

# May 1949

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# R.S.G.B. BULLETIN

OFFICIAL JOURNAL OF THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

Published on or about the 15th of each month.

Issued free to members.

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Honorary Editor: ARTHUR O. MILNE

VOL. XXIV

**MAY 1949** 

No. II

#### **TELEVISION**

A T a recent gathering of the Radio Industries Club, Mr. Gren Holden, a Vice-President of the Sylvania Electric Company of Pennsylvania, described the progress of Television in the United States and quoted facts so startling as to leave some members of his audience gasping for breath! From the low figure of 5,400 receivers in 1946 the industry increased its production last year to 850,000. The target for 1949 is approximately two million. Cathode ray tube production rose to 1,400,000 last year and is expected to exceed two and a quarter million this year.

Three years ago six concerns only were willing to sponsor U.S. Television programmes; to-day, according to Mr. Holden, the number has increased to 600. The present 40 television stations (there were only six in 1946) serve an audience of several millions. By the aid of Stratovision—written up sensationally by the National Press a few weeks ago—eight aircraft flying at suitable heights and properly dispersed could, in the opinion of experts, provide a Television service for the whole of the United States.

A significant fact is that 70 per cent. of all the sets sold in America last year were bought by people in medium-low income groups.

The information given by Mr. Holden helps us to understand why so many U.S. radio amateurs are in trouble with Television viewers. So acute is the problem in some of the larger cities that very little operating takes place during the peak television hours.

How does the British position compare with that of America? The latest G.P.O. press release reveals that at the end of March, 1949, there were 126,500 Television licences in force compared with 120,100 a month earlier. At that rate of increase the quarter million mark may be well in sight by this time next year. It certainly will if the Sutton Coldfield station gets off to a good start and purchase tax on receivers is abolished. By that time Midland amateurs will be faced with the T.V.I. problem, although there is reason to hope that, as the result of the decision to use single side-band transmission, it may not become so acute as in the London area.

In order to help members who are in trouble due to T.V.I. the Society has recently published a new technical booklet entitled *Transmitter Interference*.

This booklet contains much helpful advice on the suppression of interference to Television reception which results from the operation of amateur transmitters. Númerous cures are suggested and the importance of good-will and co-operation stressed. Copies are already finding their way into the hands of manufacturers and retailers, many of whom have written to congratulate the Society on its enterprise. Even more pleasing is the fact that 400 copies were recently purchased by H.M. Stationery Office for the use of the G.P.O. Radio Branch.

Although the booklet gives a good deal of new information the authors believe that many successful cures have been affected by methods other than those recorded. With this thought in mind we invite members who have succeeded in suppressing Television interference by new or novel methods to send details for publication. Only by the fullest and frankest exchange of ideas and information shall we be able to extract a full measure of joy from our hobby.

Mr. R. L. Varney, G5RV, who contributes an important article in this issue, has shown that T.V.I. can be overcome by patience, tact and a sound technical approach to the problem. He has also demonstrated that closing down during television programme hours is not the answer.

J. C.

#### Local News-Letters

The strength of the Amateur Radio movement in Great Britain has always been derived largely from the active co-operation of local members. The efforts of a team can achieve results impossible to the individual: knowledge and experience can be pooled; financial burdens shared. Almost every amateur has specialized knowledge of one or more out-of-the-ordinary subjects that may have some bearing upon Amateur Radio problems and techniques. To tap such fruitful sources of information and to encourage a regional spirit of co-operation have long been amongst the principal aims of R.S.G.B. Town Groups and Affiliated Societies.

Tangible evidence of the success of these efforts regularly reaches Headquarters in the form of local news-letters and magazines. The enthusiasm of the editorial committees is reflected in the roneoed sheets crammed with useful hints, station descriptions, comment on controversial topics and announcements of local interest. While several names immediately spring to mind—M.A.R.S. News-Letter (Midland Amateur Radio Society), The Radio Link (West Cornwall Radio Club), CQ Local (South London), C.I. Society News Sheet (Channel Islands)—there are many others equally deserving mention. The latest addition—and a most flourishing baby it appears to be—is the Region 12 Newsletter which promises to give news "frae a' the airts" north of the border.

J. P. H.

# FURTHER ADVANCES IN T.V.I. SUPPRESSION

# By LOUIS VARNEY, A.M.I.E.E. (G5RV)\*

#### Introduction

AVING achieved considerable success in reducing the effects of T.V.I. on neighbouring television receivers at Chelmsford, which is some 25 miles distant from the Alexandra Palace, (as recorded in the March 1948 issue of the BULLETIN) the writer decided to pursue the problem to its logical conclusion—namely the ability to view a picture of good entertainment quality in the "shack" and alongside a normal 150 watt transmitter habitually used in the pursuit of DX! The more thought that was given to the problem, the more attractive the idea seemed, despite the premonition that no easy solution could be expected.

The idea of possessing constant proof of the "inoffensiveness" of one's own transmitter and of knowing that, except for possible second-channel interference, which is clearly a receiver fault, it is possible to operate throughout television hours with an easy conscience, was thought to be worth the trouble involved, and the loss of DX while rebuilding. It can be stated that nothing discovered during a long series of carefully planned experiments and tests has disproved any of the theories or results published earlier. It was however soon apparent that the degree of harmonic suppression sufficient when the television receiver is located, say, 100 feet away from the offending transmitter, is by no means adequate when the receiver is intended to be used in the same room as the transmitter.

In order to avoid recapitulation, the reader interested in this problem is urged to study the March, 1948 issue of the BULLETIN. This issue contained, in addition to the article referred to above, an important editorial on T.V.I. as well as an article by Mr. P. F. Cundy, A.M.I.E.E., entitled "A 35 Mc/s. High Pass Filter." A number of excellent articles on T.V.I. have also appeared in "QST" and "CQ."

In certain respects, the present writer was engaged on parallel lines of research and experiment contemporarily with amateurs in the States. A case in point is the use of vacuum condenser technique for harmonic reduction in P.A. circuits. A simplified theoretical explanation of its operation is given herein, and in doing so acknowledgment is made to WIDBM who has already published details of the practical use of this arrangement.

#### **Equipment Used**

For the tests to be described, the following equipment was employed:—

 A Pye Model B18T Television receiver. (This receiver is in the low price range.)

 A normal television aerial array consisting of a dipole and reflector fed by twin 80 ohm unscreened feeder together with a suitable balanced high-pass filter.

 An improved version of the Harmonic Monitor described by the author in the June, 1948 issue of the Bulletin.

4. Equipment for "setting-up" the various filter

circuits tested.

5. A V.F.O. controlled fully screened 150 watt

 A V.F.O. controlled fully screened 150 watt 14 Mc/s. transmitter.

\* 184 Galleywood Road, Chelmsford, Essex.

This was the same transmitter as that used in the experiments described in the March, 1948 issue of the BULLETIN, except for the use of a separate 28 Mc/s. FD-PA unit which employed a cpnventional 807 doubler driving a pair of Etmac 35TG valves in push-pull.

Reference to the block schematic, Fig. 1, will enable the reader to recognise the various units referred to

in the text.

The transmitting aerials used were as described in the original article.

In addition a note book was kept in which the results (whether successful or not) of all experiments were carefully entered together with times and dates. It would otherwise have been impossible to remember accurately the results of the many tests which were made during the course of this investigation.

#### **Initial Tests**

In order to determine the type and severity of interference caused to the "monitor" television receiver, a number of transmitting tests were made and the results carefully noted for subsequent analysis. In view of the 3rd harmonic problem it was decided to concentrate on 14 Mc/s. operation. Once a satisfactory method of treatment had been evolved for that band it was thought that similar methods would be equally applicable to transmitters with outputs in other amateur bands. In practice this policy has been found to be quite sound.

Using a standard television aerial array mounted on an 18 ft. pole in the drive-way level with the front of the house and about 40 ft. away from the nearest end of the station centre-fed all-band transmitting aerial, a good picture was obtained with the gain of the receiver nearly at maximum setting. The T.V. aerial was neither in a particularly advantageous position nor even at average domestic installation height. The transmitting aerial was located on the A.P. side of the T.V. aerial. In order further to simulate service area "fringe" conditions, a feeder 100 ft. long—which is considerably longer than usual—was

employed. The first test carried out was to determine how much, if any, interference was caused by the V.F.O. which was mounted on the operating desk within 4 ft. of the T.V. receiver. No interference was detectable on the screen with the V.F.O. feeding 3.5 Mc/s. output via an 80 ohm coaxial cable under the floor to the exciter unit of the main transmitter which was on the other side of the room. The V.F.O. was quite conventional, employing a 6V6 electron-coupled oscillator on 1.7 Mc/s, with aperiodic coupling (R.F. choke and condenser) to a 6L6 3.5 Me/s. doubler. The exciter unit consisted of a 6L6 7 Mc/s. doubler followed by an 807 14 Mc/s. doubler. Both these stages were built according to normal amateur standards and technique and used high L/C ratio tank circuits to provide fairly broad-band characteristics. The 807 doubler was linked via 80 ohm coaxial cable to the grid tuning circuit of a 100 TH 14 Mc/s. P.A. unit above it. The P.A. was properly neutralised and included a 3rd harmonic anode trap circuit correctly adjusted.

Upon switching the exciter unit into circuit trouble began! The synchronisation of the picture was upset and the television screen became brightly illuminated. The receiver was then fitted with a high-pass filter designed to prevent "break-through" or cross-modulation interference. But, the picture was still ruined, indicating the presence of a relatively strong 43 Mc/s. component in the radiated field from the exciter. In an attempt to suppress the 6th harmonic of the 7 Mc/s. driving frequency, a harmonic trap circuit was fitted in the anode lead to the 807 14 Mc/s. doubler. But this proved useless. It was found however, that by detuning the P.A. grid circuit (normal drive 40 mA) the interference was reduced until, when the grid current had fallen to 5 mA, the picture was restored. Slight cross-hatching remained but the synchronisation was not upset and a picture of entertainment value was obtained.

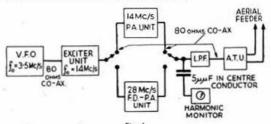
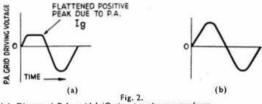


Fig. 1.

Block schematic of transmitter arrangement.

A little quiet reflection at this juncture produced an answer to this problem! Since the grid tank circuit of the P.A. was called upon to deliver substantial power, on positive half cycles only, to the grid of the 100TH, a serious wave distortion was bound to occur, especially where the energy-storage properties of the grid tank circuit were inadequate. The voltage (or current) wave form produced by the grid circuit would look approximately like that shown in Fig. 2a. Such a distorted wave form is a prolific source of harmonic energy.



(a) Distorted P.A. grid L/C circuit voltage waveform.

(b) Undistorted waveform with symmetric circuit loading or loose coupling and good "fly-wheel" action.

To prove this point, the 807 doubler output link coil was then loaded with a 24 watt 12 volt car head lamp bulb and the P.A. grid circuit isolated from the drive; then with the loading adjusted to produce the same input power to the 807, only a faint cross-hatch pattern of interference was observed on an otherwise stable picture. The conclusion was reached that the reduction in interference could be ascribed to the symmetrical loading of the doubler, producing a waveform similar to that of Fig. 2b. So long as the lamp load was not over-coupled a reasonably sinusiodal shape could be expected.

Two conclusions were drawn at this stage :-

(1) It is important for the regulation of the driving source to the P.A. to be very good. This means that the doubler or buffer amplifier stage driving the P.A. must be capable of supplying considerably more power to the P.A. grid circuit than is theoretically required for driving.

This fact is much more important than the alleged advantage of using a buffer amplifier instead of a doubler to produce the relatively high driving power required by a typical triode P.A. The fact that the use of a harmonic trap circuit (tuned to 43 Mc/s.) in

the 14 Mc/s. doubler anode circuit produced no appreciable improvement, whereas removing the asymmetric load resulted in an almost complete cure, tends to confirm this point. Further, the substitution of medium for high L/C ratio circuits in the doubler anode and P.A. grid, with their inherently better regulation, and the use of looser coupling between F.D. and P.A., while retaining a grid current of 30 mA, seemed to prove it conclusively.

(2) The P.A. grid tuned circuit should be arranged to by pass any harmonic frequency components as

effectively as possible.

A striking example of this point was discovered during the tests. The grid circuit of the P.A. was originally arranged for a push-pull circuit using a split-stator condenser with the rotor earthed and the grid coil centre tap left "floating" by means of the 1,000 ohm grid leak. When using a single valve P.A., one end of the grid tuned circuit was simply left "free." Fig. 3 shows the arrangement.

Originally the earth return lead (shown by a heavy line) from the rotor of the condenser consisted of an 18 S.W.G. tinned copper wire run direct to the chassis. Its length was about  $3\frac{1}{2}$ ". On substituting a copper foil strip,  $\frac{5}{2}$ " wide and  $\cdot 01$ " thick, of the same length, such a marked improvement was noted that it was difficult at first to believe that such a simple

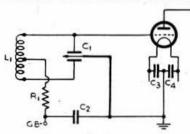


Fig. 3.

P.A. grid circuit showing importance of low inductance earth return for tuning condenser rotor.

change could produce so marked an effect. On repeating the test described above, (i.e. tuning the P.A. grid circuit through resonance while driving it from the 14 Mc/s. F.D. and noting the effect on the picture for various values of P.A. grid current), it was found that the synchronisation of the picture was no longer upset and that even when the grid current was as high as 40 mA only slight interference was produced. Furthermore the harmonic indicator coupled loosely to the P.A. grid coil, with 40 mA of grid current flowing, now produced only 3  $\mu$ A of deflection at 43 Mc/s. whereas, when 18 S.W.G. wire was used for rotor earthing, a reading of 50  $\mu$ A was obtained for the same coupling and P.A. grid current.

#### Cleaning Up the Exciter

Cleaning up the exciter was indeed an object lesson and the experience gained led to a similar campaign being conducted throughout the transmitter with very beneficial results. All de-coupling condensers and tuning condenser rotors which, for mechanical or electrical reasons, could not be bolted direct to the chassis, were connected to it by means of 5" wide copper strip of the shortest length possible in each The anode tank circuits associated with the 7 and 14 Mc/s. doubler stages were reconstructed to use medium L/C ratios and screened by copper boxes completely enclosing them. The 3.5 Mc/s. grid circuit of the 7 Mc/s. doubler was however, for convenience, retained in its original form as a high L/C ratio broad-band pre-tuned circuit. This seemed to be justified since only an extremely small amount of power is required in order to drive a 6L6 7 Mc/s. doubler stage. It is, in fact, probable that the coupling between the 7 and 14 Mc/s. doubler stages could also be of the high L/C ratio broad-band type, especially if well screened.

The L/C circuit values finally used in the successfully suppressed transmitter are given under the appropriate diagrams.

#### Modifications to the P.A.

After cleaning-up the exciter unit it was found that the television picture showed only the faintest trace of interference when drive was applied to the P.A., with up to 20 mA of grid current flowing.

The P.A. grid circuit was then rebuilt as a normal single-ended type and enclosed in a copper screening box. The original 12 turn 12 S.W.G. 2" I.D. air spaced coil was replaced by an 8 turn 14 S.W.G. 1" I.D. close spaced self supporting coil. It was then found that the 150 µµF grid tuning condenser tuned the 14 Mc/s. band at just about half capacity. Thus, the total grid circuit tuning capacity with strays and valve input capacity, may be estimated as approximately 85 µµF. This value has been found to give the desired "fly-wheel" action to maintain a reasonably good wave shape of grid excitation voltage.

The P.A. was then carefully examined. During this process all by-pass condensers and tuning condenser rotors were earthed to the chassis by means of \( \frac{1}{2}'' \) wide copper strip in place of the original wire leads. In addition the leads between the rear terminal strip of the P.A. unit and the anode and grid milliammeters (located on the meter panel above this unit) were screened. Since the anode meter leads have to withstand the D.C. anode voltage plus the peak modulation voltage, standard \( \frac{1}{2}'' \) diameter 80 ohm coaxial cable was employed but any suitable high voltage screened cable may be used, if available.

A further test, with drive applied to the P.A. grid but with the H.T. switched off, showed that up to 35 mA of grid current could now be passed with no visible interference to the picture. Upon applying H.T. a good picture was still obtainable by careful adjustment of the harmonic anode trap circuit.

Success was now near at hand, but the trap adjustment was found to be too critical to be considered reliable.

#### Harmonic Attenuation

In order to show how this problem was tackled it is first necessary to consider briefly the theory of harmonic attenuation. A P.A. valve may be thought of as a relatively high impedance generator of pulsed waves which are inherently rich in harmonic components. The harmonic trap circuit interposed between the valve anode and the P.A. tank circuit acts as a high resistance or impedance to the flow of harmonic energy at the frequency to which it is tuned, and this reduces the harmonic power developed in the tank circuit. The tank circuit may be assumed to present a fairly low impedance path to earth for harmonic energy generated by the valve.

In simple diagrammatic form the equivalent circuit is shown in Fig. 4a. In this the valve is depicted as a generator having a series, or internal, resistance of  $R_g$ . This will be of the order of several thousand ohms.  $Z_t$  is the relatively high impedance offered by

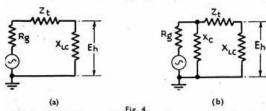


Fig. 4.

(a) Simplified diagram of P.A. harmonic suppression circuits.

(b) Addition of harmonic by-pass condenser, Xc.

the harmonic trap circuit, perhaps some 50,000 ohms.  $X_{LC}$  is the effective reactance offered by the P.A. tank circuit to the harmonic frequency considered, and may be of the order of a few hundred ohms.

Thus it will be seen that the value of the harmonic voltages which may appear across the P.A. tank circuit (and so be coupled into the aerial circuit) will depend upon the harmonic voltage-drop across  $R_g$ , Zt,  $X_{LC}$ . Let  $E_h$  be the harmonic voltage considered; in this case the 3rd harmonic of 14 Mc/s. Since Zt offers by far the highest impedance to the 3rd harmonic, (to which frequency it is tuned), a relatively large harmonic voltage will build up across it.

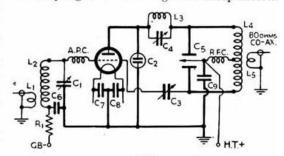


Fig. 5. Final arrangement of P.A. with full harmonic suppression.

L1 2 turn link coil.

8 turns 14 S.W.G. enam. copper, 1" dia., close wound self-supporting.

L2 turns 16 S.W.G. copper, 2" l.D. self-supporting, spaced ½".

L4 12 turns 10 S.W.G. copper, 2½" l.D. self-supporting, spaced ½" centre tapped.

L5 2 turn link coil.

APC 10 turns 18 S.W.G. copper, ½" l.D. self-supporting, spaced dia. of wire.

R.F.C. 2.5 mH. R.F. choke.

L1 000 ohm 20 watt wire wound grid leak.

L50 \(\mu\)F receiving type variable.

C2 50 \(\mu\)F vacuum condenser.

C3 \(\mu\)F vacuum condenser.

C4 \(\mu\) \(\mu\)F wiscum sondenser.

C5 \(\mu\)F split stator, 6 KV. peak working.

C6, 78 \(\mu\)Ol \(\mu\)F mica.

C9 \(\mu\)O2 \(\mu\)F 5,000 V. mica.

Since  $Z_t$  is in fact a sharply tuned resonant circuit of high Q value, it will be very frequency-sensitive—in other words a relatively small change of fundamental (and thus harmonic) frequency will cause its impedance to drop sharply. As a result, if it is not accurately retuned each time the transmitter frequency is moved by more than, say, 50 kc/s., its effectiveness as a harmonic suppressor will be seriously impaired.

Now, if a virtual short circuit to harmonic frequencies could be placed across the generator most of the harmonic voltage appearing across  $Z_t$  and  $X_{LC}$  could be removed. Variations of tuning of the harmonic trap circuit  $(Z_t)$  would then become a second order effect only.

Reference to Fig. 5 will show that a fixed  $50\mu\text{LF}$  vacuum-type condenser\*  $(C_2)$  is connected directly from the P.A. valve anode to chassis. A copper strip connection is used from the valve anode to one end of the vacuum condenser, the lower end of which is held in a phospher bronze spring clip bolted to the underside of the chassis. A  $1\frac{1}{8}$ " hole punched in the chassis allows the lower end cap of the condenser to enter the spring clip while the lower "shoulder" of the end cap sits snugly on the top surface of the chassis.

The reactance of a 50 μμF condenser at a frequency of 43 Mc/s. is about 70 ohms and this, by comparison

<sup>\*</sup> Three types are available on the surplus market, (a) Eimac 20kV type VC50-32, (b) Jennings 20 kV type VC50, (c) Western Electric 5 kV 5 amp type. It is believed that there is a Mullard equivalent.

with  $R_g$ ,  $Z_t$  and  $X_{LC}$  of Fig. 4b is a virtual short circuit.  $X_c$  represents this condenser. Thus the desired condition has been achieved. The valve will not be able to build up large harmonic voltages across such a low reactance and what little voltage is built up is much more easily dealt with by the harmonic trap circuit. In fact, the combination of Xc, Zt and XLC form a very effective harmonic attenuator network. The harmonic voltage, Eh, at 43 Mc/s. appearing across XLC will now be very greatly attenuated, for a given angle of anode current flow, as compared with that which would appear with the arrangement shown in Fig. 4a.

The addition of this 50 µµF condenser will require the P.A. tank condenser to be decreased by a similar amount. The P.A. must also be re-neutralised since the voltage distribution on the tank circuit will be modified. If a second 50 μμF condenser is connected between the opposite end of the P.A. tank circuit and earth, the original neutralising adjustment will hold, but the P.A. anode coil may have to be reduced to regain resonance with C<sub>5</sub>. This arrangement would be implicit in a push-pull P.A. It should be noted that for 28 Mc/s. working the use of such a relatively large tank circuit capacity as  $50~\mu\mu\mathrm{F}$  may be undesirable and in this case the modified circuit arrangement shown in Fig. 6 can be used. arrangement has also been found to be very effective on 14 Mc/s.

#### Testing the Modified Transmitter

After the various modifications had been effected the complete transmitter (with exciter and P.A. modified for harmonic suppression), was switched-on and its effect on the television picture observed. A very great improvement was noted, in fact apart from a slight increase in picture illumination and a barely perceptible degradation of contrast, a perfectly steady picture, of good entertainment value, was

The high-level class B modulator was then brought into circuit and normal speech applied. Very faint traces of the "modulation bar" effect could be seen on peaks but a good picture was retained. It was found that, for best results, the receiver should be adjusted to work at minimum vision sensitivity which would produce a solidly locked picture. Further that the contrast control should only be advanced just sufficient to produce an acceptable picture. Obviously, the stronger the field strength from Alexandra Palace the less critical will be the setting of these controls and the easier it will be to obtain a picture of first class quality.

#### Addition of Low Pass Filter

During these investigations which lasted for more than a year a number of improved type low-pass filters suitable for use in the coaxial 80 ohm feeder

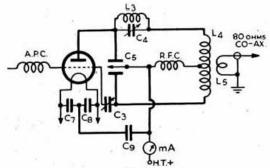


Fig. 6.

Alternative arrangement of P.A. harmonic suppression circuits.

Component values as Fig. 5.

from the transmitter P.A. to the aerial tuning unit, were designed and tested. Such filters can be very effective if carefully constructed, but unfortunately the proper adjustment for maximum performance requires the use of precision laboratory equipment which is not available to the average amateur. However, a simple method of aligning high frequency filters has been devised by the present writer and an article describing the equipment will appear in a future issue of the BULLETIN. In the meantime readers will find a description of a suitable type of aerial feeder low-pass filter in The Amateur Radio Handbook, and in Transmitter Interference a recent R.S.G.B. publication. A similar filter may, with some slight advantage, be included in the 80 ohm coaxial cable from the 14 Mc/s. F.D. to the P.A. grid circuit.

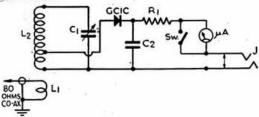


Fig. 7. Improved Harmonic Monitor.

I turn link coil. 10 turns 14 S.W.G., tapped at 3rd turn,  $\frac{1}{2}$ " I.D. length  $1\frac{1}{4}$ ". 100  $\mu\mu\mathrm{F}$  midget air trimmer.

100 µF mica.
10,000 ohms, \(\frac{1}{2}\) watt.
Meter shorting switch (Bulgin toggle).
Headphone jack socket.

0-100 micro-ammeter. Germanium Crystal (B.T.H.).

#### Transmitter Adjustment with Improved Harmonic Monitor

Where it is not possible to view the effect of the various suppressor circuit adjustments on a local T.V. receiver, the harmonic monitor should be permanently coupled, via a convenient length of coaxial cable and a 5 µµF fixed condenser, to the P.A. output link coil. Fig. 7 shows an improved arrangement of the harmonic monitor circuit which is considerably more sensitive than the original design. Experience has shown that when a well screened transmitter is in use the point of minimum deflection on the harmonic monitor meter always coincides with minimum T.V.I.

Table I, indicates the manner in which the effectiveness of the various harmonic suppression devices

may be measured step-by-step.

The reading shown by the harmonic monitor is proportional to  $\omega MI$ , where  $\omega$  is  $2 \times \pi \times f_h$  (the harmonic frequency), M is the mutual inductance between the transmitter output circuit and the harmonic indicator tuned circuit and I is the value of harmonic current flowing in the transmitter output circuit. Thus, for a given transmitter fundamental frequency and a fixed value of coupling (M), the harmonic amplitude may, for all practical purposes, be regarded as proportional to the harmonic monitor meter reading.

The effective harmonic suppression in the P.A. may be observed as shown in the table. It will be noticed that the 2nd harmonic is very considerably attenuated, using the P.A. circuit shown in Fig. 4, although an additional 2nd harmonic trap is not used:

#### Correct Adjustment of Television Receiver

A television receiver is inherently extremely sensitive to interference of a great many kinds which to an ordinary V.H.F. sound receiver would be inconsequential. The sync. separator circuit is especially prone to any minute R.F. voltage which may appear during the synchronising pulse period, since it operates during the "blacker than black" portion of the television transmitter modulation envelope, when the signal value radiated from the television transmitter is at its weakest. It is obvious therefore that the adjustment of a television receiver, under the influence of even an extremely weak interfering signal, will require rather more than normal care.

It must be emphasised that, unless the viewer whose T.V. receiving aerial is located nearer than, say, 100 feet from the transmitting aerial, is willing to co-operate to the extent of some slight re-adjustment of his receiver (which may easily and quickly be re-set to normal when no interference is present) the

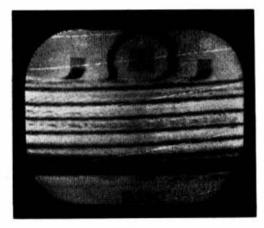


Fig. 8.

Picture ruined by 14 Mc/s, transmitter carrier only. At this stage the transmitter had been "cleaned up." No harmonic suppression devices in use.

problem becomes well-nigh insuperable except of course where the local T.V. field strength is considerably more than adequate for a good clear picture, i.e. up to say 25 miles from the transmitter. At, or near the "service fringe" area the next-door neighbour must be persuaded to co-operate, and, possibly, to accept a picture very slightly below the normal standard for the area in question.

The following method of adjustment is suggested where slight residual interference persists after all possible steps have been taken to suppress the transmitter harmonic concerned:—

- Set the Vision Sensitivity control as low as will give a reasonably good picture and just retain synchronisation.
- 2. Set the Contrast Control as low as possible.
- 3. Adjust the Brilliance Control until the "fly-back" trace does not appear. (This will result in a rather "grey" picture but will tend to mask transmitter modulation peaks.)

#### Practical Results Obtained

With the 14 Mc/s. transmitter completely screened and using all the harmonic suppression devices described in the preceding paragraphs a final check for interference was made on the three television receivers nearest to the station and on two receivers installed in the same room as the transmitter. The results are summarised below.

Case No. 1. Pye Model D16T fitted with 2-section unbalanced high-pass filter in 80 ohm coaxial feeder. T.V. aerial 100 feet from transmitting aerial. Result: Completely satisfactory.

Case No. 2. Ferranti Model T136 fitted with filter as above. T.V. aerial 150 feet from transmitting aerial. Result: Completely satisfactory. Impossible to detect when transmitter is on the air.

Case No. 3. Ekco Model TSC46. No high-pass filter fitted at time of tests. T.V. aerial 150 feet from transmitting aerial. Result: Completely satisfactory.

Case No. 4. Pye Model B18T (Monitor). T.V. aerial 40 feet from transmitting aerial. Fitted with balanced 2-section high pass filter in 80 ohm twin feeder. Results: (a) C.W. 14,000 to 14,150 kc/s. Excellent vision and sound. Virtually impossible to detect whether transmitter is on or off.

(b) Telephony, 14,150 to 14,200 kc/s. As (a)

(c) Telephony 14,200 to 14,300 kc/s. Very slight "modulation bar" effect just visible on heavy peaks but reception of both sound and vision is of excellent entertainment value.



Fig. 9.

Picture received on Pye BI8T receiver in same room as 150 watt.
14,200 kc/s. 100 per cent. modulated telephony transmitter. Full harmonic suppression in transmitter.

(d) Telephony, 14,300 to 14,400 kc/s. Good picture received; "modulation bar" effect is just visible but not, in the opinion of a number of unbiased observers, objectionable. Sound reception is unaffected.

Case No. 5. Vidor Model CN369A (Monitor) fitted with a 2-section unbalanced high-pass filter. Result: As Case No. 4.

#### Summary

The following is a brief summary of the conditions which appear to be essential to successful T.V.I. suppression:—

- (1) The transmitter must be of modern design, completely screened and free from parasitic oscillations or gross over-modulation. The stage delivering driving power to the grid of the P.A. must be capable of delivering two or three times the actual power required for Class C operation of the P.A.
- (2) The P.A. must incorporate an anode harmonic circuit and a harmonic by-pass condenser of approximately 50 μμF. The latter may be reduced to 25 μμF. or omitted altogether for 28 Mc/s. operation.
- (3) The P.A. should be coupled via a convenient length of 80 ohm coaxial cable to an aerial tuning unit, and a suitable low-pass filter inserted in this cable at the transmitter end.
- (4) A high-pass filter should be inserted, as close as possible to the aerial feeder input socket, in the T.V. receiver feeder. A balanced or unbalanced type of filter must be used to suit the type of feeder cable employed.

(5) Transmitter harmonic output should monitored when transmitting during hours-circuit adjustments can change due to various causes.

despite all harmonic suppression measures possible, slight T.V.I. persists when operating in the H.F. end of the 14 Mc/s. band, try working between 14,150 and 14,250 ke/s. The harmonics of this range of frequencies are noticeably less troublesome for a given degree of harmonic suppression.

Amateurs who are situated within the service area of the Birmingham station will probably experience much less trouble than those living within the

service area of the London station.

As the Sound and Vision channels will be on 58.25 and 61.75 Mc/s. respectively the harmonic trap circuit should be tuned to approximately 56.8 Mc/s., or the 4th harmonic of the 14 Mc/s. P.A.

#### The Problem in U.S.A.

For the following reasons it would appear that amateurs in the U.S.A. have a somewhat easier

T.V.I. problem.
(1) The frequencies used for television in the U.S. are related to the higher order harmonics of a 14 Mc/s. transmitter i.e. the 4th, 5th, and 6th which are inherently weaker and therefore easier to suppress than the 3rd.

(2) U.S. Television standards specify a field strength of 500 µV/metre for a reliable picture. In the U.K. we are content to use values as

low as 200 µV/metre.

As against these facts, of course, the average power used by British amateurs is considerably less than the average employed by U.S. amateurs and this tends to ease the problem. The moral here is :- if your 150 watt rig. presents too big a problem, try a thoroughly suppressed 25 watt rig! In very difficult situations it may be the only comsuccessful solution-and you can work pletely DX on 25 watts!

Acknowledgements

The author records his thanks to Mr. L. H. Bedford, O.B.E., M.A., M.I.E.E., of the Marconi W.T. Company for his helpful interest in the work described and for the loan of television receivers, and to Mr. W. J. Ridley, G2AJF, who has assisted in experimental work.

Acknowledgement is also made to those responsible

for the articles to which reference has been made

Since fitting the harmonic suppression devices described herein the author has contacted a number of DX stations on 14 Mc/s. 'phone including KR6, ZL, VK, CX, W7, OQ5 and FF8.

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TABLE I.

Test No.	Transmitter Condition.	1	armon donito ding g	r	Feeder Current Amps.	Approx. Power Loss	
		2nd.	3rd.	4th.	•	db.	
1	No suppression	4	100	8	0.33	0	
2	Drive L.P. filter	4	98	8	0-33	0	
3	As (2) plus Har- monic trap in P.A	4	3	11	0.33	0	
4	As (2) plus Har- monic by-pass condenserin P.A.	2	6	8	0.3	1.0	
5	As (4) plus Har- monie trap in P.A.	5	2.5	6	0.3	1.0	

· Measured in open-wire resonant feeder.

Check of 14 Mc/s. transmitter harmonic output and suppression. Conditions. Carrier Frequency, 14,300 kc/s. P.A. Input, 150 watts.

1g, 30 mA. 1a, 100 mA. Ea, 1,500 V.

#### Technical Course for Licensed Amateurs

The success of the recent course of instruction covering the syllabus of the Radio Amateurs' Examination, has encouraged the Educational Section of the East London R.S.G.B. Group to undertake the organisation of a more advanced class intended for licensed amateurs. Commencing next September, the lectures for licensed amateurs. Commencing next September, the lectures will cover many aspects of transmitter, receiver and aerial design and will include a number of practical demonstrations. They should appeal particularly to the newly licensed amateur and to those old-timers who feel the need to brush up their knowledge of modern amateur techniques. The fee for the course will be 5/-, or 7/6 in the case of persons residing outside the administrative area of the Essex County Council. The advanced classes will be held at the Hford Literary Institute (High School for Girls), Gants Hill, Hford, and will be additional to a further course for Radio Amateurs' Examination candidates. Members who are interested in joining either of these classes should communicate with Mr. C. H. L. Edwards, GSTL, not later than August, 1949.

August, 1949.

The East London Group are to be congratulated upon this new venture and upon their consistent recognition of the importance of the educational side to amateur activities.

#### S.R.D.E. Amateur Radio Society

The work of the Signals Research and Development Establishment of the Ministry of Supply was described in the October, 1948, issue of the BULLETIN. A lighter side to its activities, however, is represented by the Amateur Radio Society which functions under the Presidency of the Chief Superintendent, Dr. G. W. Sutton (ex. 5AX) and the Chairmanship of Major A. T. Kingstog (G4RP), with Captain J. Singleton (BRS9196) as Honorary Secretary.

as Honorary Secretary.

The Society's "shack "—a converted Nissen hut—is arranged as a workshop, an operating room, an office and a store. Operating under the call G3DMZ, the transmitter is a modified W/S No. 12 with H.R.O. and ARSs receivers. Mr. "Sid" Phillips (G8DL) is "Chief Operator," The workshop is fully equipped with test and servicing equipment and possesses facilities for metal working. On the educational side, the Society runs two series of ling. On the calicational stac, the society rins two series of lunch-hour lectures and demonstrations; one for the beginner and the other of general interest. The Society is particularly fortunate in having a wealth of expert lecturers to call upon. Morse practice facilities are also available and visits to places of interest are being arranged. The Committee is now considering the possibilities of co-operating in the scientific observation programme of the International Radio Scientific Union.

#### TRANSMITTER INTERFERENCE

Will solve your B.C.L. or T.V.I. worries PRICE I/3 (By post I/6) FROM R.S.G.B HEADQUARTERS

# THE R.F. 27 FOR TWO AND TEN METRE OPERATION

## By F. J. RUTTER (G2FMF)\*

WITH the departure of the five metre band, many amateurs will have surplus Type 27 R.F. Units which can be put to very good use. Two bands—two and ten metres—are the obvious choice, and with minor modifications the R.F. 27 can be made to give an excellent performance on either band.

#### The Ten Metre Conversion

Conversion to ten can be carried out in a couple of hours and the subsequent performance is better than that of most commercial communications receivers. The EF54 used as an R.F. amplifier will give results equal to that of the more popular 6AK5. At 30 Mc/s, it is possible to obtain a gain of 10,000 from an R.F. 27 and a 20 db signal/noise ratio with an input signal of 1µV at 30 per cent. modulation. The high signal output level means that the receiver into which the output is fed need not be operated in a very sensitive condition and thus I.F. breakthrough is not as serious a problem as it would be otherwise.

The output frequency of the writer's converter was made 2 Mc/s., principally to bring it into line with other converters in use, and it is for this frequency

that details are given.

The method of modifying the unit is as follows: The output transformer is removed and stripped, and one section of the winding from an old 465 kc/s. I.F. transformer is fitted and fixed with coil dope near the bottom of the former; this coil is "pulled down" (i.e. turns are removed) until it tunes to 2 Mc/s, with 100 to 150 µµF, the actual L/C ratio not being critical as it only varies the overall gain of the unit. A narrow strip of paper is then wound on the former and about 20 turns of 36 D.S.C. wire are pile-wound on to it. One end of this second winding is earthed and the other is taken to the output of the unit. With a 2 Mc/s. signal applied to the grid of the mixer, the primary winding of the output transformer is adjusted to resonance and the secondary slid along the former until maximum output is obtained. The secondary is then fixed in this position with coil dope.

Next, the three tuning coils are removed and rewound with 8½ turns of 22 S.W.G. wire, care being taken to ensure that the end tags are in approximately the same position as they were originally, so that the existing wiring need not be altered. The aerial coil requires an additional winding for aerial coupling; this consists of one turn of 32–36 S.W.G. D.S.C. wire, interwound with the last turn at the earthy end of the grid coil. It will match an aerial of about 100 ohms impedance, such as a dipole, but if a long wire is to be used, the aerial coupling should be increased to two turns to give the conventional

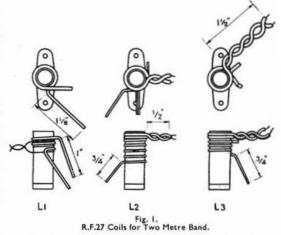
400 ohms input.

The existing input transformer can be discarded and the aerial coupling coil connected directly between the centre pin of the Pye plug and earth. Alternatively, both the ends may be brought out if a balanced input is desired.

The coils are then replaced and the following

capacities fitted :--

(a) Directly across the aerial coil grid winding, a 3-30μμ F Philips trimmer.



(b) Directly across the mixer grid winding, a 3-30 μμF Philips trimmer, in parallel with 10 μμF fixed.

(c) Directly across the oscillator winding, 30 μμF fixed.

All the existing trimmers in the unit should be set at maximum capacity, i.e. with the black line pointing to the tag end. The oscillator is operated on the low frequency side of the signal, and to achieve this the oscillator coil inductance must be increased. An iron dust core is screwed through the coil until it touches the chassis and then turned back two revolutions. The Philips trimmer across the aerial and mixer coils should be screwed up to within in of full mesh. Under these conditions, when the unit is connected up and an aerial attached, it will be sufficiently near alignment to enable a signal on 10 metres to be heard.

The aerial trimmer should be rotated and a point of maximum noise found; with the main dial set at 150° the oscillator dust core should be rotated very slowly until C.W. signals can be identified. This should not necessitate more than one turn from the previous setting. With 28,000 kc/s. set at 150° on the dial, the band should spread to 30,000 kc/s. at 20°.

#### Tracking

With the circuits adjusted as outlined above and aligned at the L.F. end of the band, it will be found that the mixer circuit is about 150 ke/s. off resonance at the H.F. end of the band. (It is assumed that the aerial circuit is kept in tune by means of the aerial trimmer.) This discrepancy is not serious as the response will be only I db down with a coil Q of about 100, but, if it is desired, tracking may be improved by adjusting the ceramic trimmers.

#### The Two Metre Conversion

Slightly more work is involved in the conversion for two metre operation, but if care is taken to follow the instructions in detail no difficulties should be encountered, even if test-gear is not available.

At first sight, certain constructional details will appear to deviate from established practice for

<sup>\* 237</sup> Windsor Avenue, Hillington, Middx.

V.H.F., particularly with regard to the making of the coils, but it must be borne in mind that at these frequencies the input impedance of an EF54 is only about 1,000 ohms, and this imposes such heavy damping on a tuned circuit that the effective Q is only about 30. This means that the R.F. circuits will have comparatively poor selectivity, but with a high I.F. of 7 Mc/s. this need not cause concern, as the chance of second channel interference is remote, due to the comparatively uninhabited

nature of this part of the

spectrum.

It would, of course, be possible to improve the Q of the circuits by tapping the valve grids down the coil, but under these conditions, we should obtain no more gain from the stages, only a little more selectivity. It is necessary to use resonant lines to achieve any worthwhile improvement in selectivity and this would make the apparatus cumbersome. Almost any coil will give a Q of 100 or more at these frequencies, and as this will be reduced to 30 by valve damping it is easy to see that very low-loss materials are

not a vital necessity, and the existing coil formers can be used.

Coil data is given in Fig. 1. The dimensions should be followed closely to reproduce the original results. The only circuit with variable tuning is the oscillator grid, the tuning of all the other circuits being fixed by valve capacities and strays, and inductances trimmed by dust cores. This enables the maximum possible impedance to be developed in the tuned circuit, and with valve damping, the response is flat enough to cover the 144-146 Mc/s band without adjustment.

The threaded iron dust cores normally used with these coil-formers are not very good above 50 Mc/s., and better results are obtained with high Q cores as used in short wave receiver coils (e.g. G.E.C., Type 68). If the core is on a threaded stem, it is necessary to drill the threads out of the coil-former and drill

Circuit as modified for Two Metre operation.

50 μμF. 500 μμF.

3-30 uuF Philips Trimmer.

C6 C7 C8 C9

Main Tuning.

7.5 µµF.

10 muF.

and tap a hole in the chassis in line with the centre of the coil.

The layout is given in Fig. 2 and the revised circuit in Fig. 3. For clarity, only the components concerned in the modification are shown and listed.

#### The Oscillator Circuit

If the oscillator circuit was to be kept in its original form and made to oscillate at 138 Mc/s., it is evident that the coil would almost disappear and

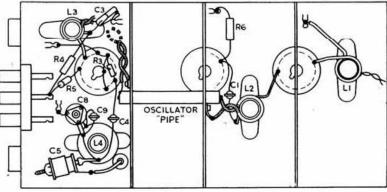


Fig. 2. Wiring details for Two Metre Operation.

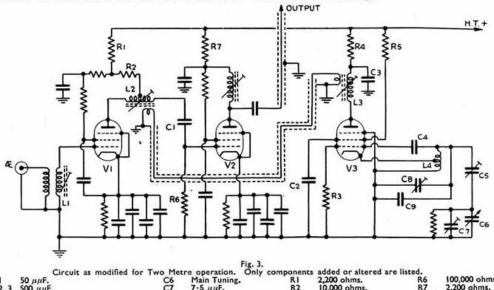
most of the inductance would be contributed by stray wiring with the result that stability would be poor. It was decided, therefore, to make the oscillator work at a lower frequency and to double this to reach 138 Mc/s. The EC52 was discarded and an EF50 used in its place, making it possible to use a very high-C oscillator circuit to improve stability. Doubling in the EF50 also helped to isolate the oscillator circuit proper and to prevent pulling.

The E.C.O. circuit was chosen to provide the oscillator-doubler facilities. The grid coil consists of 24 turns of 22 S.W.G. wire, centre tapped, wound in the grooves of the original former with the tag-rings retained in their original positions. The oscillator valveholder is stripped and rewired for the EF50, using most of the original components and keeping all leads as short as possible; the trimmers are all soldered to the coil tags.

10,000 ohms.

47,000 ohms.

4,700 ohms.



100,000 ohms.

2,200 ohms. VR136 (EF54).

The anode coil is wound on what was the mixer coil-former. The tag rings in this case are removed. The coil consists of 3 turns of 18 S.W.G. wire spaced one diameter (ignoring the grooves). The aerial coil is wound with 2 turns of 18 S.W.G. spaced one wire diameter, with 2 turns of 32 S.W.G. D.S.C. wire interwound for the low impedance aerial input.

The R.F./mixer coil consists of 4 turns of 22 S.W.G. wire, centre-tapped and spaced to occupy

half an inch.

Grid injection is used on the mixer, and link coupling is employed to transfer the energy from the oscillator circuit to the mixer circuit, the link comprising two turns of 22 S.W.G. insulated wire, wound touching, in one case the H.T. end of the oscillator anode coil, and the other the grid end of the R.F./mixer coil. Soldering tags are placed under the screws at each end of the oscillator 'pipe' (see Fig. 2) and the links connected together via the the pipe and earth.

All coils are wound and installed as shown in the drawings. The oscillator anode coil which is an addition, can be mounted at one end by the valveholder fixing screws; it will be necessary to flatten down an earth tag to allow this coil to be fitted.

Alignment

The alignment is the trickiest part, but in general if the conversion has been carefully carried out, no difficulty should be experienced. At this stage a very useful item to have is a short piece of bakelite rod with an iron dust core on one end and a brass slug on the other, to check tuning quickly. If the circuit tunes with the brass slug, it has too much inductance; with the iron slug, too little.

The oscillator grid circuit is set up with C8 open

about 1/16 in., (i.e. from the edge of the moving cup to the top edge of the flange) and C5 15/64 in. open. This should put the band on the dial, and the frequency of the centre can be checked at 69 Mc/s. with an absorption wavemeter. The mixer grid leak R6 is next disconnected at the earth end and a microammeter inserted. The H.T. is removed from the mixer anode and screen by disconnecting R7, and the oscillator circuit adjusted for maximum grid current in the mixer; 40 to 50 µA is satisfactory. The main tuning dial covers about 143.5 Mc/s. to 146.5 Mc/s. when properly set up, so that bandspread is quite reasonable.

To align the aerial and mixer coils, a source of signal is necessary. A harmonic of a lower frequency oscillator, preferably modulated, will be sufficient, although its fundamental frequency should be higher than, say, 20 Mc/s, so that the chances of picking up

a wrong harmonic are minimised.

If a transmitter with an output on 145 Mc/s. is available, the circuits can be roughly aligned in the following manner. Run the final stage of the transmitter at low input, with no supply voltages on the converter, link-couple the circuit to be aligned to the P.A. and tune it up until it loads the P.A. In other words, the circuit to be aligned is used as an absorption wavemeter, but it should be noted that the valves must be in the converter for this operation as they provide the tuning capacities. The aerial coupling coil can be used for coupling to the aerial coil, and the oscillator link coil can be temporarily disconnected and used to feed the R.F./mixer coil.

An R.F. 27 unit converted for 144 Mc/s. compared favourably as regards sensitivity with another coverter using 6J6's throughout and it was also very stable and

easy to handle.

## Good Operating

O obtain the maximum enjoyment from your telegraphy contacts:

Never send faster than you believe the other

man can comfortably copy.

Send at an even speed, without clipping dots; correct errors by means of the "erase" signal.
Give honest and helpful reports; refer frequently to the listed meanings of the RST code.

Do not give the "R" signal when only part of a transmission has been copied. If conditions are bad do not be afraid to ask the other man to slow down. Only send "doubles" when requested or when given a readability report less than 4.

Make correct use of abbreviations; avoid phrases such as "Best 73s" which means Best best regardss."

Remember that other operators have equal rights to yourself. Never interrupt a contact or cause deliberate interference. Reduce power when tuning up.

Make all calls as short as possible. Give your call-sign at frequent intervals. Avoid long drawn out final remarks.

Courtesy is the hallmark of a good operator.

#### Amateur Radio in Spain

Information has reached the Society that legislation has been approved to enable the Spanish Posts and Telegraphs Dept. to issue amateur licences to qualified personnel.

The Spanish National Society (Union de Radio Aficionados Espanoles) has revived its activities and is now operating a technical and QSL service. The address of the Society is P.O. Box, 220 Madrid. Mr. A. U. Rodriguez, EA4AD, is President.

#### Standard Frequency Transmissions

Standard-frequency transmissions from the U.S. Bureau of Standards station, WWV, are now made continuously, day and night, on the following frequencies :-

Frequency (Mc/s.)	Power (kW)	Audio Frequency (cycles)						
2·5 5 10 15 20 25 30 35	0·7 8 9 9 8·5 0·1 0·1 0·1	l and 440 l and 440 f, 440 and 4000 l, 440 and 4000 l, 440 and 4000 l, 440 and 4000 l and 440						

A 0.005 second pulse may be heard as a faint tick every second, except the 59th second of each minute. Audio frequencies are interrupted for one minute before each hour, and each five minutes thereafter, resuming after an interval of exactly one minute during which the time in E.S.T. (G.M.T. less 5 hours) is transmitted in Morse. Telephony announcements of the station's services are made at the hour and half hour. Accuracies—both radio and audio—are better than one part in 50 million.

Ionospheric disturbance warnings applicable to the North Atlantic path are given at 19 and 49 minutes past each hour. If a disturbance is in progress or is anticipated within the next 12 hours, the time announcement is followed by six W's. If conditions are normal, eight N's are sent.

# TECHNICAL ARTICLES WANTED

# TWO-BAND ROTARY BEAM AERIAL

A NOVEL arrangement of the familiar rotary beam aerial is in use at W8HHU, and some outstanding results have been achieved with it. If one imagines a conventional four-element 20 metre beam, with the ends of the rod elements bent slightly upwards, and 10 metre wire elements suspended between the ends of each 20 metre element, one can visualise the type of aerial to be described.

Because of the different spacing required at different wavelengths for reflectors and directors, the line of directivity on 20 metres is directly opposite to that on 10 metres. The 20 metre beam uses one reflector and two directors, and the 10 metre beam uses two reflectors and one director.

It is not intended here to give precise instructions for the construction of this aerial, but merely to give some of the more important details, in order to assist interested readers in the planning of similar arrays.

The elements for the 20 metre beam are made of aluminium tubing, and those for the 10 metre beam of 18 S.W.G. wire. With the exception of the 10 metre radiator element, each element can be adjusted separately for maximum response by altering the length of a stub at its centre. In the case of the 10 metre beam, the radiator element is a folded dipole, fed by a 300 ohm line, and, since its tuning is fairly flat, no provision was made in the original for altering its length. A "delta match" on the 20 metre radiator allows the 20 metre beam to be energised by a second 300 ohm line.

#### Constructional Details

The main horizontal support (C) is a 3 in. diameter aluminium tube and there are four pieces (D) of red wood, each \( \frac{1}{2} \) in. \( \times 6 \) in. \( \times 4 \) ft. to support the four elements, H, E, R and B. On each piece of wood, D, there is a vertical support, A, for the centre of the 10 metre elements. Guy wires F and G maintain rigidity of the vertical supports, A. The main vertical support, (S) by which the beam is supported and rotated, should be attached at a point where the whole assembly balances. If the spacings mentioned below are used, then the assembly should balance at a point on C between R and E, approximately 4 ft. 2 in. from R.

#### Details of the Elements

The length of each element is approximately a half wavelength at the frequency at which it is used, but each director is 5 per cent. shorter and each reflector 5 per cent. longer than its associated driven element (R). On 20 metres, the reflector and first director are spaced '15  $\lambda$  from the radiator, and the second director is spaced '1  $\lambda$  from the first. In feet, these distances are:—H to E 6 ft. 6 in., E to R 10 ft. R to B 10 ft.

The line of directivity on 10 metres being opposite to that on 20 metres, it follows that above the 20 metre reflector (B) is suspended the metre director, and above each 20 metre director (H and E) is a 10 metre reflector.

The two-wavelength rotary beam aerial devised by W8HHU for operation on 10 and 20 metres. From top of page; general view of arrangement; view looking down from top; side view showing radiator element R; side view showing one of the other elements

H, E or B; side view lengthwise.

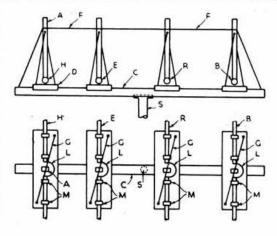
A Vertical element supports.

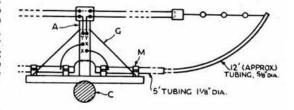
B, E, H Elements.
C Main horizontal support.

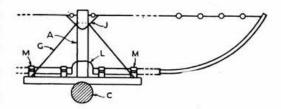
Main horizontal support
Element supports.
G Guy wires.

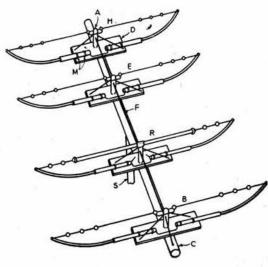
Adjustable stub.
Porcelain clamps.
Radiator element.

S Main vertical support.









The four elements for the 20 metre beam consist of  $1\frac{1}{8}$  in. diameter aluminium tubing for the first five feet from the centre, and of  $\frac{5}{8}$  in. diameter tubing for the remaining 11 ft. or so. The  $1\frac{1}{8}$  in. diameter tubing is held rigidly by porcelain clamps (M) to the wooden supports (D), and the inner ends of each pair of tubes are joined together by an adjustable length of 10 S.W.G. wire (L).

The 10 metre elements are constructed from 18 S.W.G: wire. With the exception of the radiator element (R) each consists of two insulated halves joined by an adjustable stub, (J). The radiator element (R) is a half-wave folded dipole of conven-

tional design, as shown in the illustration.

#### **Tuning Procedure**

The 300 ohm feeders from the transmitter are

connected at points XX for 20 metres and YY for 10 metres. Adjustment of the length of the various stubs can be carried out conveniently by a 1N34 crystal in series with a 4 in. loop of wire. The loop is coupled inductively to the tuning stub of the director (H in the case of the 20 metre beam, B in the case of the 10 metre beam), and the stubs are adjusted for maximum reading on the meter. Final adjustments to the stubs should be made with the beam in its operating position.

The use of a double beam of this type is not restricted to the 10 and 20 metre bands. Since the spacing between directors and reflectors can be varied considerably, the same method of construction can be applied to many cases where a rotary beam aerial, capable of operation at two widely

different frequencies, is required.

# 28 Mc/s SUPERHET CONVERTER

CONVERTING THE TYPE 26 R.F. UNIT

By STANLEY W. RILEY (B.R.S. 15049)\*

VERY good reception of 28 Mc/s. signals can be achieved using a modified Type 26 R.F. Unit in conjunction with a superhet, receiver tuned to about 7 Mc/s. Alterations needed are very slight—they consist mainly of re-winding the three coils—and, provided that the receiver can supply an extra ampere at 6·3 volts for the heaters, and about 25mA at 240 volts for the high tension, no additional power pack is necessary.

#### Circuit Details

The unit employs an R.F. Amplifier and Mixer—using two EF54's—and a triode (EC 52) H.F. Oscillator. For conversion to 28 Mc/s., the coils, L1, L2 and L3 are unsoldered and replaced by new coils constructed to the following specification: using formers made from ½ in. dia. ebonite, threaded 14 threads per in. and 1¾ in. long, coils L1 and L2 are wound with 26¼ ins. of 18 S.W.G. copper wire, and L3 with 20¼ ins.

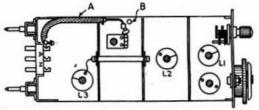
The receiver with which the convertor is to be used should be tuned to a frequency between 6.9 and 7.2 Mc/s., preferably to a spot where no station is normally heard. As a further safeguard against pick-up at this frequency, the connection from the converter to the receiver should be made by a longer piece of co-axial cable substituted for that marked "A" in the diagram. This cable is threaded through a hole in the chassis ("B") and taken out through the front panel to the aerial and earth terminals of the receiver.

The power connections to the convertor can be soldered directly to the Jones socket. Connections as viewed from the rear of the unit are as follows: Top left, heater; top middle, H. T. positive; top right, heater, H.T. negative and earth.

The three ceramic trimmers† (over the three-gang variable) should each need only the slightest movement, and the original positions should first of all be marked, in order to ensure that they can be re-set easily, if difficulties should arise. After the trimmers have been adjusted for maximum background

· " Mayville," Halkyn Road, Flint.

† These have now been changed for a set of 25μμF air-spaced trimmers.



The under-chassis view of the Type 26 R.F. Unit, showing the positions of the three coils and the co-axial cable connected, before modification, to the Jones socket.

noise, signals on 28 Mc/s, should be heard at a dialreading between 50° and 60°. As each station is received, full use should be made of the small variable trimming condenser on the front panel of the unit.

Finally, it should be noted that one side of the heaters and the H.T. negative are connected to earth, and this renders further modification (or a separate power pack) necessary if the unit is to be used in conjunction with receivers such as the R.1155 or the BC 348-J-M-N-P-Q. A useful gain control for the unit can be provided quite simply by adding a 2,500 ohm variable resistor in the H.T. lead, and using about 260 volts.

## A Novel Bias Supply

THE grid bias supply for a transmitter power amplifier requiring 120 volts at up to 50 mA. often presents some difficulty. Many amateurs use ordinary high tension batteries but these have a very limited life due to the high "charging current" and are expensive.

A convenient alternative is a Milnes' (nickel alkali) unit. These units have an almost indefinite life and the grid current will charge up the cells to normal voltage in a few seconds if this has fallen. Units which have lost their original capacity prove entirely satisfactory in this position. The only maintenance needed is an occasional "topping up" with distilled water. In the writer's case the same unit supplies all the stages including the driver. G8GI

National Convention

OCTOBER 21st to 23rd, 1949
BELLE VUE GARDENS, MANCHESTER
THE EVENT OF THE YEAR

# The First Two-Metre Contest

#### G5TP The Winner

MORE than 120 stations took part in the first two-metre contest held on April 2–3, 1949—a remarkable indication of the widespread interest in this comparatively recent amateur allocation. Despite generally poor propagation conditions no fewer than 29 contacts were recorded over distances exceeding 100 miles, showing beyond doubt that with modern equipment the normal range on these wavelengths is considerably in excess of what was anticipated when the band was released last September.

It was unfortunate—as G6DH (Clacton) commented—that the stable weather system which had prevailed during most of the preceding week gave way at the critical moment to complicated and fast moving frontal systems, which, with a few patchy exceptions, were unsuitable for tropospheric propagation. As usual the conditions across water were slightly better and G6DH worked ON4FG (155 miles), and PA0PN (110 miles) and heard F8OL (215 miles)—the only station received during the contest over a distance greater than 200 miles.

The best inter-G contacts were those between the two Oswestry (Shropshire) stations—G2ADZ and G4LU—and a number of stations in the London region, approximately 165 miles. At least three stations had 6 contacts apiece over 100 miles; they were G2ADZ (Oswestry), G2CPL (Lowestoft) and G3BLP (Selsdon). On both days contacts over 100 miles took place up to about 2100 G.M.T. although conditions for G-DX were particularly poor during the Sunday afternoon and evening.

#### Equipment

Apart from one or two self-excited rigs which came on the band to provide local stations with a few additional points, the transmitters were mainly crystal-controlled; the vast majority being built around either an 829 or 832 double tetrode as power amplifier. Exceptions were G2WS (815), G5UM (RK34) and G6CB (DET12). Considerably more variety was shown in the receiving equipment. Although the majority of stations employed superhet convertors, there was at least one straight T.R.F. receiver (G5UM). The leading station—G5TP (Stoke Row, Oxon.)—used two 6J6's as R.F. and mixer followed by an Eddystone 640. G2NH was one of the several stations using modified ZB3 convertors; while R.F.26 and R.F.27 units were other types of ex-Service equipment which proved popular. G6OT and G2CIW were amongst those who favoured crystal-controlled receivers. It was noticeable that the majority of receiving valves were drawn from the following types: EC52, EF54, CV66, VR92, Z77, 6AK5, 6J6, 954 and 9002. Many of the entrants stressed the importance of the receiving equipment and enclosed logs of stations heard but not raised despite contacts with other stations in the same locality. Aerials varied considerably in complexity, a 4-element wide-spaced array being perhaps the G5TP used a 5-element beam; most popular. G2NH an 8-element beam (two 4-element beams stacked at half-wave spacing 60 feet high); while G5RP had a 16-element array.

#### Reflections

The Contest certainly achieved its prime aim—the encouragement of activity upon the band. The knowledge that other stations all over the country are

listening during a particular period means a great deal to the V.H.F. worker. Viewed as a contest, however, it must be recognised that under the average propagation conditions which existed, the chances of any particular station were considerably affected by its location. Even the sliding scale of points was unable to overcome completely the handicap presented by a location (a) remote from the main centres of activity; or (b) in the centre of activity but with almost all possible contacts over short low-scoring, distances. Although too hasty conclusions should not be drawn from a single event, it is fairly clear that scoring systems evolved for the lower-frequency contests may require drastic modification on 144 Me/s. and above if an accurate appraisal of each entry is to be made. It is also essential that a much higher percentage of those taking part in the event should submit The present figure of approximately 33 per cent, is far too low for a contest of this type.

#### How they finished

Posi- tion	Call Sign	Location	Con- tacts	Points
1	G5TP	Stoke Row, Oxon.	55	172
3 4	G2NH	New Malden, Surrey	74	157
3	G5RP	Abingdon, Berks.	41	152
4	G3BLP	Selsdon, Surrey	68	139
5 6 7 8	G2MR	Surbiton, Surrey	67	130
6	G5MA	Ashtead, Surrey	65	127
7	G5DF	Reading, Berks.	43	125
8	G5M1	Wimbledon, Surrey	60	124
9	G2ADZ	Oswestry, Shrops.	22	109
10	G4IG	Beckenham, Kent	22 57	101
11	G6DH	Clacton, Essex	21	86
-12	G8SM	East Molesey	53	85
13	G4LU	Near Oswestry	19	83
14	G5BM	Cheltenham, Glos.	- 18	82
15	G6UH	Hayes, Middlesex	50	81
16	G2CIW	Brentwood, Essex	32	80
17	G6OT	Southgate, London	44	76
18	G2WJ	Dunmow, Essex	26	74
19	G5UM.	Knebworth, Herts.	24	65
20	G4DC	London, S.E.14	38	60
21	G6PG	Dartford, Kent	31	59
22	G5JU	Birmingham, 31	14	58
23	G3CGQ	Luton, Beds.	22	57
24	G3AUA	Dartford, Kent	35	51
25	G5LQ	Chiswick, Middlesex	36	48
26 )	G2WS	Shortlands, Kent	30	42
26	G3AHB	Slough, Bucks.	30	42
26 )	G201	Eccles, Lanes.	16	42
29	GSQY	Birmingham, 26	12	40
30	G3BY	Ashton-u-Lyne	13	37
31	G5MR	Bognor Regis	10	32
32	GSIP	Hampton, Middlesex	27	31
33	G6CB	Wimbledon, Surrey	16	16

The following stations are thanked for forwarding check logs G2FJD, G3BBA, G3CWW, G3EVC, G6VX, G8TS, G8WV.

# SPOTLIGHT ON . .

#### THE TOWN REPRESENTATIVE

- The T.R. is the king-pin in the Society's Scheme of Representation: the all-important link in the chain Member-T.R.-C.R.-R.R.-Council.
- The T.R. is the man who gets things started—meetings, Morse classes, visits and social activities.
- The T.R. knows the interests and specialised activities of the local members, and introduces newcomer to old-timer.
- The T.R. passes on criticisms and constructive suggestions to where they will do the most good.
- The T.R. sees that local uninformed press statements damaging to the Amateur Radio Movement do not pass uncorrected.
- In short, the T.R. is guide, friend and counsellor to YOU, the member.

IN RETURN the T.R. expects and needs YOUR support. Get in touch with him—if you have not already done so; offer any assistance possible; help him with his routine duties; share with him the advantages of an active local Group.

		170-5	1 00 00
Town or Area	Stn.	Call Sign	Location
Bolton	A	G2BTO/P	Top o'th Heights Farm, Morris Green, Bolton.
	В	G2HGR/P	As A station.
Burnley	A	GSTD/P	Above Waggoners Inn. Manchester Road.
	В	G3SJ/P	As A station.
Bury	2-52	G2GA/P	Barlow's Field, Hol- combe Avenue, Elton
	В	G3BRS/P	Stand Unitarian Cricket Field, Ringley Road. Whitefield.
Darwen/Blackpool	A	G2HW/P	Land adjoining Royal Hotel, Tockholes, Nr. Darwen.
Liverpool	A	GSDI/P	Suburbs of Liverpool.
	B	G3DPZ/P	Childwall Sports Field.
Manchester (North East)	A	GSQS/P	Park View Golf Club, Higher Blackley.
	B	G3RP/P	As A station.
Manchester (South East)	A	G3SP/P	Belle Vue Gardens.
Preston	A	G4QH/P	Geoffrey Hill Quarry, 46 Acres Lane, Phoneley- with - Wheatley, Nr. Longridge.
DAMES AND THE PARTY OF THE PART	В	G2NY/P	As A station,
Southport	A	G2MJ/P	Grounds of Meols Hall.
Stockport	A	G3AYT/P	Harrop Edge, Nr. Mottram.
20 270 7232 1	B	G2BJT/P	As A station.
West Cumberland	A	G6WR/F	Tarnflatt Farm, Nr. St. Bees,
and the second	B	G3BW/P	As A station.
Wirral	A	GSNH/P	Irby, Heswall.
	В	G3CK/P	Manor Farm, Noctorum Wirral.

#### REGION 2

Bradford	В	G2DJ8/P	Poplar Grove, Gt. Horton.
Darlington	A	G8IA/P	Brusselton Folly, Nr. Darlington.
	B	G3DT/P	As A station.
Halifax		G2PC/P	Fleece Inn, Barkisland.
Huddersfield		GSNF/P	Cop Hill, Slaithwaite.
22 mader system 111	B	G2BMC/P	
Hull		G2KO/P	Church Lane, Garton- on-the-Wolds.
	В	G2XA/P	Recreation Ground, De- la - pole Hospital, Willerby.
Middlesbrough	A	G3CBW/P	Red House Farm, Marton,
	В	G3CFC/P	As A station.
Northumberland		G2BDQ/P	New Ridley, Nr. Stocksfield.
	В	G3CYY/P	As A station.
Scarborough	A	G8KU/P	Scarborough Boys' High School Playing Fields, Olivers Mount.
	B	G5MV/P	As A station.
Sheffeld		G8NN/P	Dore Moor.
	B	G5TO/P	Ringinglow,
South Shields		G3DDI/P	Horseley Hill Farm. Cleadon.
Sunderland	В	G3CSR/P	Fulwell Mill.
West Hartlepool		G3TO/P	Elwick.
	13	G3UW/P	Elwick.
York	A	G3DQR/P	Nr. Heslington Hall,
	B	G5KC/P	As A station.

#### REGION 3

Cannock	***	A	G2YV/P	Whites Hill Farm, Old Hednesford Road.
		В	G3CLR/P	As A station.
Coventry	7.0	A	G3FAB/P	Whitley Abbey Grounds,
		B	G2FTK/P	As A station.
Onicestry		AB	G2AUZ/P	Old Racecourse.
4000000		15	G2NX/P	As A station,
Rughy	+++	A	G3GG/P	Water Tower Farm, Bilton.
		В	G4KK/P	As A station.
South Birming	ham	A	G3AAH/P	Shenley Fields Farm, Northfield.
	- 1	В	G6KI/P	As A station.
Stourbridge	***	A	GSGF/P	King Edward's School Playing Fields.
		В	G3BQB/P	As A station.

# NATIONAL

The following is a list of stations for which ap for permission to operate portable at the sites from Headquarters prior to the event. The Rules for the event appeared in the Mare

#### REGION 4

		REGION 4	
Town or Area	Stn.	Call Sign	Location
Roston	Α	G6LH/P	The Rectory Field,
	В	G4GI/P	Stickney, The Mill, Old Boling-
Crameell	A	G6PZ/P	broke. Cranwell R.A.F
	В	G2LR/P	As A station.
Decentry Derby	A	G5NH/P G3ERD/P	Newham Hill. Glebe Farm, Blagreeves Lane, Littleover.
Grimsby, Clee-	B A	G5YY/P G2AJB/P	As A station.  Junction of Grimsby Roadand Station Road,
thorpes	R	GSPV/P	Waltham. Humberstone Fore-
Leicester	A	G2RI/P	shore. The Park, Rearsby.
	В	G3BU/P	Thrussington Lane, Rearsby, Walton
Loughborough	A	G4MM/P	Rearsby. Seagrave Road, Walton- le-Wolds.
Mansfield	A	G4BI/P G3FR/P	As A station.  Kirby Cow Pastures,  Kirby Road, Kirby-in- Ashfield.
v	В	G8SA/P	As A station.
Northampton Nottingham	A	G2AAA/P G5CW/P G8QZ/P	Pitsford. East Bridgford.
Peterborough	A	GSQZ/P G3EEL/P	As A station. Manor Farm, Upton.
2 cicromongo	B	G3BHD/P	Manor Farm, Upton. Manor Farm, Upton.
		REGION 5	
Cambridge Town	A	G4MW/P	Quaker Farm, " Top of
	В	G8PB/P	Bendalls Farm, Bottis- ham.
Chelmsford	A	G5RV/P	Meadow in rear of the "Running Mare," Galleywood Road.
	B	G2AJF/P	As A station. Gorleston Cliffs.
Great Yarmouth	B	G3AMK/P G3EDM/P	Nr. Caister Watertower.
Ipneich	A	GSMU/P	Post Office Farm, Stutton.
Loseestoft	B	G2AN/P G3DMA/P	As A station. Grange Farm, Gisleham.
Southend - on - Sea	B	G2CPL/P G5QK/P	As A station. Thundersley Glen.
Southena - on - Sea	B	G5VQ/P	Great Wakering.
		REGION 6	
High Wycombe	A	G2RL/P	Oakdene, Amersham Road, Hazlemere.
Luton	B	G6IF/P G2COU/P	Road, Hazlemere. As A station. The Old Brickworks
Luton		W. 100 - 100	Field, Stopsley.
North Bucks	A	G5RZ/P G3AZ/P	As A station.  London Brick Co.  Works, Newton Long- ville, Bletchley.
Oxford	A B	G8PX/P G3ADD	Watts Farm, Elsfield. As A station.
		REGION 7	
Barnes and Richmond	А	G6RC/P	Richmond Park, Nr. Sheen Gate.
Barnet	B	G4GD/P G3EVR/P	As A station. Wrotham Park, Kitts
and her see see	100		End Lane, Barnet. Camp Site of R. Signals,
	В	G6CY/P	No. 1 A. A. Group, Friern Barnet Lane, Whetsfone.
Brentwood	A	G4AG/P	Paynes Farm, junction of Weald Road and Honeypot Lane.
	В	GSRC/P	As A station.

# FIELD DAY.

1-12 1949.

hich application has been made to the G.P.O. the sites indicated. Entry forms will be issued

he March, 1949, issue of the BULLETIN.

#### **REGION 7—continued**

Town or Area	Stn.	Call Sign	Location
Bromley and Beckenham	A	G6HD/P	Petleys, Downe, Kent.
Chingford	B A	G4AU/P G8JM/P	As A station. Bury Farm, Seward- stonebury.
Coulsdon	B A	$_{\rm G2DN/P}^{\rm G8AL/P}$	The Owl, Lippitts Hill. Field above Hall & Co.'s Lime Works.
Croydon	B A	G5BT/P G2FWA/P	As A station. Addington Hills, Nr. Cafe.
Dorking and Leatherhead	B A	G6LX/P G3ASV/P	As A station. Ranmore, Nr. Dorking.
Dulwich and New Cross	A	G3CZU/P G3CU/P	As A station. Rear of Goldsmiths College, Queens Road,
	В	G3ACC/P	New Cross. Grounds of Crystal
East Ham	A	G2ZZ/P	Palace. Lady Trower Sports
East Molesey	B A B	$\begin{array}{c} G3CJQ/P \\ G6GB/P \\ G6NB/P \end{array}$	As A station. Broadmoor, Dorking. Chobham Common.
Edgicare and Hendon	A B	G2IM/P	Hall's Farm, Brockley Hill, Edgware.
Ealing	A B	G2AJ/P G8IH/P G3CBN/P	As A station. Hanger Hill, Ealing. As A station.
Gravesend	A	G6BQ/P	Macleans Field, Lower Higham Road, Chalk.
Grays	A B	G2BOU/P G3DLC/P	Cranes, West Tilbury.
Hayes	A	G2FMF/P	As A station. Rush Green Farm, Nr. Uxbridge.
Hoddeşdon	A	G8FA/P G3AAN/P	As A station.  Monks Green Farm,  Monks Green.
Ilford	A	G4HJ/P G8TL/P	As A station.  East London Mission Field, Lambourn End.
North Kent and Cray Valley	A	G2QI/P G3ENT/P	As A station. The Gun Club, Cray- ford.
	В	G2DS/P	Home Farm, St. Pauls, Cray.
Reigate and Redhill	A	G5LK/P	Field adjoining Madeira Walk, Nr. Wray Common.
	В	G2AJS/P	On the Hill of Caterham School Estate.
Romford	A	G4KF/P	Nr. Havering - atte - Bower.
St. Albans	A	G8TK/P	Tyttenhanger Lane. Field south side of lane between Cell Barnes Colony and Highfield
Welwyn Garden City	В	G2CN/P	Hall. Digswell Road.
Slough	A B	G6PR/P G6CJ/P	Taplow Court, Taplow. As A station.
Southgate	A	G5FA/P	Trent Park, Cockfosters (Enfield West).
Sutton and Cheam	A	G8DF/P	Residential School, Fir Tree Road.
Woolwich, Plum- stead and Abbey Wood	A	G6HC/P G3EIW/P	As A station. Field at rear of Wool- wich War Memorial Hospital, Shooters Hill.
		REGION 8	
Ashford	A	G2JF/P	Hemmings Farm, Monks Horton.
Bournemouth	A	$\begin{array}{c} G2QT/P \\ G2DBF/P \end{array}$	As A station. Ashley Heath, Nr. Ring- wood.
Brighton and Hove	B A	G2FIY/P G3DEU/P	As A station. Devil's Dyke, Brighton.
21000	В	G3YY/P	As A station.

	200	ION 8—conti	
Town or Area	Stn.	Call Sign	Location
Eastbourne	A	G4FV/P	Polgate Recreation
Farnham and	В	G8TS/P	Ground. Ewshot, Nr. Farnham.
Farnborough Guildford	A	G3ARM/P	Peperbarow, Nr.
Medicay Towns	A	G6KT/P	Godalming. Blue Bell Hill, Kent.
Portsmouth	A	G6KT/P G5FN/P G6SS/P	Wigmore. Field of V. G. Gauntlett Dairy Farmer, Crook horn, Purbrook.
	100		horn, Purbrook.
Reading	A	G6WS/P G8TH/P	As A station. Turnhams Farm, Tile hurst.
Parkstone	A	G6WO/P G4IX/P	As A station. Canford Heath.
Southampton	B	G3ABH/P G2KC/P	As A station. Netley Hill Common.
Tonbridge Area	B	G5OB/P G4FB/P	As A station. Gt. Bounds Estate
I onortage Area			Southborough, Nr Tunbridge Wells.
Worthing	A	G4IB/P G4NY/P	As A station. 300 yds. south o
	В	G3FRG/P	"Coach and Horses' P.H., Arundel Road As A station.
	В	Gar RO/1	As A station.
14		REGION 9	
Bristol	A	G6RB/P	Dundry, Nr. Bristol.
Cheltenham	A	G6GN/P G5BK/P	As A station. Hunting Butts Farm
	В	G5BM/P	St. Marks Community Centre Playing Fields
Dorchester-	A	G5UF/P	Brooklyn Road, St Marks.
Weymouth	-	0,001,1	Askerswell Down, 10 miles west of Dor chester and 5 mile
Exeter	A	G5QA/P	East of Bridport. Top of Pennsylvania-As A station.
Falmouth	A	G3MU/P G6LV/P G8AW/P	Ashfield.
Gloucester	A	G8AW/P G3MA/P	As A station. Spoonbed Farm, Pains
1	В	G2RT/P	As A station.
North Deron	A	G2DOW/P	Catsborough Cross, Nr Monkleigh, main Bide ford and Holsworth
	В	G6GM/P	Road. Featherlands, Chils worthy, Nr. Hols
Plymouth	A	G5ZT/P	worthy. Collaton Cross, Nr.
St	В	G3TX/P	Yealmpton. As A station.
Stroud	B	G5HC G5WA	Lypiatt, Nr. Stroud. As A station.
Swindon	A	G8HI/P	Field adjoining "Gable Cottage," Broad
West Wilts	B	G4AP/P G2PS/P	Hinton. As A station. Bratton Downs, Nr
	_		Westbury.
		REGION IO	
Cardiff	A	GW8NP/P	HirwaunTradingEstate Rhigos.
Monmouthshire	B	GW3ZV/P G4GR/P	As A station. Pontypool.
Neath and Port	B	GW3CT/P GW4NZ/P	Plackwood.
Talbot Tore	В	GW2FRB/P	Neath. Mount Pleasant, Nr
-	-	with the second	Maesteg.
		REGION II	
Cærnarvonshire	A	GW3DIX/P	Capel Curig Nationa
	В	G4MZ/P	Grid 107, Ref. 74254 Gt. Orme's Head
County of Flint- shire	A	GW4CK/P	Llandudno. Golden Grove, Llanasa

GW4CK/P B GW4CX/P

County of Flint-shire

As A station.

		REGION 12	
Town or Area	Stn.	Call Sign	Location
Aberdeen	A	GM3ALZ/P	Banchory - Devenick, Kincardineshire.
yman F	В	GM2FHH/P	As A station.
Banff	A	GM3ATV/P	Old Manse Farm, Boyndie, Nr. Banff.
	В	GM3DPK/P	As A station.
Buckie	AB	GM3ALB GM3EZO	Letterfourie Estate. As A station.
Forfar	A	GM6R1/P	Tannadice, Angus.
Montrose	A	GM2DRD/P GM3KC/P	As A station. Strathella Farm, Rossic Moor, Farnell by Mont-
	В	GM4MQ/P	rose. Ferryden, by Montrose.
Stonehaven	A	GM3EHH/P	Wood on Uras Farm.
	В	GM3AXR/P	As A station.
		REGION 13	7 +
Berwick-on-Tweed	A	G2ATJ/P	Berwick Hill,
	В	G2ATJ/P G2FXB/P	Berwick Hill, Berwick Hill,
Dunfermline	A	GM3CIG/P	Castlandhill, Nr.
	В	GM3ENJ/P	Castlandhili, Nr. Rosyth. Transy Farm, Dun- fermline.
Kirkcaldy	A	GM4GK/P	Woodlands, by Mark- inch.
	В	GM3CVL/L	Newton Farm, East Wemyss.
T + _		REGION 14	
Dunbartonshire	A	<b>GM3AHQ/P</b>	Mill House, Nr. Mugdock.
	В	GM2FQG/P	As A station.
Southwest Area	A	GM4PW/P	Heathfield, Prestwick Ayrshire.
	В	GM3DJ8/P	Glenfoot, Seamill Ayrshire.
		REGION 15	
Northern Ireland	A	G12HLT/P	Lilybank Farm, Gil-
	В	GI5UR/P	nahirk, Co. Down. Hilkiah Farm, Oldpark. Belfast.
	сн	ANNEL IȘLA	NDS
Guernsey	A	GC3ZU/P	St. Peter Port.
Jersey	A	GC8NO/P	Victoria College.
	B	GC5OU/P	St. Lawrence.

Guernsey A GCSZU/P St. Peter Jersey A GCSNO/P Victoria C B GC5OU/P St. Lawre	ollege.
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The following portable stations will be operated from Malta: ZB1AU/P II Kleigha 7 and 14 Mc/s. ZB1AU/P ZB1FK/P 7 and 14 Mc/s. 7 and 14 Mc/s. Mosta

The Swiss Society (U.S.K.A.) is holding its National Field ay during the same period and a number of HB1 stations should be active.

## Third Annual

# AMATEUR RADIO EXHIBITION

Royal Hotel, Woburn Place, London W.C.I

NOVEMBER 23rd to 26th, 1949

Enquiries for Stand Space to:

EXHIBITION MANAGER PARRS ADVERTISING LTD. 121 KINGSWAY, LONDON, W.C.2

# Civic Welcome at Coventry

HE West Midlands Official Regional Meeting held on April 24, 1949, at Coventry, will be remembered by the 85 members who attended as the first event of its kind to which a civic welcome was extended. At the time of the meeting the First Citizen of that famous City of Three Spires, was Councillor W. H. Malcolm, J.P., who is President of the Coventry Amateur Radio Society and holder of the call-sign G6WX.

The O.R.M. was also marked by the presence of a large gathering of Society officials including the President (Mr. V. M. Desmond, G5VM), who had the support of Messrs. A. O. Milne, G2MI (Hon. Editor and QSL Manager), J. W. Mathews, G6LL (Hon. Secretary), John Clarricoats (General Secretary), A. P. G. Amos, G3AGM, W. H. Allen, M.B.E., G2UJ, I. D. Auchterlonie, G6OM, D. A. G. Edwards, G3DO, P. A. Thorogood (Members of Council), Miss A. M. Gadsden (Assistant Secretary), J. P. Hawker, G3VA (Assistant to the General Secretary), and a number of Regional Representatives who had, on the previous day, attended the Delegates Conference in Birmingham.

During luncheon, served in the spacious Albany Road civic restaurant, a number of informal toasts were offered and responded to enthusiastically. more formal toasts were in the hands of Councillor Malcolm ("The R.S.G.B."), Mr. Auchterlonie "Region 3"), and Major Timbrell, G6OI ("The Visitors"). Cordial responses were made by the President, Mr. D. A. G. Edwards (Region 3 Representative), and Mr. George Webster, G5GK (Region 1 Representative).

#### **Business Meeting**

During the business meeting, with the President in the Chair, the General Secretary spoke on a wide variety of subjects of topical interest. Other speakers included Mr. Auchterlonie, who appealed for support of the R.S.G.B. Band Plan and of the forthcoming Manchester Convention, Mr. Milne who described the operation of the QSL Bureau, and Mr. Mathews who gave timely warning of what may happen in the Midlands when the Sutton Coldfield station opens unless local amateurs take heed of T.V.I. and attempt to overcome its effects.

Miss Gadsden spoke on some of the problems which confront Headquarters staff, whilst news about R.S.G.B. certificates and contests was given by Mr. Hawker.

Following the speeches a number of interesting questions were asked and answered by the appropriate officers or officials.

An expression of appreciation to those responsible for the arrangements was voiced by the President and others, special reference being made to the work of the T.R. of Coventry (Mr. H. J. Chater, G2LU) and other local members.

At the end of the formal business Mr. Desmond presented to Mr. Chater a miniature replica of the N.F.D. Trophy which had been awarded to the Coventry Town Group as runners-up in the 1947

After tea visits were paid to a number of local stations.

Apparatus kindly loaned by the General Electric Co. Ltd. and by Mr. L. H. Philpotts, G4BI, was on display throughout the day. D.G.A.E.

#### 'Ware Harmonics

A case of interference to one of the frequencies used by Speke Airport was recently traced to the fourth harmonic of an amateur

transmitter working in the 28-30 Me/s. band.

Amateurs living in the neighbourhood of airports would be well advised to ascertain the frequencies in use with a view to avoiding interference by harmonic radiation.

# FRENCH V.H.F. ACTIVITY

PIERRE REVIRIEUX, F8OL, of Meudon, near Paris, veteran French amateur and one of Europe's foremost V.H.F. workers, recently paid a short visit to England. Although in London for only a few hours, he took the opportunity to call at Headquarters in order to give the latest information on French V.H.F. activity. F8OL was the first French amateur to make a transatlantic contact on 50 Mc/s. and the first Frenchman to work an English station (G6DH) on 145 Mc/s. This contact took place during the remarkable spell of conditions which prevailed on November 10, 11 and 12 of last year, when at one time the field strength of the British station rose to 10 mV.! It was during this opening that F8OL heard two Swedish 145 Mc/s. telephony stations working one another but was unable to break into the contact. A number of French stations are active on 144 Mc/s. every evening between 1930 and 2030 G.M.T. with aerials directed towards London. Stations in Southern England are advised to swing their beams south and to listen for weak signals.

#### Work on 450 Mc/s.

On 450 Mc/s., F8OL has achieved results that should provide a sharp incentive to British amateurs. Already, in portable/mobile tests, his signals have been heard at S8/S9 over a distance of 130 kilometres (approx. 80 miles). The final stage of his transmitter for this band consists of one of the new Philips QQE 06/40 twin-tetrodes-basically similar to the 829 but with single screen grid construction—capable of giving up to 20 watts of R.F. output on 450 Mc/s. He favours vertical polarization for aerials on this band. In common with most other U.H.F. workers, F8OL believes that the key to longer distances on these frequencies lies in more sensitive receivers. present receiver which is a step in the right direction, consists of a 6J6 twin-triode operating as a push-pull frequency changer with the 30 Mc/s. I.F. output fed into an H.R.O. A modified SCR 522 serves as a crystal-controlled local oscillator with the 832A as a tripler to give 420 Mc/s. output which is injected into the 6J6 mixer via a resonant co-ax line. This receiver has proved to be very sensitive and the only drawback so far observed is a certain amount of break-through from 30 Mc/s. stations.

#### DX on 450 Mc/s. Predicted

F80L is confident that G-F contacts are possible on 450 Mc/s. when conditions of temperature inversion permit ducting to take place. He bases this belief partly on comparisons of signal strengths over identical paths on 28, 50 and 144 Me/s. With true ducting the signal strengths rise from, for example, S2 on 28 Mc/s. to S5 on 50 Mc/s. and S9 on 144 Mc/s. with indications that the optimum frequency may be higher still. On the other hand, when propagation is by means of low-angle reflection from differing air masses some 15,000 ft. above ground, the signal strengths drop from say S6 on 28 Mc/s, to around S2 on 144 Mc/s. It is for this reason that F8OL regards a frequency allocation in the region of 50 Mc/s. and the ability to change bands rapidly, as being of the greatest importance in determining propagation conditions.

#### " Alarm" System Projected

Efforts are being made in France to organise an "alarm" system in order to warn amateurs when openings on the V.H.F. and U.H.F. bands are in progress. The secret of successful ducting prediction

lies in the observation of humidity and temperature simultaneously at varying heights above the earth. In the past such data has been collected largely by means of radio sonde balloons but F8OL is of the opinion that most of the equipment carried in these balloons should be considered obsolete since the results so obtained are often misleading, while the time taken to collate readings renders the system useless for ducting prediction. It is hoped to obtain much more accurate information from instruments permanently placed at varying heights on suitable structures, with direct-reading meters at the base. Suitable equipment is to be installed on the masts of the French broadcasting station Radio Lille. The tremendous importance of such a service of " alerts will be readily appreciated by all V.H.F. workers.

#### Activity on 72 Mc/s.

There is also considerable activity in France and French North Africa on the new 72–72·8 Mc/s. band which was released on January I last to all French amateurs as a result of the Atlantic City decisions. F8OL believes that this band is near the upper limit for Sporadic E propagation and regrets that intercountry tests cannot be carried out due to the fact that the band is available only to the amateurs of France and the U.S.S.R.

M. Revirieux, a firm believer in international V.H.F. co-operation, intends to return to England during the summer when he hopes to meet many British V.H.F. workers. Meanwhile, one thing is certain, there is no lack of skill or enthusiasm across the Channel!

#### Use of M.C.W. on the V.H.F. Bands

The G.P.O. has agreed, as the result of representations made by the Society, to allow first year licencees to use A2 (M.C.W.) emissions for telegraphy on frequencies in the 420 Mc/s. band and above. Up to now such licencees have been restricted to the use of A1 (C.W.) only.

Existing first year licencees should apply to the Radio Branch for their licence to be amended. New licences will automatically confer the above facility.

#### Chess Matches over the Air

The Society has been informed by the G.P.O. that if chess matches are arranged between opposing teams and particulars of the play are transmitted through the medium of amateur stations, this would involve the transmission of third party messages, and would therefore be a direct contravention of the International Regulations. The exchange of messages of this character is not one of the purposes for which the amateur service is designed; such messages should be, and in many occasions in the past have been, sent over the public telegraph and telephone systems.

#### Portable Television Microwave Link

The scope of television outside broadcasts should be further extended by new lightweight equipment which is now being tested by the B.B.C. for the purpose of relaying events of topical interest from on-the-spot cameras. A portable microwave link operating on 4·5 cm. is used to send pictures back to Alexandra Palace for re-transmission on the normal television frequencies. The present range is in the neighbourhood of 7 miles but eventually it should be possible to increase this to 20 miles or even further if one or more relays are employed.

## THE STATION BEHIND THE CALL

#### VS7PS—CEYLON



The three element beam amongst the palm trees.

To travel in imagination more than six thousand miles from London to one corner of a wooden Army hut nestling beneath the palms of a partly cleared coconut plantation 15 miles up-country from Colombo, Ceylon may seem a long step to take; but it is a journey which has been covered 669 times within 12 months by means of Amateur Radio. For there, less than 200 yards from the 100 kW. Forces Broadcasting Station (Radio SEAC), Capt. Paul Sollom, Assistant Engineer-in-Charge, takes time off from ensuring that the high-power transmitters are behaving themselves in order to maintain regular schedules with the British Isles on 28 Mc/s. telephony under the now familiar call VSTPS.

The unusual location has given rise to several problems: high R.F. fields from the nearby broadcast transmitters must be screened-off or filtered-out of the amateur rig; "bugs"—literal as well as figurative ones—have to be kept away from the equipment; and it is no easy matter to replace valves and components when the hot humid climate finally gains the upper hand. But despite these difficulties, VS7PS can usually be heard putting an excellent signal into the Old Country around about the time we are thinking of breakfast—though 'PS himself will probably have just finished a hasty lunch.

#### Transmitter

A T1131 rack and chassis form the basic transmitting equipment. The R.F. line-up is a 6V6 C.O. using a 9.4 Mc/s. crystal followed by a KT8 trebler and a second KT8 as amplifier-driver capacity coupled to an 805 in the final stage. To neutralise the 805 a balanced type of tank circuit is used, having a split-stator condenser and a six turn coil of 3 in. diameter. The 2nd turn from the end connected to the plate of the 805 is by-passed for R.F. and the moving plates of the condenser are "floating." A low-capacity condenser is arranged to feed back to the grid from the other end of the coil thus providing a step-up transformer to obtain enough feed-back voltage to neutralise the stage.

The speech amplifier receives input from a carbon microphone, which is energised by being connected in series with the cathode of an earthed grid 6J5G. To increase gain a 6C4 miniature valve has been buried in the wiring between the 6J5G and the amplifier gain control. Two low-gain push-pull stages drive a pair of 811's with zero bias to plate modulate the transmitter. R.F. is kept out of the modulator by decoupling all electrodes of the speech amplifier valves and all power leads at the point where they pass through the chassis, with small mica condensers.

A recent addition is a V.F.O. using a "Clapp" oscillator followed by a cathode-driven 807 doubler. Eleven pre-set air-spaced trimmers are connected across the oscillator tuned circuit so that the output frequency may be varied in steps of 4 kc/s. with excellent re-setting accuracy. Experimental work is in progress on a 145 Mc/s. rig; a converter using a crystal oscillator and harmonic amplifier stages, with a 6AK5 mixer has already been built. The converter is used ahead of the normal station receiver which is an AR88.

#### Three Element Beam

A three element rotary beam and associated feed system are the results of experiments carried out with VSTSV (now back in Scotland) on ground wave propagation over a 90 mile path. The final element dimensions are director 15ft. 5in., radiator 16ft. 5in., and reflector 17ft. Element spacings from the radiator are—director 5ft. 3in., reflector 7ft. The parasitic elements are made of 1in. diameter copper tubing. The driven element is a two-wire folded dipole of 10 S.W.G. copper wire mounted on 2in. × 1in. planks. A length of 3in. × 2in. timber supports the elements. The whole system is supported at its centre of gravity on a 2in. diameter galvanised pipe at about 32ft. above the ground level. The soil is sandy and the water table varies from 3ft. to 6ft. below the surface depending upon the season.

At the transmitter, the feeder is connected to a broadcast interference eliminator consisting of a parallel tuned circuit. A six turn 3in. diameter coil is tuned by a split-stator condenser, the moving plates being earthed. The condenser has comparatively small spacing and serves as a spark-gap during the frequent electrical storms. Fortunately, the 325ft. steel masts of the broadcast aerials collect most of the static and are often struck by lighting—to the accompaniment of considerable audible noise.

A six-element vertical array of two 3 element parasitic beams in-phase, half a wavelength apart, was tried during the year, but could not be made to give any gain over the horizontal beam even when the receiving aerial at VS7SV was vertically polarised. A "cubical quad" is now under construction and will be hung between the coconut palms which make good temporary masts some 25 feet high despite their tendency to sway violently during gales.

#### QSL Problems

One further problem which VS7PS shares with other "rare DX" stations is the flood of listener cards and reports which arrive with every incoming mail. A recent check showed some 64 reports covering a single two-hour spell of operation—mainly from the British Isles and other countries with which VS7PS was in contact during that period. In view of the time and expense involved in replying to all these reports, it is no wonder that VS7PS is now seriously considering a revision of his 100 per cent. QSL policy—at least towards listeners!

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#### Lid's Corner

When I was young I always thought A camping life would be such sport, And so last year it seemed to me, I'd have my chance at N.F.D.

Too late I found my " scouting " tricks, Of making fire by rubbing sticks, And raising tents the easy way, Were all forgotten on " the day."

I do not think it pleased the chaps To discover I'd lost the maps; While one or two were almost rude When I sat down right on the food. The knot I tied to fix the mast, Was not the type that's meant to last; While judging by the taste, it's true, My sausages were more like stew.

I still regret it was my hand, Which set the rig outside the band, Though really how was I to know The readings for the V.F.O.!

Perhaps that's why they'ce kept from me The plans for this year's N.F.D. "How can I help?" I asked to-day. They all replied: "Just stay away."

G3VA

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by famous makers. 5° W.B. or Truevox,
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2-3 ohms, 16/6; 8" Rola, 2-3 ohms,
17/-; 10" Rola, 2-3 ohms,
23/6; 12"
Rola, G12, 15 ohms, 85/-; Output
transformers if required for above 2/11
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125 mA., 13H				10/6
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100 mA., 6H	2.3			5/-
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500 mA., 20H				25/-
	toma Wild	272	are diffill	Serial Company

NEW 2-VALVE ALL WAVE KIT 16 to 2,000 metres. Switched Coil Pack ready wired and tested. 2 Mazda HL23 Valves. Phones, H.T. and L.T. Batteries, Condensers, resistors, diagrams and steel case, all ready to assemble, £3/10/-, including P.T.

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Q5R9 equipment is engineered up to Government standards and combines strength, electrical excellence and mechanical ingenuity, yet is reasonably priced.

- All metal arrays, 21, 6, 10, 15 and 20 metres.
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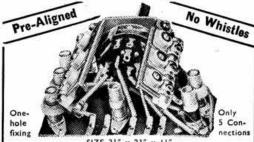
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A midget coilpack with a terrific performance that cannot fail to please! S'HET (465 kc/s.). LMS 33/-. M.S.S., L.M. Shipping and Battery Model, 35/-. T.R.F. (L. & M.W.), 30/-. All packs employ separate high-gain coils with variable iron-dust cores. Full receiver circuits and instructions supplied.

Now available-H.F. STAGE to add to standard collpack type L.M.S., price 15/-.

Attractive GLASS DIAL ASSEMBLY in 3 colours, for L.M.S. and L.M. Shipping, size 7" x 7". Fits in any position at any angle. Price complete (less bulbs), 22/6

INDIVIDUAL COILS, midget, with variable iron-dust cores, for S'Het and T.R.F., 3/- each.

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# THE MONTH ON THE AIR

## By A. O. MILNE (G2MI)\*

#### FORTHCOMING R.S.G.B. CONTESTS

lune 11-12 National Field Day. 3 July 144 Mc/s. Field Day.

20-21 August 420 Mc/s.

September 25 Direction Finding.

1-2 October Low Power (3.5 Mc/s.). "Top Band" (1.8 Mc/s.). November 26-27

Date to be announced. Affiliated Societies.

#### **Bad Notes**

LISTENING on the amateur bands these days is not recommended to those with either sensitive hearing or long memories. The one will be shocked, the other disgusted! Never have we heard such a preponderance of chirpy, wobbly, badly filtered emissions since the days of chemical rectifiers. Almost every country is represented, including to their shame, many G's. Conditions are bad enough in our narrow congested bands without this added terror. Let us do something about it now. Clean up that V.F.O., filter that supply, give and expect to receive really critical reports and don't work the persistent defaulters, even if they are located in "rare" countries. Only thus can Amateur Radio be made bearable. It is up to the amateurs themselves to have a spring clean. amateurs themselves to have a spring clean.

#### Television

The continued regular reception of the Alexandra Palace transmissions in South Africa makes us wonder if a major engineering blunder has not been committed by putting the television band where it is. What sense is there in choosing frequencies for such a service in a part of the spectrum so prone to long distance reception? ZS6QP tells us that the morning and afternoon transmissions from Alexandra Palace have been received almost daily in Johannesburg for months past with a nsable picture about twice a week. As the European air becomes filled with pictures, we forsee some amazing effects, especially in the fringes of so-called "service areas."

The local amateurs will of course get the blame. Now is the time to make a change; Television services should be operated above 100 Mc/s., before too many sets have been sold. If this cannot be done then viewers should be warned officially that an interference free picture cannot be guaranteed.

interference free picture cannot be guaranteed.

#### Notes and News

All 28 Mc/s, workers will be interested in the note on SM5VI. in "Around the VHF's" elsewhere in this issue.

BRS13401 has heard a queer one—SC4A1—on 14 Mc/s. Is it possibly FT4A1? Any suggestions? W1PWK draws attention to the certificate offered by the South Shore Amateur Radio Club to anyone working 10 of its members. If you want one, ask your W1 contacts around Boston if they are members of the Club. Cards need not be sent, only a list of contacts.

ZE21N has just arrived in this country for a stay of several months; QTH—S. E. Anderson, c/o Rhodesia House, Strand. W.C.2. He has his log and a supply of cards with him.

The W6AY/G5WI sked. has topped the 500 mark; no mean achievement. 5WI mentions that W7GBW lost all his cards in the recent flood disaster and has appealed to everyone he has

the recent flood disaster and has appealed to everyone he has

worked to be kind enough to send a replacement. Have a look back in the log chaps.

BRS11494 offers an imposing list of DX heard on 28 Mc/s. which includes C7TY, KG6ES, JA2CH, JA2AZ and VQ5PBD all around 0830 B.S.T., VP5EM, VP6SD, VP3CW, VP3MCB and CP1JK in the afternoon. Gives QTH for W4AXC/C6 as 3961, Illinois St., San Diego, Cal. Others to look for are VP4TAY, ET3AF, CP5FB, HSWF, and SV5UN (Rhodes). Cards are just in from SV5UN.

On 14 Mc/s WiB is active again, 11494 reports that the

On 14 Me/s. M1B is active again. 11494 reports that the price of an *Eddystone* 640 receiver in New Zealand is £50 15s. 0d. ! Who collects the difference?

Who collects the difference?

G3EAP has worked W1BOR on 7058 at 0155 B.S.T. and suggests a look on 7 Mc/s, for those fed up with the QRM on the other bands at this time of day. BRS18017 gives the QTH of E3IFIC, as 208 San Giovanni, Cagliari, Sardinia. If AP2R happens to read this, will be please send a QSL to 111R? The first one seems to have gone astray.

ZE2JV comments on the good operating manners during the B.E.R.U. contest and asks "Why no G's on 7 Mc/s?" We have not noticed any lack of G's on 7 Mc/s, this end!

\* 29 Kechill Gardens, Hayes, Bromley, Kent.

GM3AFG, the much travelled owner of such calls as ZD2H, ZS60L, VQ2JT etc., is now home in Scotland and will QSL anyone who has not yet received his card. QTH is 37, Landale Rd., Peterhead. He hopes shortly to be operating as VU7JT. G2TG has just received his card for a 7 Me/s. ZL contact using an input of 25 watts. G2HBM worked VK5FL on April 2nd and was surprised to find G3CXQ on the key there.

#### Macquarrie Is.

Congratulations to GSIG and GSIIH upon being the first G's to contact VKIADS (Macquarrie 1s.). These were nearly the first 'phone QSO's from England with Antartica but G6RH pipped them a fortnight earlier by working Grahamsland. VKIADS who operates most mornings on 14 Mc/s. is liable to QRT suddenly because he causes interference to the reception from weather balloons sent up by the expedition. No cards can be expected for at least a year.

be expected for at least a year.

Cards have just arrived from another southern outpost VPSAK on Deception Is.

Has anyone information on VS4GE? Was he genuine? If so where is he now?

#### Slow Morse Transmissions

B.S.T.		Call		ke/s.		Town
Daily				10000000000		
22.00	***	G6NA		1840	***	Guildford
Sundays						
11.00	***	G2LC		1800	***	South Ruislip
20.30		G2DLJ		1802		Derby
Mondays						10.000
13.00		G3AXN		1870	***	Southend-on-Sea
20.00		G2AJU		1900		Stutton, Ipswich
20.00		G2DJS	***	1800		Bradford
20.00	***	G3BHS	***	1820		Eastleigh, Hants.
20.00		G3DSR	***	1750	***	Derby
21.00		G2BLN		1900	***	Bournemouth
21.00		GSVR		1850	***	London, S.E.2
Tuesdays						
13.00		G3AXN		1870	***	Southend-on-Sea
22.00		GSTL		1896	444	Hford
22.30		G4GA	***	1896		Chingford
22,30		G6JB		1820	***	Salcombe, Devon
23.00		GM4AN		1820	444	Kirkealdy
Wednesda	ys					
20.00		PAOAA	***	3625	***	Hilversum
20.00		G3AFD		1783	***	Southampton
22.00		G3DLC		1800		Grays, Essex
Thursdays	8			4)		
13.00	***	G3AXN	***	1870	***	Southend-on-Sea
22.00	***	G2BCX		1873		South Woodford
22.30	***	GSARU		1873		South Woodford
22.30		G3OB		1803	***	Manchester
Fridays						
13,00		G3AXN		1870	***	Southend-on-Sea
19.00	***	G3BLN	***	1900		Bournemouth
20.00	***	G2AJU		1900		Stutton, Ispwich
29.00		G3AKW		1860	***	Wirral
20.00	***	G3BHS		1820		Eastleigh, Hants.
20.30		GSLZ		1868	***	Gravesend
22.30		G6JB	***	1820	***	Salcombe, Devon
23.00		GM4AN		1820	***	Kirkealdy
Saturdays		Contract of the last				
20.00		CLOCATEAR		4 (25)		Anhham or Tarme

G3CHY 1800 23.00 ... G3CHY ... 1800 ... Ashton-u-Lyne Volunteers in districts not covered by these transmissions are Ashton-u-Lyne invited to write to Mr. C. H. L. Edwards, GSTL, 10, Chepstow Crescent, Newbury Park, Ilford, Essex.

#### OUR FRONT COVER

THE photograph on our front cover this month shows the manufacture of stems for small Mazda triode receiving valves, at the Brimsdown factory of The Edison Swan Electric Co. Ltd.

The three operators in the right foreground assemble the necessary parts in containers, which are carried to the fourth operator, who places them in the sealing machine which fuses the parts together. The completed stems are then carried past cooling jets, to the inspection bench on the left.

# THE RADIO & ELECTRICAL MART (G3BSW) of 253-B PORTOBELLO RD., LONDON, W.II

Phone: Park 6026

Take pleasure in offering the following :-

R.A.F. Type 22 Transmitter-Receivers. 2-8 Mc/s. Crystal controlled. The superb 12-valve set complete with 12-v vibrator power pack, mike and m/c headphone set, comes to you tested and ready for use in green canvas holdall carrying case as new for bargain price of £15. Add 10/- for wood crate (returnable).

U.S. Signal Corps 15-watt Amplifiers. Complete in handsome green finished duralumin cases. Complete except for power pack. Contains tapped input and output transformers, etc. Two 1619 tubes (better than 6L6's). Price 50/-. T17 Carbon Microphone, as used with these sets, 10/- each extra.

FL8 AUDIO FILTER, as described in March issue of Short Wave Magazine, 10/6 each, plus 1/- postage.

Type BC347 U.S. Signals Mike Amplifiers. Small and compact. Case measures  $5\frac{1}{2}$ "× $2\frac{1}{2}$ "×4". Price 10/-.

Test Set Type 46. We still have a few of these excellent battery-operated frequency meters covering 2 to 235 Mc/s. Made by Marconi Instruments. Can be adapted to all waves by inclusion of LW and MW Coils. Circuit supplied. 40/— each. Aluminium Rod Aerials for use with same, 3/6 extra.

Type TGI0-F. This beautifully made 25-watt Amplifier in black crackle finished cabinet, 21" × 14" × 11", also contains a variable-speed motor photo-electric cell, and exciter lamp. Ideal for conversion to sound unit of cine projector or for dance hall amplifier. New. £15. Add 10/- for crate (returnable).

Mains Transformers. Input 110/250v. Output 400-0-400v 150 mils. 6-3v at 4 amps., 6.3v at 2 amps., 5v. at 4 amps. Price 35/-, plus 2/6 carriage.

Mains Transformers. Steel case. Input 230v. Output 10v at 4 amps. 12/6 post paid.

ImA Selenium Meter Rectifiers. Measure  $\frac{1}{2}$  × 1 × 1 × 1 × .

New IN34 Crystal Diodes. 5/3 each, post paid.

Valves. Button Based. 1-4v. 1T4-3S4-1S5 at 6 6 each. 1 R5 at 7/6 each, post paid.

Osmor Miniature All Wave Coil Packs. Measure  $3\frac{1}{2}^n\times 2^n\times 1\frac{3}{8}^n$  for 465 Kc/s, IF's, 35/6, post paid.

12v Vibrator Unit with Audio Pentode Amplifier. Complete in steel case for 30/-. A bargain.

10cm Rotary Beam Aerials. Made for U.S. Army. Consists of Aluminium Circular Tray, 3' diameter, with reflector and Dipole mounted on geared chassis with AC Motor and Selsyn Pulse Motor. Price £2 10s. 0d.. Add 10/- for case (returnable).

Mains Power Supply Unit. This neat and handy unit in black enamelled case, 9"×6"×6", contains heavy-duty transformer, rectifier valve, smoothing choke, condensers, panel light switch and fuses. Input 200/260v AC. Output 6.3v at 3.5 amps. H.T. 350v at 80 mA. Larger output available by changing rectifier valve. Price £3/5/-.

250-watt Double-Wound Transformers. 230v/110v. Made' by G.E.C. With steel shroud. New. £2/7/6 each.

R1132A. This grand 10-valve superhet, covering from 100 to 126 Mc/s, is easily adapted to 144 Mc/s band by simply moving connections on tuning coils. Large slow-motion dials, S meter, etc. Case measures 20"×12"×12". Price £4/19/6. Plus 10/carriage and packing.

We thank all who have written for our lists—these will be sent out shortly. They contain hundreds of items in short supply. Remember, money-back guarantee.



# Southern Radio & Electrical Supplies 85, FISHERTON ST., SALISBURY. WILTS

Telephone: Salisbury 2108

Best Makes-Quick Service

● DENCO—CT4 Coil Turret, 175 kc/s., 36 Mc/s., £12 14s. 11d. CT4/SW, 1·65-36 Mc/s., £9 6s. (Medium and Long wave strips, 24/- extra). CT4/C as CT4 but with R.F. sub-chassis wired to mixer stage, £15 16s. 10d. Technical Bulletins, Nos. 1, 2 and 3, 3/- each. DCR19. 13-valve Communications Receiver, £49 10s.

• EDDYSTONE—" 640" Receiver, £27 10s. We also carry in stock full range of Eddystone Components.

• RADIOVISION—"Commander" Double Superhet Communications Receiver, £48 10s. Two-stage preselector, 3-3-34 Mc/s. with built-in power supply. Average gain 30 db over all bands, £13 13s.

 LABGEAR—All items advertised in February Bulletin available for delivery.

 WODEN—Multi-match modulation transformers UMI, 54/-, UM2, 72/6, UM3, 90/-, UM4, 215/-. Practically every type of Woden transformer and choke available for immediate delivery.

Thousands of other Amateur requirements are in stock for immediate delivery. Send us your requirements.

IT PAYS TO BUY THE BEST FROM A RELIABLE AND SPEEDY SOURCE

## CALIBRATION SERVICE

Are you certain of your frequency when using VFO? If not or you would like the calibration checked accurately, send us the VFO or Freq. Meter and we will calibrate it for you. Quick service, you pay carriage both ways and our charge is reasonable. We can calibrate that Surplus Crystal which may or may not be "spot on." May we quote you?

#### MAINTENANCE SERVICE

We can fit meters or N/L to your present receiver, align, calibrate and generally overhaul any type of communication receiver. Let us have details and we will furnish quotation by return.

by return.

We have two secondhand receivers to offer, a Hallicrafters SX25 Super Defiant at £28 10s., and an AR77E RCA at £35.

#### TRANSMITTERS

Type 44—Two-stage crystal controlled rig, a pocket sized outfit which really gets the DX. Price £7

Type 44P—As above, but with incorporated power supply.

Price £13 2s. 6d.

Write for List M/9 which gives full details.

Chassis—Steel, finished black crackle, as used for above TX's, size  $11'' \times 6\frac{1}{2}'' \times 2\frac{1}{2}''$ .

9/- each

#### RECEIVERS

Eddystone 640 at £27 10s. cash, or on extremely reasonable H.P. terms of £5 15s. deposit and 78 payments of 6/-.

Eddystone Model 680 receiver, 15 tubes, 480 kc/s. to 30 Mc/s., details available on request. List price £85. No purchase tax.

Please note our temporary address below.

## RADIOCRAFT LTD.

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# AROUND THE V.H.F.'s

## By W. H. ALLEN, M.B.E. (G2UJ)\*

WE much regret the misunderstanding which led to the publication in our last issue of news of a contact between G2FMF and D1.40K on two metres. We are informed by G2FMF that although he called D1.40K on schedule he heard no station on two metres using that prefix, and, so far as he is aware, he was not heard in D1.4.

#### V.H.F. Propagation

We are indebted to BRS4029 for details of observations which

we are indebted to be \$1.00 feet as 1 observations which has made during the past few years on frequencies between 70 and 100 Mc/s. in connection with his work on police V.H.F. communication systems.

So far, no "aurora effect" has been reported, but it has been noticed that signals on frequencies of the order of 100 Mc/s. show a tendency to flutter on the first and second days after a sun spot has crossed the centre meridian of the sun. This effect is more prominent on the second, and may even be noticeable on the third day, especially after dark, and at times the resulting on the third day, especially after dark, and at times the resulting distortion of the modulated signal is such as to render communication impossible. Frequencies down to 72 Me/s, suffer in a similar manner, although not to such a marked extent. Vertical polarisation is used exclusively. The range of working on 100 Mc/s, varies with climatic conditions. In warm, damp weather the range seems to be greatest, but under these conditions in late summer, damp trees, when close to a mobile transmitter, have a screening effect. Distances of 45 miles have been worked under favourable conditions, but only from good locations. The power employed by the mobile stations is 10 watts, and, of course, no employed by the mobile stations is 10 watts, and, of course, no beams are in use at either these or the fixed stations. Frequencies of 80 Mc/s, and below seem to follow the contour of the country-side, but those of 100 Mc/s. or so get badly attentuated under similar conditions.

#### Two Metres

Conditions during the misty weather before the Contest were really good at times, and G2ADZ (Oswestry) managed to make a two-way contact with 2CPL (Lowestoft) over a distance of 215 miles. The same station, after their initial contact last month, worked G3EHY (Banwell, Son.) on most evenings, and as this involves a distance of 120 miles it must be regarded as a very line performance. An even more extraordinary sked, is that maintained between G5BM (Cheltenham) and GM3OL (Dumfries) night after night at 22.30 B.S.T. since their first contact on March 28. There is good evidence that this distance—230 miles—is covered by virtue of reflected waves, for we understand that it is unusual for stations situated on the route to hear either end, although this was not the case on Sunday, April 17. We have had no reports regarding contacts with European stations, apart from those made on April 1 by G4HG (Beckenham), 5MI (Wimbledon) and 6NB (Chertsey) with ON4FG, near Antwerp. The Belgian station was on a frequency of approximately 144·7 Mc/s. and was S3/4 at G2UJ.

G2ADZ has added an 829B P.A. to his transmitter, and finds it rather easier to raise the southern stations, including a 200 mile Q80 with G3DAH at Herne Bay, and frequent contacts with 3AEX (Bromley). GWSSA and others are active in North Wales, but in view of their screened position hold out little hope of working stations to the south east, but we should not be

of working stations to the south east, but we should not be surprised if they manage to break out of their mountain fastness during the better conditions hoped for during the coming warmer

G3EHY and 6WT are making an attempt on the G-DX record by beaming north every evening from 1900 to 2000 B.S.T. In Cambridge G2AIQ, FID, PU, XV, 4MW, 5IG, JO and 8SY are active, but as several of them are particularly interested in a local 'phone net, and are employing vertical aerials, there is a reduced chance of their being heard in other parts of the country.

#### Echoes of Five

G2AOL (Otford) wishes to thank the various stations who G2AOL (Otford) wishes to thank the various stations who assisted him during his recent sojourn in Loughborough, in particular G2FNW (Somerby, Leics.) who was worked nearly every day. 'FNW is shortly coming on 2 metres, and should be much sought after by those considerate of their "county" scores. And here is a story with a happy ending. BRS.17479 (Loughborough), is G2AOL's father, and an ardent listener, and ever since his son came on five last September he had listened for him almost nightly, but wave measured to here him Mach. for him almost nightly, but never managed to hear him. March 31 came, and with the idea of now or never, BRS.17479 tried yet again, and at 2230 he was successful, with only 1½ hours to go before the band finally closed.

#### Seventy-centimetres

The question of aerial polarisation on this band was discussed, among other topics, at the meeting of the South London V.H.F. Group on March 27. It was finally decided that, due to serious interference from the harmonics of the Alexandra Palace T.V. and F.M. stations, and from police broadcasts, members would adopt horizontal polarisation for an experimental period of eight months from May 1 next, and that at the end of that period

. 32 Rarls Road, Tunbridge Wells, Kent.

a further discussion would be held to review the results obtained. a further discussion would be need to review the results obtained. It is hoped that groups operating in other parts of the country will appreciate South London's reasons for this change, and will co-operate so that the possibilities of long-range contacts may not be prejudiced by the employment of conflicting systems of polarisation

The weekly test periods, at present 2000 to 2200 B.S.T. on Wednesdays, have been extended to include 1100 to 1300 B.S.T. on Sundays, and it is hoped that workers on this band will make every effort to be active during these hours.

#### V.H.F. Tests in Sweden

We have been informed by SM5VL (Enskede), that the S.S.A. are arranging tests on the 50 Mc/s. band from 1400 on June 11 to 2300 G.M.T. on June 12, and during similar hours on June 18 and 19. Cross-band QSO's are permitted, and watch will be kept on both 10 and 2 metres for replies. QSL cards are requested to verify all contacts.

#### Photographs

An appeal was made in the BULLETIN last month for photographs of V.H.F. gear with a view to the formation of a pictorial record of what we feel will one day be regarded as historical

apparatus.

We intend publishing some of these photographs, probably on this page, from time to time, to provide a more personal touch than can the printed word when dealing with V.H.F. topics, and to than can the printed word when dealing with V.H.F. topics, and to than can the printed word when dealing with V.H.F. topics, and to stimulate interest among readers by showing them what the other man is doing or building. We do occasionally receive photographs of this kind which, while interesting in themselves, are quite unsuitable for reproduction. Their unsuitability falls generally into three categories; lack of that extreme sharpness of detail necessary to make a successful block, lack of contrast, and lastly, but by no means least, poor composition of the nicture.

picture. Most readers will be familiar with at least the outline of the process of block making by which a photographic print is turned into a form of type suitable for printing in a newspaper or magazine through the medium of printers ink. Without going into technicalities, it boils down to the fact that the type and quality of the paper on which the publication is printed is the determining factor of the amount of detail which can be shown in a given size of picture, and this sets a practical limit to the quality of the block beyond which it is unnecessary to go. As delicate graduations of light and shade are to a large extent lost, the original print must be of good contrast, and of a sharpness which would permit of considerable enlargement without introducing any suggestion of fuzziness. So far, a good lens, carefully which would permit of considerable enlargement without introducing any suggestion of fuzziness. So far, a good lens, carefully arranged lighting, and suitable negative and positive material will go a long way to providing the required result, with the addition, in the case of close-ups of apparatus, of touching-up of the negative to emphasise certain otherwise obscure detail. The "floating in air" effect produced by professional photographers by skilful blocking out of the background in a picture is almost an essential feature for photographs of apparatus.

As regards composition, an example of how not to do it is the photograph we sometimes see of G9ZZ's beam, completely dwarfed by a close-up of its proud owner. If we wanted the latter, then the beam might be considered as a satisfactory and "typical" background, but the amount of blocking out, let alone the expense required to get rid of G9ZZ and to enlarge the small image of the beam would be entirely uneconomical, and that photograph would be considered unsuitable with a capital

that photograph would be considered unsuitable with a capital

Now we certainly number among our members those who can and do turn out first rate photographs, and we would ask them to be good enough to send us examples of their work having a V.H.F. interest. To those who do not pretend to be photographic experts we make this suggestion; please send us ordinary photographs of your gear, and if there is anything which we consider likely to be of interest to other V.H.F. enthusiasts we will willingly pay for a professional photograph to be taken if the owner will arrange for that to be done.

And lastly, please do not think that to submit a photograph for publication is a form of ostentation or of personal advertisement—it isn't, but should you desire to remain anonymous we will certainly respect your wishes. We now look forward to your Now we certainly number among our members those who can

ment—it isn t, but should wishes. We will certainly respect your wishes. We views, comments—and photographs! We now look forward to your

The number of reports has been somewhat greater this month, for which many thanks, and we would remind readers that notes for inclusion in the June issue should reach us by May 23.

#### Amateur Television Transmissions

Mr. M. Barlow, G3CVO is anxious to contact other members AIT. M. Barlow, G3CVO is anxious to contact other members who are interested in amateur television transmissions. He is already in touch with PAOZX of the Groningen T. V. Group which, as reported in the March BULLETIN, is now making experimental 202-line transmissions on 145 Me/s. His address is Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks. (Tel. 2935) or, alternatively, via the Catterick Amateur Radio Club.

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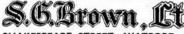
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> TYPE "F" (Featherweight)

PRICE 30 /- PER PAIR

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# HIC ET UBIQUE

#### COUNCIL, 1949

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General Secretary: John Clarricoats, G6CL

G.P.O. Ligison Officer: Arthur E. Watts, G6UN.

#### March Council Meeting

Resume of the Minutes of the Proceedings at the Meeting of the Council of the Inc. Radio. Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1., on Tuesday, March 15, 1949, at 6 p.m.

Present.—The President (Mr. V. M. Desmond, in the Chair), Messrs. W. H. Allen, A. P. G. Amos, D. N. Corfield, S. K. Lewer, J. W. Mathews, A. O. Milne, W. A. Scarr, P. A. Thorogood, A. J. H. Watson, and John Clarricoats (General Secretary).

Apologies were submitted for the absence of Messrs. Auchterlonie, Charman, Edwards and Watts.

Amateur Radio Exhibition.

Amateur Radio Exhibition.

It was reported that arrangements had been made to hold the Third Annual Amateur Radio Exhibition at the Royal Hotel, London, during the week commencing November 21, 1949.

National Convention in Manchester.

Mr. Auchterlonie was appointed Chairman of a Working Committee whose duty it will be to undertake local arrangements in connection with the Convention.

The President, General Secretary, and Mr. Auchterlonie were appointed to serve on the Convention Executive Committee.

Braaten Trophy.

appointed to serve on the Convention Executive Committee. Braaten Trophy.

Mr. Banner, GW3ZV, in a Letter to the Editor, wrote to protest against the decision of the Council to restrict the award of the Braaten Trophy in future to English competitors in the Annual A.R.R.L. DX Contest. A letter of protest was also received from Mr. F. Hamer, GW8BW (Hon. Secretary, Rhigos and District Radio Club). In this Mr. Hamer stated that arrangements had been made for 12 entries to be sent to A.R.R.L. from Wales to give every assistance to GW3ZV in bringing the Braaten Trophy to Wales.

It was reported that the Secretary had explained to Messrs. Banner and Hamer the reasons which prompted the Council to make their decision.

Banner and Hamer the reasons which prompted the Council to make their decision.

Resolved not to publish the letter from Mr. Banner and to advise Mr. Hamer that in the view of the Council the explanation given by the Secretary is entirely satisfactory.

The 1951 Festival of Britain Exhibition.

The Secretary was instructed to enquire whether it is possible for the Society to participate in this project. It was suggested that the Society should operate an amateur radio station at the Exhibition.

Exhibition.

Exhibition.

I.A.R.U. 25th Anniversary Congress.

It was agreed to inform I.A.R.U. Headquarters that the Society would be prepared to consider sending delegates to a 25th Anniversary Congress in Paris in 1950, providing there will be opportunities to discuss such matters as Band Planning and Operating Codes of Practice.

Membership. Resolved-

(a) to elect 110 Corporate Members, 26 Associates and 5 Junior Associates (total elected 141).

(b) to grant Corporate Membership to 8 Associates who had

to grant Corporate Membership to S Associates who had applied for transfer. to grant affiliation to the East Surrey Radio Society, the Kingston and District Amateur Radio Society, the Montrose Radio Club, the S.D.U. Amateur Transmitting Society and the Southport Radio Society. Band Planning.

Consideration was given to a revised Band Plan put forward by the Codes of Practice Committee.

Bearing in mind that many of the proposals contained in the plan are coming into operation voluntarily it was considered that the Society would be unwise to request the G.P.O. to embody any form of plan into the amateur licence.

(a) to publish the revised R.S.G.B. Band Plan as drawn up

by the Codes of Practice Committee, together with a strong recommendation that it be adhered to voluntarily by all U.K. transmitting amateurs. (b) that a copy of the plan be sent to all European I.A.R.U.

Societies.

(c) to ask the Societies in question to recommend to their members that the plan be adhered to voluntarily.
 (d) to print 2,000 copies of the plan in card form for the

use of members.

General Secretary's Service Agreement.

General Secretary's Service Agreement,
Resolved to renew the General Secretary's Service Agreement
for a further period of three years as from July 1, 1949.
Accident Insurance, Council Members.
Resolved to effect an insurance in the sum of 10/- per capita
on behalf of the members of the Council against accidents
incurred whilst travelling or engaged on Society business.
Regional Representatives Conference,
Resolved to hold a Regional Representatives Conference in
Birmingham on Saturday, April 23, 1949, for the purpose
primarily of discussing the operation of the present scheme of
representation.
F.O.C. Badge.
Mr. Amos drew attention to the fact that the badge adopted
by the First Class Operators' Club (F.O.C.) is similar to the
R.S.G.B. badge, in so far as the symbols used (aerial, condenser
and earth) are concerned. It was agreed to discuss this matter
with representatives of the club.
The meeting terminated 45 9.25 p.m.

The meeting terminated at 9.25 p.m.

#### Representation

The following are additions or alterations to the list of Representatives published in the February, 1948, and subsequent issues :-

#### County Representatives

Region 2. ... J. P. Featherstone, BRS16417, 208A Psalter Lane, Ecclesall, Sheffield, 11. Yorkshire West

Region 12. Aberdeenshire, Banffshire and

Kincardineshire ... B. McDavidson, GM3ALZ, 42 Smith-field Drive, Aberdeen.

#### Town Representatives

Region 1. Cheshire-

... J. Taylor, G2BJT, Hollinwood, Ridge Stockport ... End, Marple.

Region 4. Leicestershire—

... L. Milnthorpe, ... Drive, Thurmaston. Milnthorpe, G2FMO, 3 Winster Leicester ...

Northumptonshire-

L. Critchley, G3EEL, 36 Waterloo Road, Peterborough

Region 5 Norfolk

Great Yarmouth ... P. J. C. Harrison, G3CFK, 63 South-town Road.

Region 7.

London North Southgate ... E. Profaze, BRS6942, 106 The Mall, N.14. ... L.

London South

Wandsworth ... A. R. Dyer, BRS11228, 28A Isis Street, S.W.18.

Region 8.

Berkshire

... F. Hill, G2FZI, 997 Oxford Road. Reading ...

Hampshire-

... J. Singleton, BRS9196, 51 Walcott Christchurch Avenue,

Region 9.

Deconshire-

... A. E. Cornish, G2DOW, 5 Well Street, Torrington. North Decon

Dorset-

Dorchester and Weymouth A. Barrett, G5UF, Moigne Court, Owermoigne, Nr. Dorchester. ... A.

Region 12.

Kincardineshire-

... A. J. A. Law, GM3EHH, 25 Cameron Street. Stonehaven

Banffshire-

... I. Sutnesstreet. Sutherland, GM3EZO, 15 High Buckie

Region 13.

Fifeshire-Dunfermline ... C. A. M. Clackson, GM8KR, 24 Blake

Channel Islands. Guernsey

W. E. Butt, GC2FZC, Meo Voto, Green Lanes, St. Peter Port.

#### Radio Amateurs' Examination

Forty of those who attended the special course of instruction at the Hford Literary Institute entered for the 1949 Radio Amateurs' Examination. During the session there was an average attendance of 24 out of 35 in each of the two classes.

#### FORTHCOMING EVENTS

#### REGION 1

Ashton-under-Lyne.-June 5, 3 p.m., New Jerusalem Schools,

Ashton-under-Lyne.—June 5, 3 p.m., New Jerusalem Schools, Katherine Street.

Birkenhead (Wirrall R.S.).—May 25, June 8, 8 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

Blackpool.—May 17, 7, 30 p.m., 53 Queen Street.

Bolton.—June 7, 8 p.m., Y.M.C.A.

Burnley.—June 1, 7,30 p.m., Mechanics Institute, Manchester

Road.

Bury.—June 9, 7.30 p.m., Atheneum, Market Street, Darwen and Blackburn.—May 27, 7.30 p.m., Weavers

Institute, Darwen.—May 27, 7.30 p.m., Weavers Institute, Darwen.

Manchester.—June 13, 7.30 p.m., Reynolds Hall, College of Technology, Sackville Street.

Preston.—May 27, 7.30 p.m., Three Tuns Hotel, North Road. Oldham.—May 25, June 8, 7.30 p.m., Civic Centre, Clegg Street.

Street.
Rochdale.—June 5, 3 p.m., Drill Hall, Baron Street.
Southport (S.R.S.).—May 16, June 20, 7,30 p.m., 38a Forest
Road (Nr. St. Lukes Station).

#### REGION 2

-May 27, June 10, 7.30 p.m., King George Hotel, Barnsley .-Peel Street.

Bradford.-May 31, 7.30 p.m., Cambridge House, 66, Little Horton Lane.

Horton Lane.

Catterick.—Tuesdays, 7 p.m., Loos Lines, Catterick Camp.

Darlington.—Thursdays, 7.30 p.m., Club Room, British
School Yard, Skinnergate.

Doncaster.—Wednesdays, 7.30 p.m., 73 Hexthorpe Road.

Harrogate.—Wednesdays, 7.30 p.m., rear of 31 Park Parade.

Hull.—May 25, 7.30 p.m., Ye Olde White Harte, Mytongate.

Middlesbrough.—May 23, June 6, 7.30 p.m., 400 Linthorpe Road.

Newcastle-on-Tyne,—May 23, June 20, 8 p.m., British Legion Rooms, 1 Jesmond Road. Sheffield,—May 25, 8 p.m., Dog and Partridge, Trippet Lane. June 8, 8 p.m., Albreda Works, Lydgate Lane. South Shields.—Thursdays, 7,30 p.m., Trinity House, Laygate. Spenborough.—May 25, June 8, 7,30 p.m., Temperance Hall, Cleckheaton.

York. Wednesdays, 8 p.m., 29 Victor Street.

South Birmingham.-May 1, 15, June 12, 10.30 a.m., Stirchley

Stourbridge.—May 20, 8 p.m., Corn Exchange Vaults, Market Street. June 18, 7.30 p.m., King Edward's School. Talk by G2MI.

#### REGION 5

Southend .- May 25, 7.45 p.m., G2SO, The Chalet, Woodside, Leigh-on-Sea.

#### **REGION 7**

London.—May 27, 6.30 p.m., Institution of Electrical Engineers. Tea 5.30 p.m. "The Design of Communication Receivers"—D. W. Heightman, G6DH.
Barnes and Putney.—June 14, 7.30 p.m., 28 Nassau Road, S.W.13.
Barnet.—June 11, 7.30 p.m., Bunny's Restaurant, 15 Station P. D. J. New P. 200

Road, New Barnet.

Chingford.—May 26, 8 p.m., G3AOE, 1 Essex Road. June 9, 8 p.m., G4CA, 1 Templeton Avenue.

Croydon (Surrey R.C.C.).—June 14, 7.30 p.m., Blacksmiths

Arms, South End.

Edgware (E. and D.R.S.).—May 25, June 1, June 8, 15.

St. Michaels School, Flower Lane, Mill Hill.

Enfield.—May 15, 3 p.m., George Spicer School, Southbury

Road. Hayes.—June 6, 7.30 p.m., The Vine, Uxbridge Road, Hillingdon.

Hillington.

Hoddesdon.—May 19, June 2, 8 p.m., Salisbury Arms Hotel.

Holloway (Grafton R.S.).—7.30 p.m., Grafton School,
Eburne Road, N.7. (Mondays, Wednesdays and
Fridays).

Poolsbon.—Lune 6, 7, 30 p.m. The Kentish Droyer, Rye Lane.

Peckham.—June 6, 7.30 p.m., The Kentish Drover, Rye Lane. St. Albans.—June 8, 8 p.m., The Beehive, London Road. Slough.—May 19, June 16, 7.30 p.m., Labour Memorial Hall, Chandos Street.

Wanstead and Woodford.—May 30, 8 p.m., G2BCX, 111 Maybank Road, South Woodford, E.18. Welwyn Garden City.—June 7, 8 p.m., Council Offices.

#### REGION 8

Portsmouth.—Tuesdays, 7.30 p.m., at The Radio Club Room, Eastney Barracks. Southampton.-June 4, 7.30 p.m., 22 Anglesea Road, Shirley.

#### REGION 9

Exeter.—June 3, 7 p.m., Y.M.C.A., 41 St. Davids Hill. Plymouth.—June 18, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Judes. Torquay.—June 18, 7.30 p.m., Y.M.C.A., Castle Road.

#### REGION 14

Ayr.—May 25, Royal Hotel, Prestwick. Glasgow.—May 25, 7 p.m., 39 Elmbank Crescent.

#### London I.E.E. Meeting

Mr. A. D. Gay, G6NF (Past President), was in the Chair at the Meeting of the Society held on Friday, April 29, 1949, at the Institution of Electrical Engineers, when Mr. R. W. Lowden of the British Sound Recording Association lectured to about 100 members on "Some aspects of high-quality Sound Recording and Reproduction."

At the conclusion of the discussion Mr. W. H. Allen, M.B.E., G2UJ, voiced the thanks of the meeting to Mr. Lowden, who had the assistance of Mr. Leek in much appreciated demonstrations of high quality reproduction.

It is hoped to publish Mr. Lowden's paper in a future issue of the R.S.G. B. BULLETIN.

#### Ceylon QSL Bureau

Mr. J. Dawson Burgess, VS7JB, has informed the Society that the new registered address of the Ceylon QSL Bureau is P.O. Box 907, Colombo.

#### Channel Islands

Amateur activities continue at a high level in the Islands. There are now 16 licensed stations in Jersey; 8 in Guernsey and one (GC2BMU) in Alderney. A local Society has recently been formed in Guernsey with 21 members present at the inaugural fleeting. GCSOK was elected President with GC2FZC as Secretary/Treasurer.

#### Gravesend Amateur Radio Society

The Society is providing a stand at the hobbies exhibition organised by the Combined Gravesend Societies Committee on May 14–21 at the Town Hall. The normal weekly meetings of the Society, whose membership now exceeds 30, are held at the Clubroom, 30 Darnley Road, on Wednesday evenings and include a Morse class as well as technical lectures. The Hon. Secretary is Mr. R. E. Appleton, 23 Laurel Avenue.

#### **Hawick Radio Society**

A highly successful "Spring Conventionette" was held recently at Hawick, Roxburghshire, when visitors attended from many parts of the Border country. Of the 41 enthusiasts present, 17 were licensed amateurs. The talks included "Breaking into Ham Radio," by Mr. S. Young (G2YY) and

"My Trip to W-Land," by Mr. D. Maxwell of Galashiels. The Secretary, Mr. W. McMahon (GM3CV), gave a report on the activities of the Society which now holds the appropriate callsign GM3HRS.

#### Isle of Man Amateur Radio Society

The Annual General Meeting of the Society will be held at the Ridgeway Hotel, Douglas, on Tuesday, May 17, at 7.30 p.m., to which all amateurs resident on the Island are cordially invited to attend.

New headquarters at The Nook Pavilion, Quarter Bridge, are proving a happy choice. Meetings are held on Tuesday evenings.

#### Radio-Controlled Models Society

An increasing interest is being shown in experimental work on the remote control of models by radio. The London Group of the R.C.M.S. has recently started a series of monthly lectures intended to cover the whole field of radio-control. These meetings, to which visitors are welcome, are usually held on the second Sunday of each month at the St. Ermins Hotel, S.W.I. Full details may be obtained from the Hon. Group Secretary, Lt. (L) G. C. Chapman, R.N., Pine Corner, Heathfield, Sussex.

#### Surrey Radio Contact Club

Surrey Radio Contact Club

The eighth A.G.M. was held on April 12th, 1949 at the Blacksmiths Arms, South End, Croydon, when the following members were elected to serve on the committee for the year 1949/50:—Chairman, C. W. Crook (G5BT); Vies-Chairman, K. Guy (G2DN); Hon. Secretary, L. C. B. Blanchard (BRS3003) Hon. Treasurer, S. E. Janes (G2FWA) and Messrs. K. W. Drummond (G2AUS), R. Dabbs (G2RD), J. Haydon (G3BLP) and R. M. Herbert (G2KU). Mectings are held at 7.30 p.m. on the second Tuesday in each month at the above address.

The Chub has been pleased to extend a welcome to several overseas amateurs during recent months including, VK3JP, ZL1LD, W3TR and VQ3EDD (now licensed as G5YM.) About 90% of chub members also belong to the R.S.G. B.

90% of club members also belong to the R.S.G.B.

#### Traveller

Ben Wallich, well-known to the DX fraternity as G6BW and more recently as ZLIGN, has been posted to a special job in Australia. Letters can be sent c/o Bank of N.S.W., 341 George Street, Sydney, New South Wales.

#### LETTERS TO THE EDITOR

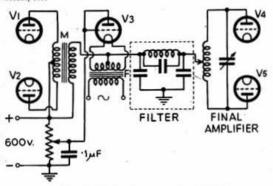
#### Speech Clipping

DEAR SIR,—The article by Mr. P. F. Cundy (G2MQ) in the Spring "Proceedings" was a pleasure to read—one rarely sees so much straight information set down in so little space. I am

writing to add just a few words.

The "tilting" which sometimes takes place when using a low-level clipper seems to result from insufficient iron in the modulation transformer. In extreme cases this tilting can cause the modulating waveform to become practically triangular. Thus the use of a low-level clipper may require some redesign of the modulators.

For plate-modulated systems the high-level clipper has one advantage not found in the low-level clipper, in that it is immune to changes in final-amplifier plate current such as may result from changing frequency, rotating a beam aerial, rain or ice on the



The Speech Clipping Circuit used by W3GKP

Modulation Valves
Type 210 Valve.
Power Amplifier Valves. VI, 2 V3 V4, 5

Modulation Transformer.
Filament Transformer.
Bleeder resistance to be adjusted to least positive voltage which prevents negative peak overmodulation.

The high-level clipper can be used in shunt form. I had one according to the diagram which used a diode-connected type 210 valve. With 600 volts on both the modulators and modu-lated stage, and a positive bias of 75 or 100 volts on the clipper plate, upward modulation of about 130 per cent, could be had plate, upward modulation of award.
without overmodulating downward.
WILLIAM L. SMITH (W3GKP).

Silver Spring, Maryland, U.S.A.
P.S.—Note that this keeps the modulation transformer well loaded throughout the entire modulation cycle.

DEAR SIR,—I am obliged to you for allowing me to comment on the interesting letter from Mr. Smith. (1) "Tilting" results from a too restricted low-frequency response and too little iron can certainly cause this. The effect does not appear serious with the popular English make of multi-ratio modulation transformers if used within their rating. (2) The immunity of the high level clipper to changes of final

anode current is an advantage of the high level clipper not

mentioned by me.

mentioned by me.

(3) The high level shunt clipper is certainly worthy of note and it was omitted from the original article since at the time of preparation I had no experience of it. W3GKP's remarks are therefore very useful. The shunt diode circuit prevents voltage transients being produced by sudden removal of the load but it does increase the cathode current and dissipation of the modulator valves, by making the load impedance very low during conduction of the diode;

Yours faithfully.

Yours faithfully, P. F. CUNDY (G2MQ).

#### Transformers for Mains Voltage Regulation

DEAR SIR,—Mr. A. H. S. Bridgman (G3BAA), whose letter and diagram you published on page 211 of the February issue, has surely gone astray in his assessment of the relative sizes of his transformer and the auto-transformer described by Mr. L.

nis transformer and the auto-transformer described by Mr. L. Bergna (BRS14342) in the October 1948 issue.

Mr. Bergna clearly shows that the "frame" size of his transformer, for a maximum output, of 255 volts at 2-08 amps, (i.e. 530VA) is 50 × 2-08=104VA. This latter rating is that of a double wound transformer which could be accommodated on the series of output.

the same size of core.

The "frame "size of a transformer as shown in Mr. Bridgman's diagram, to give the same output and tapping range of that described by Mr. Bergna, can be calculated as follows:—

Ratio :—P/S = 
$$\frac{205}{50}$$
 = 4·1  
Max. primary voltage = 255

255

... Max. secondary voltage  $\frac{255}{4\cdot 1} = 62$ "Frame" VA rating  $62 \times 2 \cdot 08 = 129$ Mr. Bridgman's transformer is therefore 24 per cent. larger than Mr. Bergna's, for the same rated output. The relative inefficiency of Mr. Bridgman's transformer is

due to two causes:

(a) Unnecessary duplication of turns in what is a partially double-wound design.

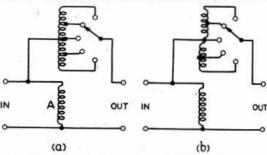
(b) Employment of a fixed input winding for varying input voltage, instead of a tapped input with constant volts per turn as advocated by Mr. Bergna. Yours faithfully,

N. ASHTON, A.M.I.E.E. (G3DQU). Timperley, Altrincham, Cheshire.

DEAR SIR,-The letter from Mr. A. H. S. Bridgman in the

Dear Sir,—The letter from Mr. A. H. S. Bridgman in the February issue raises some interesting points. It is somewhat misleading to refer to the power of an autotransformer supplying 255 V at 5 A as 1,275 watts, as an auto is rated by the transformed power, and thus depends on the input voltage. In the above example, with an input of 205 V, the power would be  $(255-205) \times 5 = 250$  watts, ignoring power factor.

The method described, however, is still essentially an auto-transformer, as will be seen by redrawing (Fig. 1a).
Even this will not reduce output voltage below input unless part of the tapped section is reversed (Fig. 1b) as moving the



selector switch either way from centre puts more turns in circuit. In fact, such a reversed, or bucking, section could, with convenience be replaced by tappings on the main winding A, which brings us back to the conventional auto-transformer.

This method, therefore, appears to possess no advantages over the ordinary auto-transformer, but actually requires more wire.

Yours faithfully,

E. J. HATCH, Grad.I.E.E.

Greenhithe, Kent.

DEAR SIR,—After reading the above letter and re-reading Mr. Bergna's article, I have to withdraw, unconditionally, my remarks on the size of auto-transformers! But my suggestion re the use of an odd-secondary mains transformer still goes.

Yours faithfully,
A. H. S. BRIDGMAN, B.Sc., (G3 BAA).

Stafford.

#### Empire DX Certificate and Badge

DEAR SIR.—I feel that I must write and tell you how much I and other East African amateurs admire the Empire DX Certificate and Badge which were recently awarded to me. They are surely the most beautiful awards in all Amateur Radio.

I offer my best thanks and heartiest congratulations to those

noner my best mains and heartiest congratulations to those who were responsible for the design and execution of these magnificent examples of British craftsmanship.

Incidentally it is, in my opinion, infinitely more difficult to qualify for the Empire DX Certificate than for the A.R.R.L. DXCC.

Yours faithfully, E. ROBSON, M.P.S. (VQ4ERR).

Nairobi, Kenya Colony.

#### Around the Trade

The Transmitting and Industrial Valve Department of Mullard Electronic Products Ltd., Century House, Shaftesbury Avenue, London, W.C.2, has just issued the first of a series of "News-Letters" designed for the information of valve users. Technical information, and news about valve types for transmitting and industrial purposes will form the major contraction. tents of the sheet which—to begin with—will be issued quarterly.

The firm of Grand Arcade Radio, Leeds, known to many North Country amateurs, has recently closed down. The proprietor, Mr. Dobson, G8OG, is discontinuing his business connections with radio.

G2AK

# This Month's Bargains

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JUST THE THING TO TAKE AWAY WITH YOU ON YOUR HOLIDAYS

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FOR ALL YOUR HAM REQUIREMENTS

CHAS. H. YOUNG G2AK, The Red House, Phillips St., Aston, B'ham 6.

Phone: ASTon Cross 3381.

## Silent Keys

We record with sorrow the passing of Mr. Colin Bridgewater, G3BKU, and Mr. F. A. Bech, HB9CE.

Mr. Bridgewater served with the Signals Branch of the R.A.F. in India during the war and after his return home he applied for and was granted a licence under the call, G3BKU. He joined the Society in 1943.

Mr. Frank Bech who had been a member of the Society for some years, was well known personally to a large number of U.K. amateurs.

In 1936, at the age of 33, he took over a small electrical concern in Zurich which he developed in the course of 13 years into a large and successful radio business. He became licensed as HB9CE in 1937, and within a short space qualified for the DXCC and other awards.

Just before the war he operated for a time from the principality of Licehtenstein, where his station (HEICE) became one of the most sought after by DX operators.

His business premises were a meeting place for amateurs

His business premises were a meeting place for amateurs

from all over the world.

At the time of his death—due to electrocution whilst operating his station on 28 Mc/s, telephony—he had every-thing in readiness for participation in the Swiss National Field Day, an event to which he always looked forward with great enthusiasm.

To the President, Council and Members of U.S.K.A. we extend our deepest sympathies in the great loss they have sustained. To his relatives we offer sincere condolences

#### Around the Trade

Messrs. Chapman and Hall Ltd. announce that they have acquired from Pilot Press Ltd. their complete list of Scientific and Technical books. This list includes the well-known "Frontiers of Science" series, which will be continued in its present form with further additions. All enquiries for these books should be addressed in future to Messrs. Chapman and Hall Ltd., 37 Essex Street, Strand, London, W.C.2, or to Book Centre Ltd., North Circular Road, Neasden, N.W.10.

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B.S.W.L. Join British Short Wave League—over 20 departments (Q.S.L. Bureau, DX Certificates, Technical, Translations, etc.). Members receive "Short Wave Review" each month. For details send S.A.E.—H.Q., 145 Uxendon Hill, Wembley Park, Middlesex.

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All Thermador material as advertised last month is still available. All R.C.A. material with the exception of 425/0/425 still available. LATEST addition to R.C.A. range:

DRIVER TRANSFORMER P.P. 6L6 anodes to P.P. TZ40 or 811 grids. 1-74 to 1. Completely screened. Split Secondary at 15/-. CRYSTALS. 7,000 to 7,300, FT4 holders, your choice of freq., 12/6. 3,500 to 3,800, B.C.610 fitting. Your choice of freq., 15/-. For 144. 6,000/6,083, 8,000/8,200, 9,000/9,250. FT.4 Holders, at 15/-. R.C.A. 100 Kc/s bar. Sub-standard, 30/-.

VARIABLE CONDENSERS. Transmitter. Hammerlund 1,500 V. wkg. 30μμF, 60μμF, 100μμF, 120μμF, 140μμF, ceramic ins., at 5/- each. 50 + 50 at 7/6 each.

VALVES. TRANSMITTER. 866, 25/-; 836, RG240A, 20/-; FG17, 20/-; 5U4, 10/-; 5R4GY, 7/6; 250TH, £3; 100TH, 35/-; 304TL, £3; 805, 45/-; 388A, 25/-; 811, 45/-; 808, 37/6; 211, 20/-; 813, 60/-; CV57, 30/-; HK257B, 60/-; 807, 6L6, 12/6; 931A, Elec. Mult., 30/-; 2C26, 10/-.

VALVES. RECEIVER. 6C5, 6B8, 6SJ7, 6K7, 6G6, 6SK7, 6SH7, 6AC7, 1852, 6SC7, 6SN7, 6AG7, 6H6, 6SL7, 6K6, 1A5, 37, 12SK7, 12A6, 1619, 12SR7, 12SL7, 12SG7, 12K8, 12SJ7, 12SA7, 12J5, 12C8, 9001, 9004, 955, 3S4, 1T4, 1L4, 1S5, 1A3, all at 7/6 each. 6F6, 6V6, 6L7, 1613, 6K8, at 8/-. 884, 7/-. 717A, 12/6. 20S1, 7/6. 5W4, 5V4, 5Z4, at 7/6. 2C22, 3/-. VR105, 7/6. VR150, 8/-.

I.F. TRANSFORMER. 5.2 Meg. Set of 4 incl. Discriminator. Hallicrafter at 20/- set.

BIAS TRANSFORMER. 230 V. Primary. 175/0/175+40/0/40 at 7/6.

SYLVANIA. IN21 Crystal. Diodes at 5/-.

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POWER UNITS. RA34H. 110/230 V. input, 1,000 V. D.C. at 400 mA, 12 V. 141 Ampere, £12/-/-.

TYPE 45. Input 230 V. 50 c/s. Output, 1,200 V. at 200 mA. Metal rectification, £10/-/-.

AUTO TRANSFORMERS. 230/115 21 kVA., £5/-/-.; ditto Kenyon, I kVA., £3/-/-.

CONDENSERS. T.C.C. 4 \( \mu f. 2,000 \) V. wkg., size 4" \times 4" \times 3", at 5/-.

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R.1224.A 5 VALVE BATTERY SUPERHET. A superb ex R.A.F. receiver covering 1.0-10.0 Mc/s. in 3 switched bands. Circuit employs RF stage. Has Muirhead precision slow motion dial, aerial trimmer, sensitivity control, reaction control, etc., etc. Operating voltages 120v. HT, 9v. GB, 2v. LT. An ideal set for club field days.

Complete with valves, and all BRAND NEW IN MAKERS PACKING. ONLY 99/6 (carriage 7/6).

THE A.C.R. 1155 COMMUNICATIONS RECEIVER. This receiver is too well known for the specifications to be repeated here. It is now available complete with speaker and power pack ready to operate from AC mains, at ONLY £18-10-0, and an illustrated leaflet is available on request.

R.3084 RADAR RECEIVER. An ideal unit for conversion to a vision receiver, and to assist intending constructors we supply with each unit full details showing how this can be done. Contains valves as follows: 2 EF54, 1 EC52, 7 EF50, 1 VU39A, 1 HVR2, 1 EA50, and a 30 Mc/s. IF strip. BRAND NEW IN MAKERS PACKING. ONLY 75/- (carriage 10/-).

INDICATOR UNIT 62A. The cheapest way of buying EF50s and a VCR97 tube. Besides the tube it contains 12 EF50s, 2 EB34s, 4 SP61s, and 3 EA50s, besides of course, shoals of condensers, resistors, etc., etc. ONLY 89/6 (carriage 10/-, plus 10/deposit on transit case).

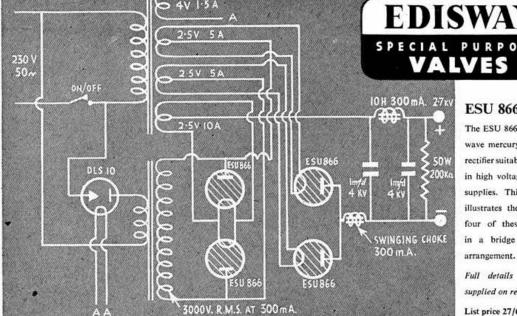
MIDLAND TELEVISION CONSTRUCTORS should now be preparing for the opening of the Sutton Coldfield station, which is scheduled to start test transmissions in early July. Undoubtedly the cheapest method of constructing a Television Receiver is from ex Govt. Radar Gear, and our 26 page data priced at 7/6 shows how to convert a Radar Indicator containing the CR Tube, and a Vision Receiver IF Strip, into a first class Televisor. The two items mentioned cost £6-10-0, the data being supplied gratis, but to those who would like to read the data first we will credit the cost against the purchase of the two units within 14 days. All additional components and power supplies are available ex stock, and in the majority of cases are probably in the constructors "stock box." However, a complete schedule is available and is supplied. When ordering by post please add 12/6 carriage plus 10/- deposit on transit case, for the above Radar Items.

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The ESU 866 is a half wave mercury vapour rectifier suitable for use in high voltage power supplies. This circuit illustrates the use of four of these valves in a bridge rectifier

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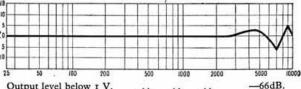


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