during 2100-2359 GMT, Arnold kept a schedule with OK2LG (Valtice) right down on the OE border; a full QSO was made between 2143 and 2314, the distance being 780 miles. Arnold points out that this is particularly interesting because OK2LG runs only 50w. Also on August 11, OK2VCG/SM3AKW made a full contact in 50 mins. from 2100 GMT, distance 940 miles. These QSO's bring the total of EU/MS contacts up to eight since schedules were first started here in Europe. Incidentally, for those who may be interested, G3HBW/OK2VCG keep a check-schedule every Sunday morning, 0500-0700 GMT. OK2VCG calling for the first 5 mins. on 144.414 mc and G3HBW for the next five on 144.458 mc, and so on.

Success in ZBI

We were very glad to hear that



The TW-2 portable/mobile phone transmitter for two metres is a particularly neat job; it runs about 10w. input in the QQV03-10 PA, with push-pull EL84's in the modulator. The speech amplifier gives ample gain from any standard crystal microphone. There is only one tuning control, for PA tank, as the oscillator-multiplier chain has pre-set adjustments for the crystal frequency used; the holder takes the FT-243 type of crystal.

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14 From Fixed QTH Only	
Worked	Station
79	G5YV (787)
76	G3CCH, G6NB
74	EI2W
70	G5MA, G6XM
68	G3BW, G3GHO, G3HBW
67	G3KEQ
66	G3IUD (302), G5BD
64	G3BLP
63	G2FJR (542)
62	G3EHY, G3FAN (760)
61	GM3EGW (232)
60	G2OI (402), G3DMU
59	G4SA
58	G3IOO, G8OU
57	G8SB, G3HAZ (535)
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G5BM, GW5MQ
54	G3JWQ (493), G8VZ
53	G2AJ (519), G2CIW (210), G3LHA (387), G4CI
52	G2NH, G3FZL, G6RH, G6XX, GW2ADZ
51	G5ML
50	G3ABA, G3GSE (518)
48	G3FIH, G6TA (487)
47	G3DKF, G5WP, G6XA
46	G4HT (476), G5BY, G6YU
45	G2AHP (647), G2DVD (362), G2XC, G3BJQ, G3GFD, G5JU, G6GN
44	G3BK, G3DVK (282), G3NBQ (218), G8DA
43	G2CIW (164), G2DDD, G2FCL (322), G3BA, G3COJ, G3DLU*, G3HWJ, G3KHA (262), G3KUH, G3WS, G4RO, G5DF
42	G2HOP, G3BNC, G3DO, G3IER, G3KPT*, G6CI (220)
41	G2CZS (282), G2FQP
40	G3CGQ, G5MR (366), G8KL
39	G2IQ, G3GBO (434), G3LTF, G3VM, G8IL (325)
38	G3APY, G3CKQ, G3HTY, G3KQF, G8VN (190)

"after four years of effort to raise someone," ZBIAJ has had a solid 1½-hour first QSO with

Worked	Station
37	G3AYC, G3FNU, G2FZU (180), G3DLU, G3GSO, G3LAR (435), G3MAX, GC3EBK (260)
36	G2DCI (155), G3CXD, G3DLU*, G3IIT, G6CB (312), G8DR (354), G8IP
35	G3FYY (235), G3HCU (224), G4LX
34	G3AEP, G3MPS, G8IC, GM3DIQ, GW3ATM
33	G3CO (303), G3FUR, G3HHY (125)
32	G3HIL, G3JAM (311), G8QY, G8VR, GC2FZC
31	G3HXO, G3KPT (180), G5RP
30	G2AHY, G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GW8UH
29	G3AGS, G3AKU, G3FIJ (194), G3IOE
28	G3ICO, G3ITF, G4JJ/A, G8DL, GM3BDA, GW3MFY
27	G3CVO (231), G3DAH, G3HWR (276), G3ISA (160), G3LTF/A, G6GR, G8NM, G13GQB, GW3GWA
26	G2BRR, G3CFR (125), G3MED, G3SM (211), G3YH, G4MR (189)
25	G3JHM, G3JMA, G3JXN (220), G5SK, G6PJ
24	G3FD, G3FEX (226), G3FXG, G3FXR
23	G3CWW (260), G3HSD, G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM
21	G2AOL (110), G3BDQ, G3DVQ, G3IWJ, G6XY
20	G3EYV
19	G2HDR, G3GCX, G3OBB, G3OBD, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE, G3MLS
15	G3IWA
14	G2DHV, G3CYY, G3MHD

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

* New QTH

IT1GO, RS-59 both ways; this was on July 3. Conditions were not so good for their subsequent contacts, but the great thing is that ZBIAJ has at last got out of the Island; he says that ZBIE is also active, that they are both on normally at week-ends, but that for the next few weeks he will be "frantically scanning the band every evening 1700-1800 GMT." Frequencies are 144.12 and 145.3 mc.

G3LAR on TTx

With 8 mW out of the PA, G3LAR (Tooting, S.W.17) has been getting good results both from the home QTH and when out /P using an all-transistor CW/phone transmitter; this consists, on the RF side, of an OC170 osc. tripler into an OC171 tripler and a 2N384 doubler driving a 2N384 as PA, the total power consumption being 14 mA at 12v. for the RF output of 8 mW. For phone, the layout consists of a GET106 speech amplifier with another GET106 as unity gain high-impedance input stage driving a pair of GET114's in push-pull as modulator.

G3LAR says that, to get this transmitter working properly, he had to devise and build a lot of new apparatus for measuring and checking at the very low inputs involved.

Four-Metre Activity

Further to last month's comment about the 4-metre band, G3MVF (Worcester) writes that both he and G3NUE are operational on that band, the frequency of both stations being 70.26 mc. Soon, we shall see quite a network building up on four metres.

Some Station Reports

G3JDN (Reigate) re-appears after five years, and now runs 15w. to a QQVO3-20A in the PA, with a 5-ele Yagi at 27 ft., the converter being a G2IQ. SEO type, into an HRO. Though not too well located, with heavy screening to the north, he has worked G6GN to the west, and is on most evenings from 8.00 p.m. onwards.

G3OBD (Poole) has worked F8MX/A, and is now /M with quite satisfactory results. G3NBQ

(Coventry) goes up four in the Counties tables, good QSO's being with G3EHY and GW2HIY, among others. G6GN (Bristol) writes that in under two years on the band he has got into 45C; his transmitter runs 25w. to a QQVO3-20A PA, beam is a slot-fed 6/6 at 45 ft., and the converter is pre-amp. A.2521 into cascode ECC85 with 6J6 osc. mixer and 6J6 IF; he is shortly going QRO with a 4X150A in the PA, and mentions that he has worked G5ZT/M in four counties, as well as from the home QTH. G3OBB (Christchurch), still level-pegging with his "oppo" G3OBD, reports one up for Counties, and G2CIW (Birmingham) also moves in the Tables, though he says that there has not been much doing; however, G3LHA/M and GW3JWQ/P were interesting QSO's.

On the mobile front, G3FRV/M is now out and about, the Tx running 10w. in a QQVO3-10 on 144.79 mc, with an ECC84 cascode CC converter and the IF tuning 9-11 mc, using a halo on the car; the modulator and power supply are transistorised. All this gear is home-built (in three weeks) and G3FRV/M would be very glad to have reports and contacts during his week-end travels—one very interesting QSO was with F9EA/M in Dieppe. G3FVR finds G6OX a strong and consistent signal whenever he is out mobile.

During August, G2DHV/M did more than 1,600 miles through 19C, and lists a number of stations heard and worked, under generally poor conditions. Likewise, G3JMA has been out mobile, into Yorkshire and South Devon, and is another to mention G6OX as "consistent DX" during the latter trip; from S. Devon he worked a good number of London stations, including G3JR using his indoor Quad, as well as G2XV and G3IIT further east, and G3KHA, G6GN and GW3MFY in the northerly direction. The Yorkshire week was not quite so fruitful, except that on August 6, from Garrowby Hill, near York, several London stations were worked and, for GDX, G3KMP in Hastings. The G3JMA/M gear consists of a much-modified Hamobile and a 3-ele Yagi.

Expedition

As regards portable working, G3HWR and G3LAR plan a foray to take in Westmorland, Cumberland, Northumberland and Durham, home *via* Rutland and Huntingdon—all in the rare-county category; this will be during September 5-18, with no set time-table, as they will be touring; the idea is to be on from somewhere most evenings after 7.30 p.m. "till as late as we can manage." Frequencies are given as 145.82 and 145.93 mc—so it will mean tuning really HF.

Many people will have heard or worked G3OGC/P—he got his licence on July 29, and on August 1st was out, with G3NNG and G3HS (all members of the A.E.R.E. Harwell club) at a fine site on White Horse Hill, 860 ft. a.s.l., at Uffington, 9 miles east of Swindon. The first CQ signing G3OGC went out at 1510 GMT, and thereafter they worked 27 stations in a row without having to call CQ again till late in the evening—this was an ordinary (wet) Sunday afternoon, with no contest on! In all, 30 stations were worked till the generator ran dry at 2020, in the middle of a QSO with G3NNK. Best DX was G3IKV/A at Barrow-in-Furness and GW3LJP in Llandrindod Wells. Nice going for the first time out! The G3OGC/P transmitter, to a design by G3NNG, ran 10w. input using series-gate modulation, with a 4-ele Yagi, and a CC converter into an HRO. G3HS/P has also been out to the same site, using the same gear, with equally satisfactory results—in fact, when your A.J.D. was listening to him, on August 14, stations were still being worked in the LF part of the band quite late in the evening.

Activity Generally

An interesting point brought out not only by these /P results, but also in the mail, is that the level of activity is much higher than one might suppose from just listening round at the home QTH. For instance, anent his Devon trip, G3JMA says "... surprised at the activity in Dorset and Hants, where numerous stations

were worked which are never heard at the home QTH in Harlow" G3OGC writes "... as a newcomer, I hope that my /P report will prove encouraging to those who are under the impression that two metres is a rarely-used band" G3NBQ remarks "... somehow, activity on 2m. to me seems very good, and I get tired of those who say there's nobody on half the time; in 8 months of rather intermittent operating I have worked 218 stations" And there are other quotes in the same sense.

This is all quite true, and it is easy to see that when a station is /P from a good location, he brings within his comfortable range a large number of fixed stations who normally can only hear a few locals unless and until there develops what is *for them* a good GDX opening. Of course, there are certain stations which are permanently in what amounts to a good /P location—with the added advantage of using carefully-developed gear under fixed-station conditions. They may be envied, but they are also entitled to credit for making the most of their opportunities.

Annual Counties

We have now come to the end of the year with this Table and, though at the moment of writing we cannot have claims to August 31, please now send in yours to that date, so that final placings for 1959-'60 can appear in the next issue. And the moment the old Table closed at midnight on August 31, the new one for 1960-'61 started, under the same rules. If you can work 14 or more counties by deadline for October, send in a claim to help get the new table going.

Contest Reminder

You may see this in time to be reminded of the I.A.R.U. Region 1 VHF Contest taking place during September 3-4. If conditions give us a break, there will be plenty doing.

Finally, the *deadline*. This is **September 21**, with everything VHF addressed to A. J. Devon, c/o the Office. Till October 7, then, *73 de A.J.D.*

• • • The Mobile Scene • • •

BEAULIEU, STOKE-ON-TRENT AND DERBY RALLIES

BY the end of this month, the Rally season will be over for this year so far as what may be called "open scheduled events" are concerned. There can be no doubt that it has been a most interesting and successful Mobile season, with a huge total attendance at some 16 meetings held all over England in the 6-month period.

The organisation for the big Rallies is getting more and more detailed and sophisticated, and every event has taught its organisers something about what they should do, or not do, "next year." It has surely been proved by this year's experience that for a Rally to be a success it is essential to provide, in addition to the purely radio interest, (a) Good catering facilities, (b) Ample cover in case of wet weather, and (c) Carefully thought out attractions and activities for the feminine element and, particularly, the harmonics.

All this adds up to a big job of organisation when 300-400 cars are expected, bringing in about 1,000 or more people. While visitors never want to be over-organised, they do want to feel that the meeting as a whole is on an organised basis, and that they are free to take part, or not, in the various events, as they wish.

As we now know them in this country, mobile rallies have become important social occasions in the Amateur Radio calendar, and it is certain that this year personal contacts have been made on a scale and under conditions which would not have been thought possible five years ago.

* * * *

Southern Counties Rally

In co-operation with the Bournemouth Amateur Radio Club, the Southampton A.R.C. entered upon the mobile scene with their Rally at Beaulieu, Hants. on July 17. The weather was unpromising, with a very high wind, but by mid-morning the rain had stopped and by 2.30 p.m., when the Rally was officially declared open, some 450 people had arrived and there were about 150 cars in the specially reserved /M park. Attractions on the ground included the famous Vintage Car Museum, well worth a visit at any time, the Abbey itself in its beautiful park, and a manufacturers' exhibition of radio equipment. Additionally, there were launch trips on Beaulieu River, from the quay at Buckler's Hard, to which a Dormobile made regular runs from the Abbey grounds.

On the radio side, a particularly interesting feature of the arrangements was that the talk-in stations, for Top Band and two metres, on a hill about a mile away, were linked back to the Rally site by a two-metre radio teleprinter channel provided by G2FGD and G3HKT—surely the first time RTTY has been used in this practical way in the U.K.

Though no accurate count of the mobiles was made, it was noticeable that there were more two-metre /M's in evidence than has been usual at other Rallies this year. The one planned event that fell rather flat was the mobile treasure hunt due, it is believed, to the large number of counter-attractions.

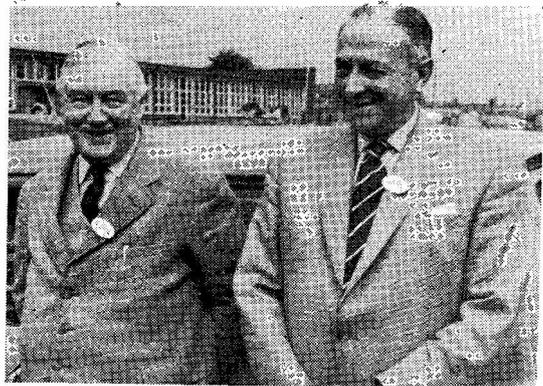
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The Stoke Boat Rally

This was the first event of its kind—a mobile rally involving canal craft fitted for operation on the amateur bands. It was held during the week August 8-13, with Stoke-on-Trent as centre, when the S-o-T Amateur Radio Society co-operated with the local Boat Club for the National Rally of Boats, as part of the City of Stoke-on-Trent jubilee celebration.

The Potteries, so far removed from sea or lake, may seem a strange setting for a boat rally, but throughout the period the tow-path of the Trent and Mersey Canal was packed bow-to-stern with craft, several of which were fitted for /M operation. Of the visiting craft, G3JUW/M from London, with his 70 ft. narrow-boat *Susan*, was a star attraction. G2AMN/M was in a converted cargo boat, *Alice*, and the S-o-T Amateur Radio Society were loaned *Mayfly*; manned by G3COY and signing G3GBU/M, she became the club's patrol station. As the moorings stretched for about a mile, this was a very necessary service. G3GBU/M was able to keep in touch with the exhibition station GB3SOT, and arrange for such facilities as battery-charging, which was much appreciated by visiting crews.

So far as the radio side was concerned, a limiting



At the Derby Mobile Rally on August 14, G2MF (right), with old-timer G2HQ, who has been associated with Amateur Radio for 50 years. G2HQ was the winner of our recent constructional competition, with a home-built receiver and transmitter for SSB, to be described in forthcoming issues.



General view of part of the car park at the Derby Mobile Rally on August 14, at which the total attendance was estimated at over 1,000 people. It was a most successful and enjoyable meeting, in spite of rain later in the afternoon. The attractions included a Judo exhibition by the Derby Judo Club and, as well as the raffles — one of the prizes was a washing-machine, won by ON4GK — there were various events for the juniors, including a one-hour film show.

factor was the shortage of licensed operators locally ; as well as manning GB3SOT and G3GBU/M, many of the visiting crews, not fitted /M, were anxious to have radio aboard, but it was impossible to meet the demand. Another slight difficulty was found to be the low bridges over the canal into Stoke ; this meant that aerials had to be stapled along cabin roofs—there was hardly enough room even for stand-off insulators !

This Rally was a great success, and it is anticipated that at the next there will be many more canal craft fitted for mobile working. Incidentally, the Post Office point out that the correct suffix to use when operating from inland waterways is /M—as for mobile in a car—and *not* /MM or /PM.

* * * *

Derby Mobile Rally

Held on August 14, it is thought that the unsettled weather was responsible for the reduced attendance at this year's event—nevertheless, the number estimated to be present by 5 p.m. was at least 1,000. Up till the time of closing down the talk-in stations, G3ERD/A on 160 metres had worked 41 mobiles, and G3EEO/A on two metres, 17. A check on the car park at 3.15 p.m. gave a count of 215 cars, 65 of which were fitted for mobile operation ; after this, no further record was kept, though mobiles continued to arrive, the last being G3BA/M on two metres, who did not book in till after 5 p.m. The visitors' book was closed at 3.30 p.m. with a total of 461 signatures, of which 163 had callsigns ; among these was ON4GK —who, incidentally, won an electric washing machine in the raffle !

Winner of the mobile competition, which was a "novelty affair," was G6NW/M with *another* washing-machine as prize ! The runner-up was G3NPU/M, all the way from Eastbourne. Rain somewhat disorganised the programme and curtailed the children's outdoor events, but the radio-controlled aviation display was possible late in the afternoon.

A new event which attracted much interest was the Judo demonstration by the Derby Olympus Judo Club.

Business was brisk for the Great Junk Sale, which took the best part of an hour, during which G3FGY, playing to an audience of well over 600, auctioned off a great variety of this-and-that. He was also the chairman of the organising committee for the Rally. The raffle was drawn and prizes presented by Mrs. A. G. Melville, wife of the Club president, after which there was a film show for the juniors while their elders refreshed themselves.

* * * *

The October issue of SHORT WAVE MAGAZINE will



G5CP was at the Derby Mobile Rally, with his Jaguar WWJ-794 fitted for two-metre mobile. He says this halo is the only one he is ever likely to have !

carry reports on the last of the season's Mobile Rallies, one of those yet to come after this appears being the meeting at Lincoln on September 18—see p.313 August issue for details.

CORRECTION—"MULTI-BAND TRANSMITTER DESIGN"

In the circuit and table of values on pp.292-293 of the August issue, C2 should have been shown as having 21 μF neg. coeff. capacity in parallel, R14 given as 15,000 ohms, and a grid resistor of 100,000 ohms shown between pins 8, 9 and earth for the 5763 at V2. G3LNQ also says that C10 is a disc ceramic condenser mounted directly on the 5763 socket between the anode and cathode tags; he uses an anti-parasitic suppressor in the anode of V2, between pin 1 and the junction of C13, RFC4; this APC consists of 4 turns of 18g., self-supporting and wound to $\frac{1}{4}$ in. diameter, with the turns slightly spaced. The coil L5 is also air wound.

THE RADIO AMATEURS' EXAMINATION

Further to those listed on pp.298-299 of the August issue of SHORT WAVE MAGAZINE, following are additional local R.A.E. courses, notified since the August list appeared:

Bristol: At the Bristol Technical College, Ashley Down Road, Bristol, 7, commencing during week beginning September 19; enrolment at the College September 8, 9 or 12, 6.0-8.30 p.m. Full details from R. E. Griffin, G5UH, 13 Alexandra Road, Uplands, Bristol, 3 (Tel: 6-3723).

Bognor Regis: At Bognor Regis Technical Institute, commencing during September, courses in R.A.E. Theory and Morse Code, Wednesday and Friday evenings, 7.0-9.0 p.m. Enrolments at the Institute, September 12-14, 5.30-8.30 p.m. Details from E. J. Pearcey, G2JU, Spindrif, Marine Drive, West Wittering, Sussex.

Bradford: At Bradford Technical College, Dept. of Engineering, Central Hall, Bradford, 5, on Wednesday evenings, 7.0-9.0 p.m. Further information and details of registration from General Office, Bradford Technical College, telephone 25763.

London, Chingford: At the Senior Evening Institute, County High School, Nevin Drive, E.4, on Mondays, 7.30-9.30 p.m., commencing September 26; enrolments at the School evenings September 19-21. Further details from E. Johnson, G2HR, 35a Woodland Road, Chingford, London, E.4.

Derby: At the Derby & District College of Technology, Kedleston Road, Derby, commencing September 26 for three terms, Monday and Friday evenings, 7.0-9.0 p.m. Fees 35s. (under 21, 15s.), registration September 19-21 at the College. This course has been running successfully for some years, and further details can be obtained from: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby T1931.

High Wycombe: At the College of Further Education, starting September 26. Enrolments

September 14-16, 5.0-8.0 p.m. Holding of the course is conditional on sufficient candidates applying.

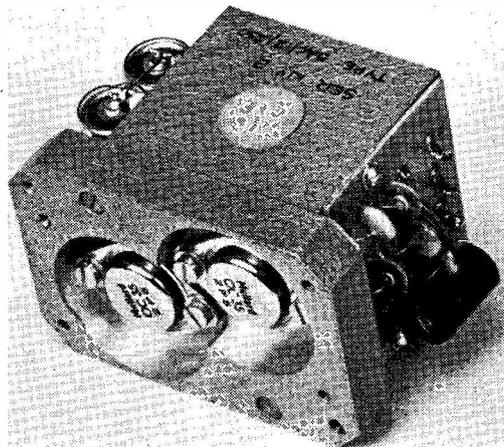
Peterborough: At Peterborough Technical College, in R.A.E. Theory and Morse Code. For details apply J. W. Boswell at the College, or to D. Byrne, G3KPO, Jersey House, Eye, Peterborough.

St. Albans: At the College of Further Education, Evening Dept., Hatfield Road, St. Albans, beginning on September 19 and covering R.A.E. Theory and Morse Code. Enrolment September 12-15, 6.30-9.0 p.m., at the College. Details from C. Davies, 54 Langley Crescent, St. Albans.

Stockport: At the Avondale Evening Institute, Edgeley, Stockport, on Tuesday evenings 7.0-9.0 p.m., fees 21s., 18-21 10s., and under 18 *nil*. Apply G. R. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.

Wirral: At the Birkenhead Technical College, starting September 15. This course has been running for the last three years. Applications for enrolment should be made to the College as soon as possible. Details can be obtained from L. Roberts, G3EGX, 18 Croxteth Avenue, Wallasey.

Readers wanting an R.A.E. course and who have not seen their locality mentioned in the lists already published—here, and on p.298 of the August issue—should apply forthwith to their local Technical College, Evening Institute or Department of Education as to the availability of a course. There the term begins during September.

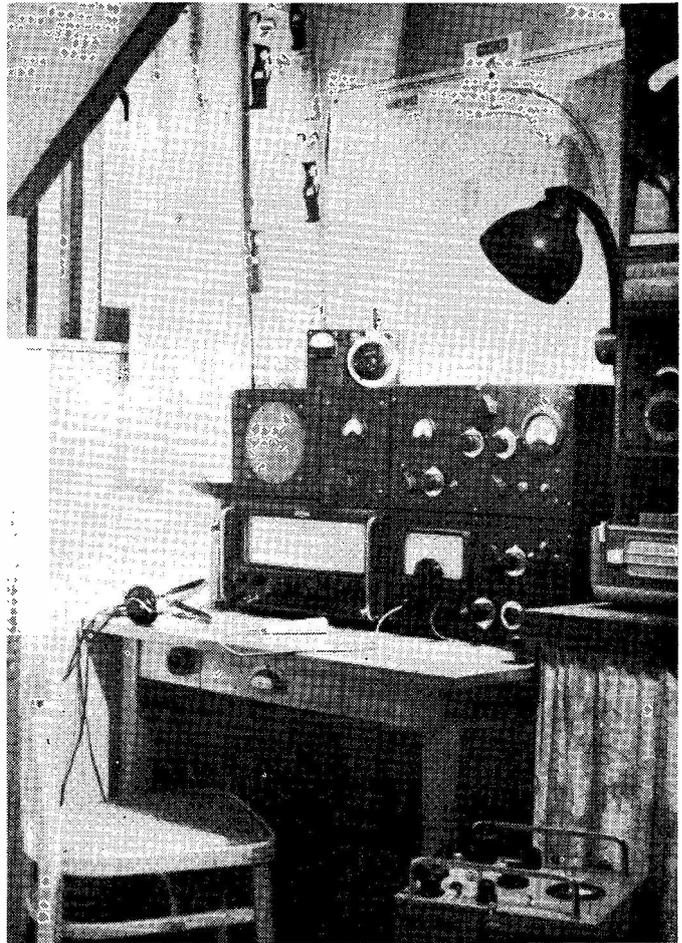


The Aveley 5AC12 DC-DC converter gives 45 watts output at up to 250v. from a 12v. battery. The switching transistors, Mullard OC35's, on the primary side are in the heat sink in the foreground. The HT rectifier panel and output tags are on the right, the LV input being at the other end. In this model the transformer casting is electrically insulated from the heat-sink, the transformer itself being toroidally wound. RF filtering is incorporated, the size overall is only $3\frac{1}{2}$ ins. by $2\frac{1}{2}$ ins., and the weight about 20 ozs.

Short Wave Magazine has a world-wide circulation

**THE
OTHER
MAN'S
STATION**

GM3NZI



AS may be gathered from our photograph, the transmitting equipment at the station of GM3NZI—B. G. Taylor, St. Margarets, Irvine Crescent, Bathgate, West Lothian—is entirely home constructed and is mainly to SHORT WAVE MAGAZINE designs.

The RF assembly, consisting of the "DX-Pilot" Exciter and "DX-Hunter" PA unit—from the *May 1956* and *September 1956* issues respectively—is to the right of the operating table, while the Eddystone S.750 receiver is on the left, surmounted by speakers and an S-meter, with a crystal calibrator unit (*January 1959*). The miniature 807's in the PA are fed at 700v. from an HT power pack under the table and take an input of 140 watts on CW and NBFM, and 100w. on AM phone. These facilities, as well as band-changing to 14, 21 or 28 mc—and also closing down!—are available without having to fiddle with plugs.

Audio from the pre-amplifier within the Exciter itself is applied to the "Midge-Mod" NBFM unit (see SHORT WAVE MAGAZINE, October 1956) in the

VFO, or piped to the AM modulator, standing to the right of the operating position.

Station change-over is by relay from the receiver stand-by control, using an electronic switch—another *Magazine* circuit—which is incorporated in the PA. The latter also gives some useful gain on reception (it is not a cathode-follower arrangement) and, furthermore, allows the transmitter tank to be tuned to frequency without applying power to the PA.

The modulator is the conventional circuit employing a pair of 807's in Class-B zero-bias; it is the latest addition to the station, operating having begun in February of this year on CW. The small item above the main equipment, with the s/m dial, is a valve-voltmeter form of GDO with a coverage extending well into the VHF region; it has internal modulation and its own power supply and, as it can also be used as a station monitor, it has proved a most useful piece of auxiliary equipment.

Aerials at present in use at GM3NZI are a 20-metre dipole and a home-built Cubical Quad, at

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, 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.

E19AH, T. J. Burns, 22 Palmers-town Drive, Palmerstown, Co. Dublin, Eire.

G3NTV, B. E. Gillingwater, 79 Lancaster Road, Great Yarmouth, Norfolk.

G130AU, D. B. McCutcheon, 20 Greenhill Park, Newcastle, Co. Down, N.I.

G30BI, E. K. Hickey, 3 Piers Road, Handsworth, Birmingham, 21.

G30EU, J. F. C. Clue, 54 Hastings Road, Kingsthorpe, Northampton, Northants.

G30FA, D. J. Lee, 6 Fairfax Avenue, Ewell, Surrey.

G30FD, J. Walton (*ex-ZE7JW*), c/o 7 Holmefield Road, Ripon, Yorkshire.

G30FF, P. C. Hunter, 109a London Road, Morden, Surrey.

G30FU, C. D. Hyde, Glendale, Bollinway, Prestbury, Macclesfield, Cheshire.

G30GC, C. W. Parsons, 79 Wel-ford Gardens, Abingdon, Berks.

G30GE, J. Rose, 63 Broomfield Road, Beckenham, Kent.

GM30GJ, A. M. Cameron, 6 Cluny Avenue, Bearsden, nr. Glasgow.

G30GK, G. R. Kennedy, 17 Southbourne, Hayes, Bromley, Kent.

G30GL, F. C. A. Cobbett, 33 Pulborough Road, Southfields, London, S.W.18.

G30GM, J. C. Moore, Wellingore, Dean Wood Road, Jordans, nr. Beaconsfield, Bucks.

G30GO, J. M. Nisbet, 57 Haling Park Road, South Croydon, Surrey. (Tel.: CROYdon 6287.)

G30GQ, G. N. Fare, 26 Kings-way, Penwortham, Preston, Lancs.

G30GZ, M. S. Beer, 13 North Park Avenue, Roundhay, Leeds 8, Yorkshire.

G30HC, G. C. Badger, 24 Wood-Green Road, Winson Green, Birmingham 18.

G30HN, S. Whitehouse, 72 Rose-mary Crescent, Parkes Hall, Woodsetton, Dudley, Worcs.

CHANGE OF ADDRESS

G3BHC, R. T. R. Cocks, Tregod-dick, 14 Donnington Road, The Lidden, Penzance, Cornwall.

G3GDJ, R. B. Wilson, 45 Whit-taker Street, Derby, Derbyshire.

G3GRA, C. J. Spencer, 11 Deers-wood Road, West Green, Crawley, Sussex.

G3HCT, J. Bazley, 19 Maple Road, Brooklands, Manchester, 23.

G3HDL, S. E. Kelly, 159 The Green, Eccleston, nr. Chorley, Lancs.

G3HDW, J. D. Ward, Blue Waves, Worsley Road, Gurnard, Isle of Wight.

G3IFL, J. H. P. Pridmore, 1 Elm Walk, Royston, Herts.

G3IIZ, A. S. Burden, 21 Water-side, Willesborough, Ashford, Kent.

G3IMA, E. F. A. Collins, 35 Second Avenue, Farlington, Portsmouth, Hants.

G3IQF, R. A. Fowler, 6 Grenfell Avenue, Maidenhead, Berks.

G3JFH, T. A. Russell, 10 Dale Walk, Bishops Cleeve, Chelten-ham, Glos.

G3KBK, T. G. Musgrove, 37 Monks Avenue, West Monk-seaton, Whitley Bay, Northumb-erland.

G3KGN, A. C. Edwards, 126 Danescroft Drive, Leigh-on-Sea, Essex.

GM3KMR, T. Heslop, The Cot-tage, Cobbinshaw, West Calder, Midlothian.

G3KNB, K. A. Ballance, 8 Oak Avenue, Walton Heights, Walton-on-the-Hill, Stafford.

G3KUN, J. B. M. Hain, 39 Oak-ington Avenue, Wembley Park, Middlesex.

G3LWS, E. H. Ross (*ex-VP8CZ/ZC4FB*), 8 Pottergate, Rich-mond, Yorkshire.

G3MBK, D. W. Underdown, c/o 57 Briarswood, Hatfield, Herts.

G3MOT, C. J. Lambert, 48 Micawber Avenue, Hillingdon, Middlesex.

G3NJM, J. E. Philp (*ex-DL2GA*), 12 Rawlinson Road, Catterick Camp, Yorkshire.

G3NNH, P. A. Sharp, 32 Coles-bourne Road, Clifton Estate, Nottingham, Notts.

G3NPB, D. W. Blackford, Truro, Belmont, Haydon Bridge, Hex-ham, Northumberland.

G3NTH, D. S. Davison, South Carlton-in-Lindrick, Worksop, Notts.

G3OAZ, J. Akehurst, 30 Hamp-den Avenue, Hampden Park, Eastbourne, Sussex.

G4OK, H. Bailey, No. 1 Flat, 19/21 Church Street, Wath-on-Deerne, nr. Rotherham, York-shire.

AMENDMENT

G3MFQ/A. Delete entry p.324 August issue.

32 ft. mean height, for 10-15 metres; this is to the design in the *Magazine* for October 1957. A 99-ft. wire is also available and is used on the 40-metre band in conjunction with a separate 60-watt transmitter.

All who read this will agree that GM3NZI has started entirely on the right lines. He is but 17 years

of age, and has all his Amateur Radio life before him. He goes up to the University of Edinburgh in October (with rig, with luck!) but says that this will not leave West Lothian a "cold" county, for, under his tuition, six local lads took this year's R.A.E. To them and to GM3NZI himself we wish all success in the future.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for October issue : September 16)

(Address all reports for this feature to "Club Secretary")

TIME has arrived already for the preliminary announcement of the **Fifteenth MCC**—the Magazine Club Contest on Top Band. The rules, which are unchanged from last year's event, will be published in full in next month's issue.

We shall also publish, as last year, a list of serial numbers allotted to Clubs for use during the Contest. This will include all the Clubs who have taken part during the past three years; any who wish to participate in this year's event and find they have not been allotted a number will be able to obtain one by sending in a postcard asking for an allocation.

Meanwhile, sufficient to say that this year's MCC will take place on **November 12, 13, 19 and 20**, between the hours of 1700 and 2000 GMT on each of those days. Fifty-four logs were received last year, with some 60 Clubs participating; we look forward to seeing the record broken yet again this November.

Cornish, being one of those widely-dispersed clubs, relies on a Top-Band net for keeping things together; they run one nearly every evening on 1921 or 1970 kc. They met at Falmouth during August, and decided on the club dinner; G2FQD lectured on Beam Aerials to about 27 members.

Crystal Palace heard a talk on Crystal Oscillators, by G2FKZ, at their August meeting. The September gathering, on Saturday the 10th, will take the form of a lecture-demonstration on Hi-Fi Equipment, by Barry Arundel. **Hastings** had talks on Modern Physiotherapy and Electronic Music (by G3MTX and G6QB respectively) during August. On September 13 and 27 they will be hearing about SSB from G3BDQ, at present the only local exponent. Both 7.30 p.m. at 33 Cambridge Road.

Ilford give advance warning of an outstanding attraction—a talk by Capt. P. P. Eckersley of "2MT Writtle" fame, on Radio from the Beginning. This

will take place in Ilford Town Hall at 3 p.m. on Sunday, October 9. All are welcome—and they should certainly have a record attendance.

Liverpool held their annual exhibition at the Liverpool Show, which was attended by 72,000 people. GB2LS worked all bands and made 400 contacts. Many new members were enrolled, and many enquiries received concerning Clubs in other areas.

Purley, having had a talk on Transistors (G3GKF) at their August meeting, are looking forward to hearing about Radio Control, by Mr. R. Kennedy, on September 16. Then on October 21 they will hold a Junk Sale—both at the Railwaymen's Hall, Whycliffe Road, Purley.

Slade will be hearing about Transistor Applications on September 9; on the 23rd they have a display of



For the first "Boy Scouts of Ireland International Jamboree," which was held at Loc Rinn Castle, Mohill, Co. Leitrim, Eire, from July 25 to August 3, station EI3AE was installed and operated by EI2AH (left) and EI3AE himself. On the air for 26 hours for the week-end only, EI3AE made about 150 contacts. There were 890 scouts in camp from 11 countries; many of them visited the station and heard QSO's with their home countries. Contacts of outstanding interest were with G3ELP/A, also operating a Scout station, in Cumberland, and with old-timer EI4C, who was licensed in 1908 and was one of the first scoutmasters in Ireland; DL4JB/M was also worked, mobile in Southern Germany. The Tx ran 25w. to an 807 with Geloso VFO, the Rx was an S.640, the aerial a 300 ft. wire end-fed, and the bands used were 20-40-80 metres.



When the Silverthorn Radio Club went out on a field day, signing GB3SRC, 197 contacts were made on various bands. In this photograph are, standing, left to right: G3NZO/M, SWL Colman, G3ICY, and SWL Jeavons; front, SWL Awcock, G2HR, and SWL Renault.

members' apparatus, at which a trophy and a cup will be awarded. Meanwhile their Clubroom and their station G3JBN are available for members, and Thursday evening meetings will include informal discussions, Morse classes, and time on the air.

South Birmingham will meet for a lecture (subject not yet known) on September 15; on Sunday, October, 2, they will hold one of their morning Mobile Rallies; and October 20 is the date fixed for the AGM.

Spenn Valley re-open on September 14 with a talk on Modern Methods of Communication; and on the 28th they will be having an Evening of Music (arranged by Fane Acoustics, Ltd.). For the next 12 months their meetings will be held at The Labour Rooms, Railway Street, Cleckheaton.

Wolverhampton will be meeting on September 5 and 12 (no subjects announced) and will hold their AGM on the 19th. This will be at the Clubroom, Neachells Cottage, Stockwell End, Tettenhall.

Worthing are having their AGM on September 12 at the Adult Education Centre, Union Place; after the formalities, they will be discussing the programme for the coming season. Visitors always welcome, and prospective members especially so.

The **Silverthorn Radio Club**, which covers the E.4 district of London, held their own field-day recently, when the station signed GB3SRC; one of the active

members here is old-timer G2HR. **Wellingborough** closed for the "summer recess," but re-commence operations on September 8; the committee has prepared a lecture/demonstration programme for every other Thursday until April, and it is also anticipated that the Club station G3KSX will be on the air on the three LF bands.

Acton, Brentford & Chiswick, meeting on September 20, will hold a discussion on Aerials for Portable Working, which G3JEA will open. This will take place at 66 High Road, Chiswick, W.4. **Cheltenham** still meet every Wednesday, although attendances have dropped somewhat during the holidays; one of their SWL's passed his RAE and is awaiting the Morse test. Their AGM will be held in October.

Halifax had a talk on Receiver Alignment in August; September 20 is "Activity Night"; October 4 Open Night. **Harrow** will hold a Junk Sale on September 9, and on the 23rd G3HBN will describe his mobile transmitter. Meetings every Friday, with alternate Fridays as Practical Nights. Members, including mobiles, hold a net on Fridays at 7.30 p.m., half an hour before the meeting.

Nottingham are running a properly organised course of R.A.E. lectures under G3LXL, throughout the coming winter. Meanwhile, on September 13 they will be hearing about Cabinet Construction; the 22nd is the opening of the R.A.E. class; on the 27th, a talk on a 60-watt all-band Transmitter (G3APY); and on the 29th another R.A.E. class.

Cambridge University Wireless Society have elected the following officers for the Academic Year 1960-61: Chairman, G3NHB (Clare); Secretary, G3MDR (Emmanuel). They will have a stand at the University Societies' Fair, during the first week of term, at the Corn Exchange. Audio gear, model control and the station G6UW will be on show. Anyone coming up in October is invited to visit the stand or to contact one of the officers in College.

Lymington, a newly-formed Club, operated GB3LY at the local Hobbies Exhibition, and made 111 QSO's in about 28 hours; VR2 and VK8 were worked on 21 mc; KH6 and VK5 on 14. G3JAF, 3LLW, 3ODJ and 3NRH were the operators.

North Kent meet on September 8 for a Film Show (Hunterston Nuclear Generating Station and other

WOOD GREEN SHOW, LONDON, N.22

At this two-day Show and Fete (September 9 and 10), GB3SRA will be operated by Southgate, Finchley & District. At least one station will be on the air throughout Friday night. All bands, Ten to One-Sixty, and a special QSL card for all contacts.

SOUTH NOTTINGHAM

An attempt is being made to form a new Club in Nottingham, south of the Trent. Anyone interested is asked to get in touch with either R. C. Barnett, 76 Firs Road, Edwalton; or W. L. Healey, 28 Chestnut Green, West Bridgford.

subjects) and on the 22nd for a Junk Sale. Their scheme of going through the recent R.A.E. paper produced such interest that it had to cover two meetings. On August 1 they operated GB3ENT from the Erith Show and Sports. Special QSL's will be sent out when the stickers, bearing greetings from Mayor and Corporation, are available.

Reigate report that three members who passed R.A.E. are now hard at their Morse. On September 17, at The Tower, Redhill, G3VK will talk on RAEN; and the trip to Gatwick Airport is fixed for October 8.

Southampton, as well as being co-organisers of the Southern Counties Mobile Rally—see "The Mobile Scene" in this issue—had a stand at the Southampton Show in July. In the large marquee

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.
 ARMY WIRELESS RESERVE: Maj. D. W. J. Haylock, G3ADZ, 3 Norris Gardens, Grange Estate, Havant, Hants.
 B.A.R.T.G.: A. C. Gee, G2UK, East Keal, Romany Road, Oulton Broad, Lowestoft, Suffolk.
 BLACKWOOD: P. M. Fulton, G3MMU, 36 Sunnybank Road, Blackwood, Mon.
 CAMBRIDGE UNIVERSITY: M. H. Hallett, G3MDR, Emmanuel College, Cambridge.
 CHELTENHAM: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham.
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn.
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
 ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
 EXETER: J. Duff, 70 Cranford Avenue, Littleham Cross, Exmouth, Devon.
 HALIFAX: A. Robinson, G3MDW, 7 Upper Brockholes, Ogden, Halifax.
 HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
 HASTINGS: W. E. Thompson, G3MQT, 8 Coventry Road, St. Leonards-on-Sea.
 ILFORD: A. J. Reynolds, G3NNK, 107 Brian Road, Chadwell Heath, Romford.
 LIVERPOOL: H. James, G3MCN, 448 East Prescott Road, Liverpool 14.
 LYMINGTON: W. Johnson, Denton, Hordle Lane, Hordle, Lymington.
 MITCHAM: M. Pharaoh, G3LCH, 1 Madeira Road, Mitcham.
 NORTH KENT: D. W. Wooderson, G3HKX, 75 Mount Road, Bexleyheath.
 NOTTINGHAM: E. C. Weatherall, 16 Avebury Avenue, Clifton, Nottingham.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
 SILVERTHORN: B. Lea, G3ICY, 9 Balgonie Road, Chingford, London, E.4.
 SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
 SOUTHAMPTON: G. J. Meikle, G3NIM, 33/34 Victoria Road, Netley Abbey, Hants.
 SOUTH BIRMINGHAM: J. Bratby, G3GVA (no address given).
 SOUTHGATE: A. G. Edwards, G3MBL, 244 Ballards Lane, London, N.12.
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.
 STOCKPORT: G. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
 SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
 WELLINGBOROUGH: P. E. B. Butler, 88 Wellingborough Road, Rushden, Northants.
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.
 WOLVERHAMPTON: E. Brindley, 1 Pool Hall Road, Castlecroft, Wolverhampton.
 WORTHING: P. J. Robinson, G3KFH/T, 46 Hill View Road, Worthing.

THE FIFTEENTH MCC

Dates are November 12/13 and November 19/20 1700-2000 GMT each day. General form of Contest as last year. Rules and serial-number allocations in next issue. All clubs who have taken part in any of last three years' MCC will be allocated serial numbers; others wishing to participate this year should apply.

they had four transmitters working simultaneously, and put some QSO's over the PA system with excellent results. The prize for the best home-built gear was won by G3NXY, a schoolboy of sixteen.

Southgate meet at Arnos School, Wilmer Way, N.14, on September 8 to hear G3HRH on Aerials. On the following two days they will be operating GB3SRA from the Wood Green Show, Woodside Park, High Road, N.22.

Surrey (Croydon) celebrate 25 years of existence, and their September meeting will take the form of a Sale of Members' Surplus Equipment (they don't have "Junk" in Croydon!). This will be on the 13th at the Blacksmiths' Arms, South Croydon.

Blackwood (Mon.) is growing in strength and has a full programme fixed until October, with the emphasis on R.A.E. and Morse classes. They are drawing up plans to take them forward to next May.

Crawley meet at The Brewery Shades, 8 p.m., on September 22, but the subject is not yet decided. During August they visited the BBC TV station at Crystal Palace, and the S.E. Electricity Control Centre at East Grinstead.

Derby have four September meetings. On the 7th there is a Surplus Sale; on the 14th, Open Evening; 21st, Demonstration by Truvox, Ltd.; and 28th, Talk by G3JXL on a Two-Metre Converter. All at Room No. 4, 119 Green Lane, Derby, at 7.30 p.m. Stockport have kept going through the summer months and have enrolled several new members. They operated GB3NEE at the Northern Electronics Exhibition in Manchester recently, and about 100 amateurs signed the visitors' book. Normal meetings are at the Blossoms Hotel, Buxton Road, Stockport.

The Exeter group now have club-room facilities at the YMCA buildings, and regular meetings have been fixed for the second Thursday of each month; on September 8, G3HTA will give a talk on Multi-Band Beam Aerials. The hon. secretary (see panel for QTH) hopes this notice will reach not only

CLUB PUBLICATIONS

We acknowledge, with thanks, the following Club publications: Army Wireless Reserve Amateur Radio Society (*Broadcast*, Summer 1960); Crystal Palace (*Newsletter* No. 54); Enfield Group (*Lea Valley Reflector*, Vol. 12, Nos. 4 and 5); Hastings (*Natter-Net Notes*, No. 10); Mitcham (*Newsletter*, August); Purley (*Newsletter*, August); South Birmingham (Vol. 1, No. 6); Wirral (*Newsletter*, Vol. 13, Nos. 3 and 4); Wolverhampton (*News Sheet*, August); Croydon (Surrey) (*SRCC Monthly News*, August); British Amateur Radio Teleprinter Group (*News Sheet*, No. 8, August).

potential new members, but also the older supporters of previous club groups in the City. (We can remember an active club in Exeter, with more than a dozen members, as early as 1935.)

Peterborough have made arrangements for their winter meetings to be held at the Technical College on the first Friday of each month. The programme includes: October 7, Modern Transmitters; November 4, SSB Operation; December 2, RTTY; and January 6, Film Show. Courses of instruction for the R.A.E. and Morse Test have also been arranged.

ELECTRONICS INDUSTRY COUNCIL

The formation of an Electronics Industry Council (11, Green Street, London, W.1) is announced by the Electronic Engineering Association, who with the Radio and Electronic Component Manufacturers' Federation and a number of other bodies has been discussing this project for some time. The new Council will be concerned with electronic instruments, sound and television transmitters, radio communication equipment, radar and radio navigational aids, computers, industrial electronic control equipment and industrial television and the electronic components involved—but not with the broadcast radio and television receiving industry nor with apparatus for public telephone services.

The gross output of the industry with which the Council will be concerned is valued at about £200 million annually and is growing quickly. The exports

for this section of the industry, also expanding rapidly, in 1959 were worth approximately £50 million. One of the first tasks of the Council will be to co-ordinate statistics.

PREPARING FOR THE R.A.E.

Those reading privately for the Radio Amateurs' Examination can obtain the syllabus, price 1s., and copies of the question papers for the last three years, price 6d. each year, on application to the City & Guilds of London Institute, Sales Section, 76 Portland Place, London, W.1, specifying "Radio Amateurs' Examination—Subject No. 55." Remittance should be by P.O. payable to City & Guilds. For the price of an s.a.e., the Institute will give a list of references and text books as recommended reading for the Examination; the books themselves can usually be borrowed through the local public library. They can not be supplied by the Institute.

MULLARD GRANT FOR RESEARCH

In connection with the work on low-temperature physics, which involves investigation of the behaviour of materials at near the absolute zero of temperature, an extension is being built to the Clarendon Laboratory of the University of Oxford. The research is being undertaken by Dr. Nicholas Kurti, F.R.S., under the direction of Prof. B. Bleaney, F.R.S., Professor of Experimental Philosophy. Mullard, Ltd., have made a grant of £25,000 towards the cost of the new building, which will be known as the Cryomagnetics Laboratory.

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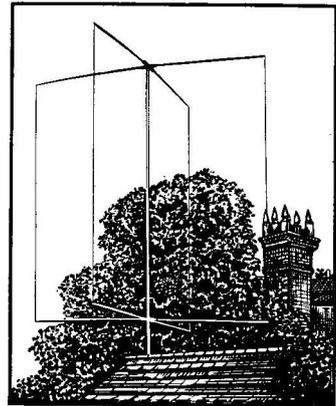
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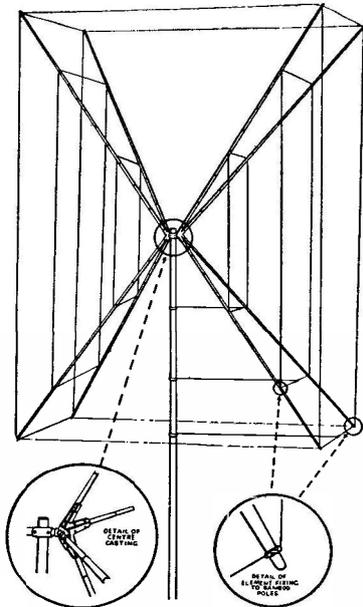
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WANTED: Receivers SX-28 and 5-10 National 1-10, and H.F.S. AR88, D or LF; Bendix 639A; AVO 8, RCA Valve Voltmeter, Hickock 1-177 Valve Tester. All equipment must be in original and first-class condition.—Box No. 2311, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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HEATHKIT DX-40 Tx for sale, as new; relay controlled, complete with manual, £20. — D. Gordon Spencer, 69 Deakin Road, Erdington, Birmingham, 24.

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WANTED: BC-453 Q-Fiver in new or good condition, unmodified. Also a shock-absorber mounting plate for BC-342 Receiver and S-meter for HRO; state prices.—J. Pridmore (G3IFL), 1 Elm Walk, Royston, Herts.

FOR SALE: HRO bandspread coils, power pack, Class-D W/meter, Q5'er, Clipfil speech amplifier, etc.; s.a.e. list.—Lyons, 1 Thorfinn Place, Thurso.

WANTED: Eddystone 750 (no mod's).—Price and particulars, please, to: G3JZN, 100 Radcliffe New Road, Whitefield, Lancs. (All correspondence answered.)

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WANTED: Handbook and circuit for Class-D Wavemeter; state price.—Hayes, 31 Beverley Crescent, Northampton.

SALE: HRO Senior Receiver, table model, 7 coils, coil rack, speaker, and power pack in matching cabinet, v.g.c., £20. R1155N receiver, speaker, power pack and output stage in cabinet, v.g.c., £10. RF24, 10s.; or sell lot £28.—Kellow, Cross, St. Dominic, Cornwall.

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EDDYSTONE 840A, World-wide Reception, amateur, shipping, commercial, 480 kc-30 mc, first over £25 secures! — R. Crisp, Maryfield, St. Annes Road, Canvey Island, Essex.

SSB RIG wanted; prefer American Phasing Type, but others considered.—Details and price to Box No. 2318, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED (working or faulty): Receivers, Type R.1155, R.206, R.107, CR-100, AR88, R.1392, R.1132 or similar; also Command Rx's, RF Units and Oscilloscope.—94 Long Reach Road, Cambridge.

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CR-100/2 RECEIVER in mint condition (not ex-Govt. surplus) with manual, £20. U.S.A. 19 Set (Zenith), brand-new, with variometer, etc., bargain, £4. R.107 Receiver, £5. All items any trial. Buyer collects. — Walker, 38 Ash Close, Petersborough, Northants.

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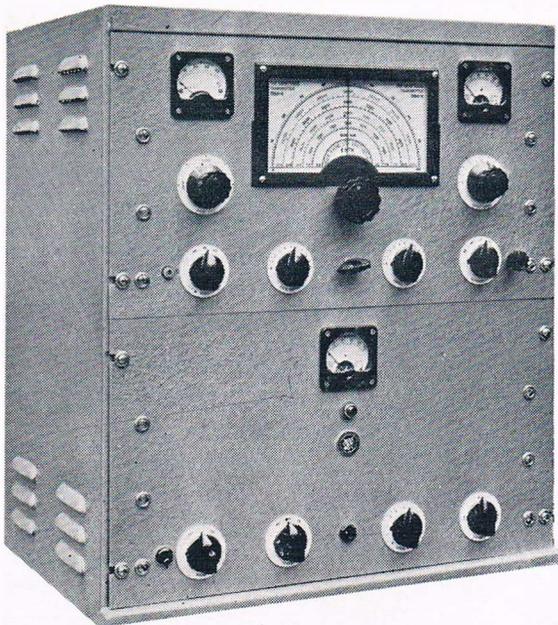
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