R.S.G.B Bulletin

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

Vol. 31 No. 2 | AUGUST, 1955 | Price 2/6 Monthly

R.S.G.B. BULLETIN

Devoted to the Science and Advancement of Amateur Radio

Vol. 31, No. 2 **August, 1955**

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ADVERTISEMENT MANAGER: HORACE FREEMAN
ADVERTISING OFFICE: THE NATIONAL PUBLICITY CO., LTD.,
36-37 UPPER THAMES STREET, LONDON, E.C.4
Telephone: CENtral 0473-6

Published on or about the 15th of each month as its official journal by the Radio Society of Great Britain and issued free to members.

Closing date for copy is the 22nd of the month preceding publication.

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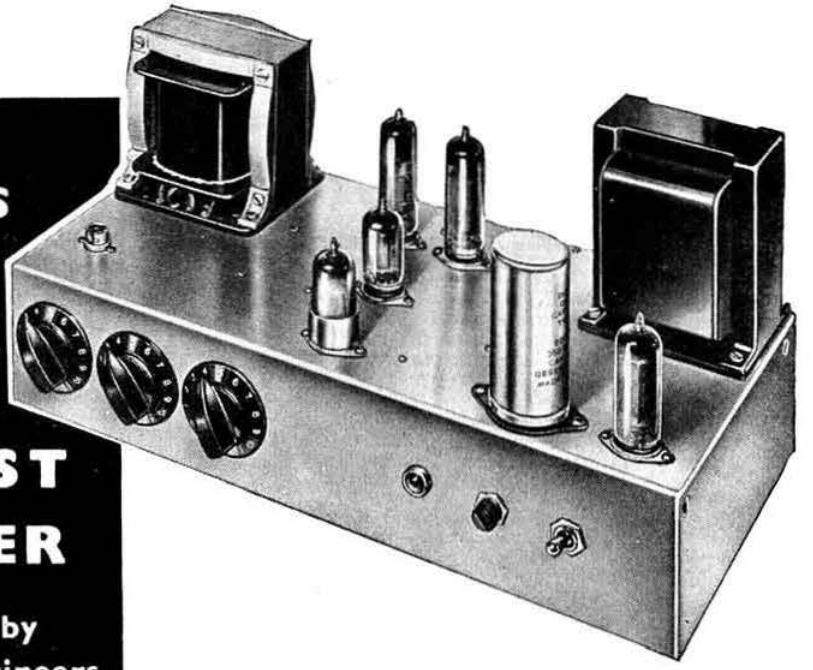

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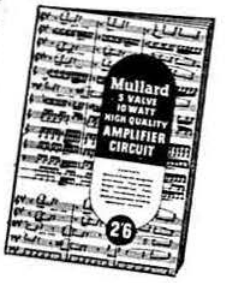

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Current Comment

International Talking

TO the newer generation of radio amateur the initials I.A.R.U. may signify little; and it must be confessed that the International Amateur Radio Union may not have been dynamically active enough to cause him to remember them.

In the last half dozen years the dormant condition has been shaken off, especially in Europe. Lively and successful conferences took place in Paris and Lausanne in 1950 and 1953, and in 1956 there is to be another of these international meetings, this time in Italy, and delegates will attend from most of the several countries in the telecommunications Region I*. The activities of the co-ordinating body, known as the Region I Bureau of the I.A.R.U., are financed from the contributions from all the national Member-societies in the region.

The 1956 gathering in Italy may well prove to be a momentous one. It will precede the "professional" C.C.I.R. technical convention which is to be held in Warsaw in August, 1956, and the full-scale I.T.U. convention which is expected to be held shortly afterwards—probably in Geneva during 1957.

Already the Council of the R.S.G.B. in considering a list of items which might usefully be put on the agenda for the Italian meeting, has included the question of I.A.R.U. representation at both the Warsaw and Geneva conferences. The "professionals" cannot be expected at these conferences magnanimously to take account of amateur requirements, and only by positive representation by the Amateur Radio movement can these requirements be voiced.

This positive representation brought results at the I.T.U. Conference of 1947 in Atlantic City, in spite of the fact that it was borne almost wholly by the two R.S.G.B. representatives, speaking for the Amateur Radio movement of the entire world. It must be repeated at the next I.T.U. conference and a united voice expressed by the collective strength of several national societies will be the means of achieving it.

The importance of the 1956 Italian conference of Region I I.A.R.U. societies will thus be appreciated. The Region I societies, who look to the R.S.G.B. for leadership—and the status of British Amateur Radio on the Continent and in Africa is tremendously high—will be expecting us to send a strong contingent. They will not be disappointed.—J. H.

**Region I comprises Europe and Africa, i.e., approximately a segment through the Eastern half of the Western Hemisphere of the globe.*

Surrounded by Video

IN just about five weeks' time television broadcasting will commence in London on 195 Mc/s. On September 22 the first so-called independent television station is to start operation.

Hitherto most operators on the 2 m amateur band have felt that, with the nearest television allocation just about 100 Mc/s below them, they could operate in peace and give a sigh of relief at the freedom from TVI which may have kept them off the lower bands.

When the new TV Band III comes into use in five weeks' time the v.h.f. worker will be flanked with video on either side of his 2-metre spectrum.

It may well prove to be the case that Band III broadcasting causes no more trouble to the amateur experimenter, nor he to the Band III viewer, than is at present experienced in respect of Band I. But the danger would appear to be more real on Band III that sundry unexpected beat effects between amateur transmitter and receiver local oscillator will take place. Another thing to remember is that, roughly, television broadcasting on 200 Mc/s is three or four times less effective than on 50 Mc/s, because receiver gain is frequently less and service range of the transmitter probably less. So altogether it looks as if signal-to-noise ratio at any appreciable range from a Band III station will be poorer than with a comparable Band I emission, and receivers therefore more susceptible to local interference. These conditions should be borne in mind by operators on the lower frequencies as well as those on 2 m, because quite small amounts of harmonic radiation, and interference wrought by key-clicks or over modulation, will be aggravated in consequence.

To many hundreds of members this is nothing more than preaching to the converted, meaning those who have brought their installations up-to-date by adequate shielding and filtering. For those who still remain unconverted—or if their transmitters are—then there are just five weeks left in which to do something about it.—J. H.

Amateur Radio at Earls Court

THE R.S.G.B. stand—No. 310 in the Gallery—at the National Radio Show, due to open at Earls Court, London, on August 24, will again provide a meeting place for radio amateurs. Whether members or not they can be assured of a warm welcome.

The display of amateur-built equipment should ensure a goodly crowd around the stand throughout the Exhibition period—the finest advertisement for the Society.—J. C.

THE R.S.G.B.

Band III Television Converter

A Tunable Unit for the reception of I.T.A. Broadcasts on Band I Receivers

By A. H. KOSTER, Dr. Ing. (G3ECA)*

Many television receivers at present in use were designed for operation only on channels in Band I. In this article the author describes a converter to enable such receivers to receive transmissions in Band III. The use of the latest types of v.h.f. valves and a highly stable trough line oscillator are important features of the design.

THE converter to be described has been designed with a view to obtaining high gain, high oscillator stability and a low noise figure. A new valve, the 7AN7/PCC84, which is exceptionally efficient at frequencies in the region of 200 Mc/s, is employed as the r.f. amplifier, while advantage has been taken of the high conversion conductance of one half of a 12AT7 in the frequency changer stage. Use of the latter type of valve is possible because the converter changes frequencies only from Band III to the corresponding ones in Band I, thereby leaving a substantial difference between signal and intermediate frequencies. The 12AT7 is not to be recommended in multi-channel converters in which Band I and Band III frequencies are changed to the new preferred television i.f. of 35 Mc/s. Here the difference is small—in particular on the London Band I frequency—and the 12AT7 has a tendency to become unstable. A pentode frequency changer, such as the 9U8/PCF82, is much more suitable.

*195 Woodford Avenue, Ilford, Essex

In order to make the converter usable with any type of Band I receiver, an i.f. stage is included which compensates for possible losses through mismatch in the connecting cable between the output of the converter and the input of the receiver.

The Circuit

The diagram in Fig. 1 shows the circuit of the complete converter with its power supply.

At 200 Mc/s, 300 ohm feeder has advantages over the more usual 70 ohm feeder and the r.f. stage (V1) has accordingly been designed for balanced input from 300 ohm ribbon. The stage is stable without neutralization but in order to reduce the Miller effect and the resultant damping of the input circuit, neutralizing is provided by means of C2. The value is not critical and C2 (2.7 $\mu\mu$F) is satisfactory for all Band III frequencies. L2 has been chosen so that C1 will tune it to the London and Birmingham channels.

The two triodes of V1 are coupled together by means of the output capacity of V1a, the input capacity of V1b and the inductance of L5 which together constitute a pi-network resonant at about 200 Mc/s. The data given for L5 cover all channels in Band III. Fixed bias is applied to V1b by means of a voltage divider across the 170 volts h.t. rail. Coupling to the mixer is provided by the tightly coupled loops L6 and L7.

One half of a 12AT7 (V2b) coupled to a capacity-loaded trough line is used as the oscillator. To ensure stability the grid and cathode connections are tapped

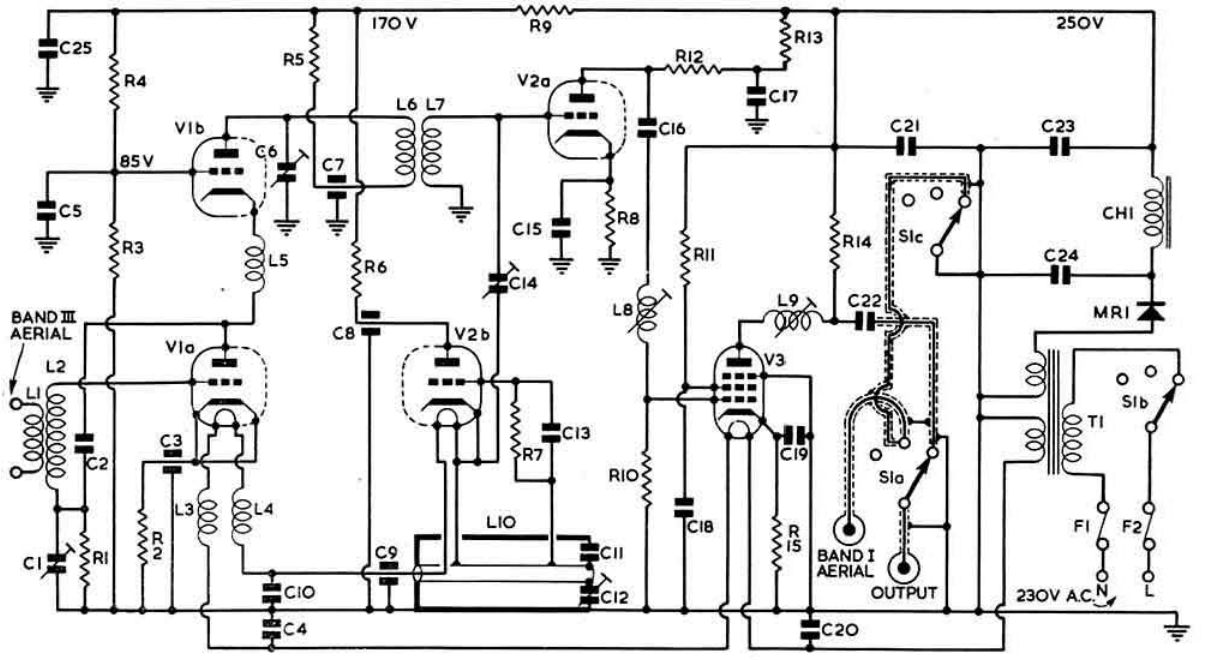


Fig. 1. Circuit diagram of the R.S.G.B. Band III Converter.

well down the line. It is inherent in arrangements of this type that the available heterodyne voltage is low and internal coupling from the oscillator half of the 12AT7 to the other which serves as the mixer, is not enough. In order to obtain optimum conversion external coupling must be added. This is done by fixing one end of C14 to the cathode of the oscillator so that the earth return of this condenser goes through part of the line. In this way, with 120 volts on the anode of the oscillator, a satisfactory heterodyne voltage of about 4.5 is obtained at the grid of the frequency changer. In areas where the mains are subject to severe fluctuations of say ±20 volts, it is advisable to stabilize the oscillator voltage by means of a G.E.C. stabilizer type QS150/45.

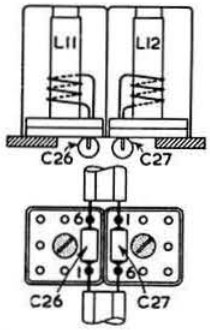


Fig. 2. Construction of a suitable i.f. trap. Winding details are given in the text.

The mixer (V2a) is followed by a single stage i.f. amplifier (V3) which feeds into 70 ohm co-axial cable. The series tuning permits large inductances to be used and the output circuit matches into any length of feeder.

The heaters of the valves are in series and require a 20 volt supply. For a.c. mains operation a Woden transformer is available. H.t. is taken from the 230 volt winding, rectified by a type DRM1B rectifier and suitably smoothed. Provided the converter is built into a *non-metallic cabinet,* a Woden transformer type MK25644, with one secondary giving 20 volts for the heaters may be used, the h.t. being taken direct from the mains supply.

The 7AN7/PCC84 has a 7.4 V heater but in the near future a corresponding 6.3 volt valve—the ECC84—will become available. This will enable those who favour parallel heaters to use a standard transformer.

For d.c. or universal mains operation, a 0.3A mains dropper has to be used. It should be appreciated that an extra 70 watts of heat have therefore to be dissipated so adequate ventilation must be provided. *In all cases where the chassis is live the usual precautions must be taken to ensure that metallic parts are inaccessible from the outside of the cabinet.*

A Yaxley type switch (S1a, b, c) breaks all aerial and mains connections in the *off* position. In the *Band I* position it connects the Band I co-axial cable straight through to the receiver. In the *Band III* position it supplies a.c. to the converter, shorts the Band I aerial input to chassis and connects the converter output to the receiver. It is optional whether the main receiver is switched on by the converter switch.

Break-through

The converter has no i.f. traps because only negligible break-through from Band I occurs, even with no Band III signal present in an area where Alexandra Palace is visible at aerial height from a distance of ten miles. The strength of the break-through signal was much smaller than ignition or other man-made interference. In the presence of Band III signals there was no trace of i.f. break-through. Nevertheless, it would be possible for it to occur if the field strength were exceptionally high and a suitable filter will therefore be described.

In cases of difficulty, it is advisable to verify that the break-through is getting in through the "front end" (converter) and not directly into the receiver. If, for example, a screening can is removed from one of the r.f. stages in the Band I receiver, severe break-through will be experienced. It also occurs if decoupling of h.t. rails, heaters or mains supply in the main receiver is insufficient. It is believed that many Band I receivers will be subject to interference of this nature and it is considered that screening and decoupling will be required

Components List for the Band III Converter

C1, 6, 8 $\mu\mu$F trimmer, Philips type E.7850.
C2, 2.7 $\mu\mu$F, T.C.C. type SCT6 or SCD1 or CC12SS.
C3, 7, 8, 1000 $\mu\mu$F, T.C.C. type CTH315/LT.
C4, 17, 18, 19, 20, 21, 1000 $\mu\mu$F, T.C.C. type CM20N.
C5, 1000 $\mu\mu$F, T.C.C. type CTH310.
C9, 500 $\mu\mu$F, T.C.C. type CM30.
C10, 500 $\mu\mu$F, T.C.C. type CTH310.
C11, 10 $\mu\mu$F, T.C.C. type SCT1.
C12, 10 $\mu\mu$F double spaced variable, Jackson Bros. type C.804.
C13, 47 $\mu\mu$F, T.C.C. type SCT1.
C14, 4.5 $\mu\mu$F max. trimmer, Wingrove & Rogers type C3201 (Webbs' Radio).
C15, 1000 $\mu\mu$F, T.C.C. type CTH310/S.
C16, 22, 100 $\mu\mu$F, T.C.C. type STC2.
C23 + 24, 32 + 16 μF, T.C.C. type CE28HA.
C25, 0.01 μF, T.C.C. type M3N.
C26, 27, 47 $\mu\mu$F, T.C.C. type SCT6.
CH1, 12 H 60 mA, Woden type PCF11.
L1, 4 turns $\frac{1}{2}$ in. i.d., 20 s.w.g. enam., pushed between turns 3, 4, 5 and 6 of L2.
L2, 7 turns, 20 s.w.g. enam., $\frac{1}{2}$ in. i.d., $\frac{1}{2}$ in. long.
L3, 4, 5, 7 turns, 26 s.w.g., on $\frac{1}{4}$ in. diam. polythene former, $\frac{1}{4}$ in. long.
L6, loop of $\frac{1}{4}$ in. o.d. copper tube, $1\frac{1}{4}$ in. long, $\frac{1}{16}$ in. wide.
L7, loop of $\frac{1}{4}$ in. o.d. copper tube, $1\frac{5}{16}$ in. long, $\frac{1}{16}$ in. wide.
L8, 9, 20 turns 24 s.w.g. enam., close-wound on Aladdin formers type PPF5938, with top plate type PP5973/6, "F" type cores No. PP5940. Aluminium cans type D/TV2 (John Dale Ltd.).
L10, trough line, 1 in. x 1 in., centre conductor $5\frac{1}{2}$ in. long x $\frac{1}{4}$ in., tapped $1\frac{1}{16}$ in. and $3\frac{1}{4}$ in. from cold end (see text).
L11, 12, 3 turns 20 s.w.g. tinned copper, spaced 2 diam., on Aladdin formers type PPF5938, with "F" type iron-dust cores No. FPP5940. Aluminium cans type D/TV2 (John Dale Ltd.).
MR1, Metal rectifier, Brimar type DRM1B.
R1, 47,000 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 9.
R2, 120 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 9.
R3, 4, 100,000 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 8.
R5, 11, 12, 13, 14, 1000 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 8.
R6, 12,000 ohms 1 watt, 20 per cent, Erie type 10.
R7, 10, 10,000 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 9.
R8, 680 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 9.
R9, 5,600 ohms 6 watts, Dubilier type A2 (wire terminals).
R15, 150 ohms $\frac{1}{2}$ watt, 20 per cent, Erie type 9.
S1a, b, c, three-pole, three-way, Yaxley-type switch.
T1, 230 V input, 230 V 50 mA, 20 V 0.3 A output, Woden type D3535, Lamination Stack 1" 29 A.
V1, PCC84/7AN7, Brimar.
V2, 12AT7, Brimar.
V3, 6AM6, Brimar.

MISCELLANEOUS

One Belling-Lee aerial socket type L733/S (Band III input).
One Belling-Lee aerial plug type L733/P (Band III input).
Two Belling-Lee co-axial plugs type L734/P.
Two Belling-Lee co-axial sockets type L604/S.
Two Belling-Lee fuseholders type L.510.
Two Belling-Lee fuses, 1A, $1\frac{1}{4}$ in. x $\frac{1}{4}$ in., type L1055.
Two McMurdo valveholders type XM9/UD1 with No. 8/75 screening cans (V1, 2).
One McMurdo valveholder type XM7/UD1 with No. 4/45 screening can (V3).
One cabinet, E. J. Philpott's Metal Works Ltd.

rather than i.f. traps. For those who may consider a modification of the coupling arrangement between the converter r.f. stage and the frequency changer to use a single series tuned circuit, it is pointed out that break-through becomes greater if this is done.

The converter itself should be completely screened. The perspex window fitted to the bottom of the model shown at the R.S.G.B. Amateur Radio Exhibition in November, 1954, was for demonstration purposes only and is normally replaced by a metal sheet.

If it is established that a filter is necessary the arrangement shown in Fig. 2 will be effective. A length of 20 s.w.g. tinned copper wire is fed through and soldered to eyelet 6 of an Aladdin former type PPF5938/6. The wire is then wound on for three turns with two wire diameter spacing and out again through eyelet 1 and anchored by soldering. Two coils of this type are made, put into screening cans side by side and plugged into the Band III aerial socket. The condensers C26 and C27 are arranged to form part of the 300 ohm aerial line. Tuning is achieved by use of dust iron cores.

The R.F. Stage

A short length of 300 ohm ribbon is connected to the Band III input socket and terminated by L1 as shown in Fig. 3. The turns of L1 are spread and meshed into L2 to make the coupling as tight as possible. Care must be taken not to damage the enamel. If a "live" chassis is being used, the feeder should be isolated from the coil by two ceramic 50 $\mu\mu$F, 500 V working condensers. L2 is mounted as a sub-assembly with C1, C2 and R1 (see Fig. 5c) and arranged for one hole fixing by means of the feed-through condenser C3. C1 will tune L1 to the London and Birmingham channels.

The layout of the components associated with the r.f. stage is critical but provided the arrangement illustrated in Fig. 3 and dimensions shown in Fig. 5 are closely adhered to, there will be no difficulty with instability. The dimensions of L6 and L7 shown in Figs. 5a and 5b are suitable for both London and Birmingham channels. Coupling between these coils must be as tight as possible; they are therefore arranged to touch each other initially and are then separated by sliding a thin sheet of mica 1 in. by 1¼ in. between them. To prevent the mica falling out, a little wax, such as that found on surplus coils, is placed on either side of L6 and quickly touched with a hot soldering iron. If L6 and L7 are separated beyond a certain critical distance the signal strength increases tremendously but at the expense of bandwidth and noise figure. This is due to regeneration; finally, a point is reached where the r.f. stage becomes unstable.

Coils L3, L4 and L5 are wound on short lengths of ⅛ in. diameter polythene (as used in television co-axial cable). With a pin, two holes $\frac{3}{16}$ in. apart are pierced through the polythene and the beginning and end of the winding pushed through them for anchorage. L5 should be at right angles to L3 and L4.

The Trough Line

The oscillator trough line (L10) is formed by utilizing the front and base of the chassis as two of the sides, adding the third by making a 16 s.w.g. aluminium angle piece 1 in. x ½ in. by 6 in. long. To take C11, the aluminium angle piece requires a slight indentation which is

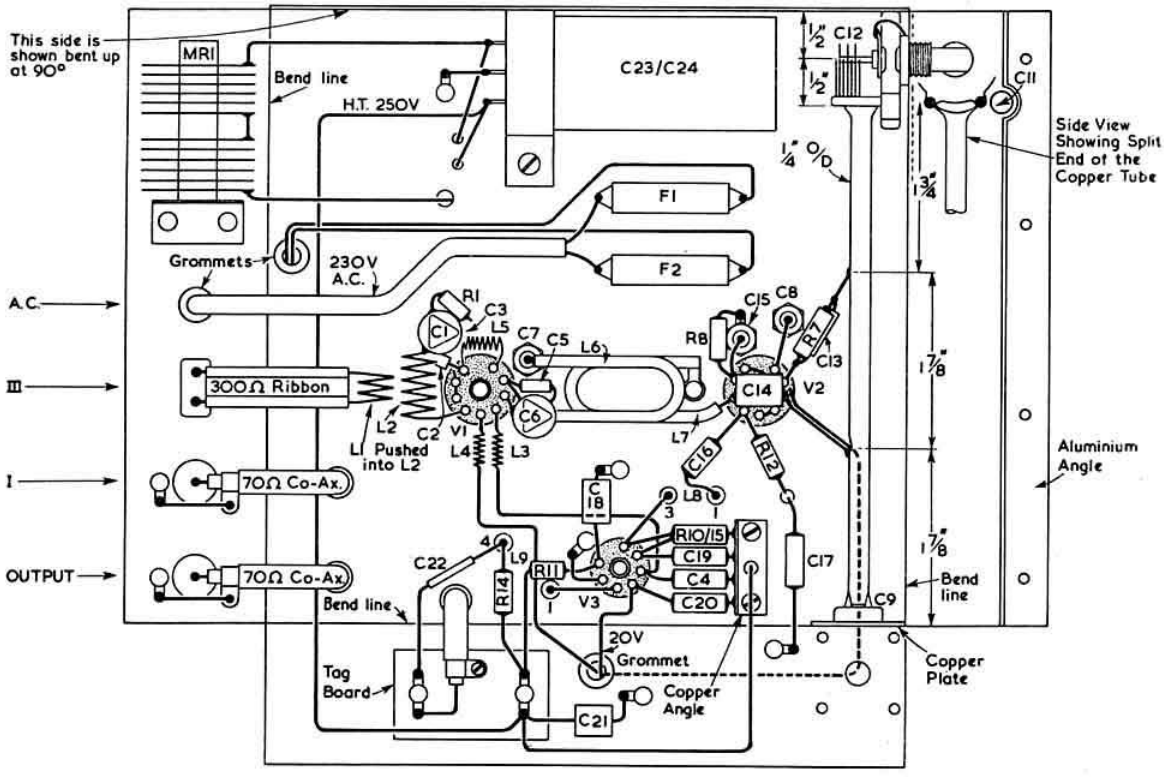


Fig. 3. Layout of the chassis seen from the underside.

made with a $\frac{3}{8}$ in. diameter round file by applying extra pressure whilst filing. This not only thins down the metal but also provides the indentation. The arrangement is illustrated in Figs. 3 and 4.

The line is prepared as a sub-assembly. A 1 in. by 1 in. copper plate with holes for 6 B.A. bolts $\frac{1}{2}$ in.

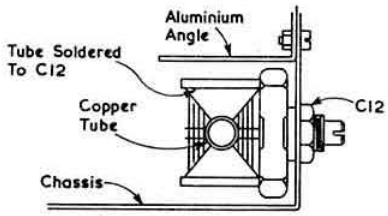
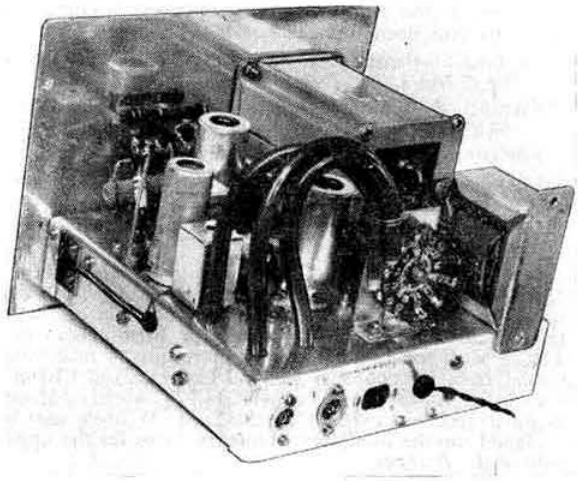


Fig. 4. Cross-section through the trough line showing the mounting of C12.

from each corner and a $\frac{1}{4}$ in. hole in the centre is made first; a mica-disc feed-through condenser C9 is soldered centrally to this plate. A length of 22 s.w.g. tinned wire for the heater supply to V2 is pushed through the centre of the mica-disc and soldered to it, Next, a piece of $\frac{1}{4}$ in. diameter copper tube is split at one end, C12 soldered to it, the tube cut to length and provided with a hole, $1\frac{7}{8}$ in. from the base, to let the heater wire through. Sleeving is pushed over the wire and the tube soldered to the tags of the mica-disc C9. When assembled, the line is held firmly in place by means of the fixing bolts for the copper plate and the nut on C12. The tag on C12 is cut short and connected to the collar with 16 s.w.g. wire (Fig. 3).

The heater wire, suitably sleeved, is fed through to the outside of the chassis, along which it runs for 3 in., and then in again through a grommet to V1.



A rear view of the Band III converter showing the above-chassis layout.

The Oscillator and Frequency Changer

Figs. 1 and 3 show how the oscillator trough line is connected to one half of V2. The oscillator anode (V2b) is decoupled by the feed-through condenser C8. H.t. is supplied *via* R6 situated on the upper side of the chassis (Fig. 7). C12 tunes the trough line from 120 to 160 Mc/s. From the end of the first to the end of the fifth minute after switching on, the oscillator frequency will drift 20 kc/s downwards, most of which occurs in the first two minutes. After five minutes, frequency variations are negligible.

According to the Stockholm allocations, London

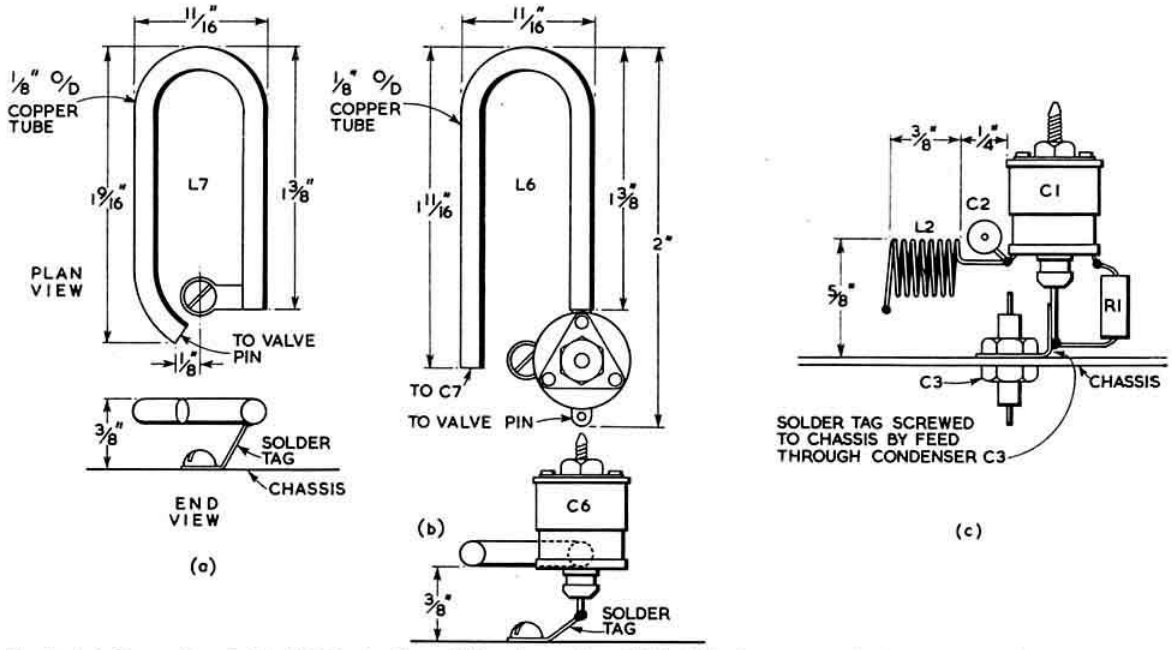


Fig. 5 (a) Construction of L7. (b) Construction of L6 and mounting of C6. (c) Arrangement of the components in the grid circuit of V1a. The diagram is reproduced actual size.

should receive Channel 6 and Birmingham Channel 9. However, at the time of writing only two channels in Band III had been released for television.

Channel 8—Birmingham: *Sound* 186.25 Mc/s; *Vision* 189.75 Mc/s.

Channel 9—London: *Sound* 191.27 Mc/s; *Vision* 194.75675 Mc/s.

For comparison, the Band I frequencies are:

Channel 4—Birmingham: *Sound* 58.25 Mc/s; *Vision* 61.75 Mc/s.

Channel 1—London: *Sound* 41.50 Mc/s; *Vision* 45.00 Mc/s.

Oscillator frequencies on the upper side of the channels cannot be used because the resulting vision and sound i.f.s. would be reversed. Therefore, the oscillator frequencies have to be 128 Mc/s for Birmingham and 149.77 Mc/s for London. It is interesting to note what would have happened if London had received Channel 8: 186.25 minus 41.50 equals 144.75 Mc/s! Multi-channel receivers with a fixed i.f. of 35 Mc/s can be designed for the oscillator frequency to be on the upper side of the channel.

At some future date the channels will be shared by other stations, *e.g.*, South Lancashire will use Channel 9 with sound on 191.25 Mc/s and vision on 194.75 Mc/s. In order to avoid interference under exceptional propagation conditions the London and Lancashire frequencies have been offset by a small amount, and have been chosen in such a way that line synchronisation troubles on the vision and whistles on the sound are avoided. This has led to the spacing between the vision and sound frequencies on the London channel being 13.25 kc/s less than usual. The converter oscillator should therefore be adjusted to produce a satisfactory sound i.f. The vision will be unaffected because the bandwidth of the i.f. stages is sufficient to accommodate the small shift of 13.25 kc/s.

A point which affects London viewers is the fact that the Alexandra Palace station transmits two sidebands and many commercial receivers of older design were made for upper sideband reception. So far as is known at the moment all Band III stations will conform to modern practice and transmit the lower sideband only. This will result in poor reception on such receivers. It is beyond the scope of this article, and in

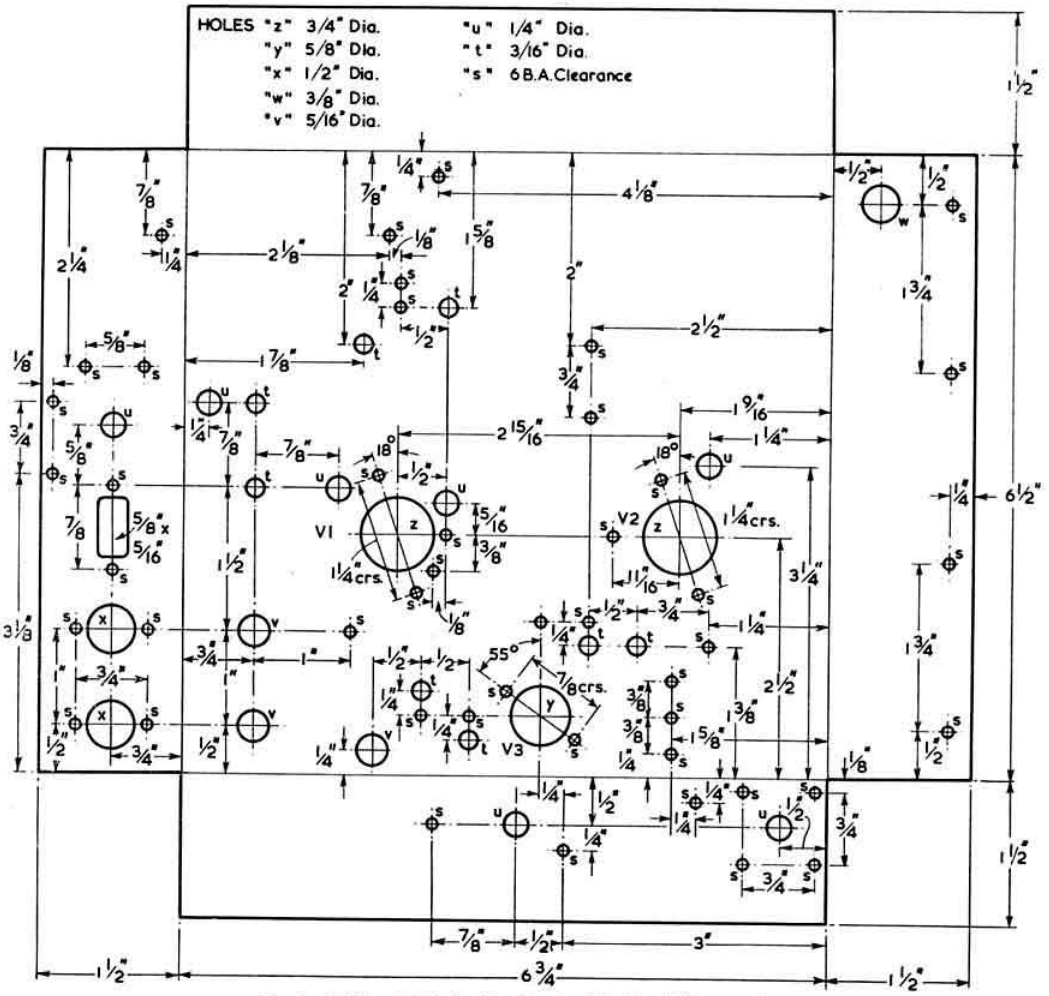


Fig. 6. Drilling details for the chassis of the Band III converter.

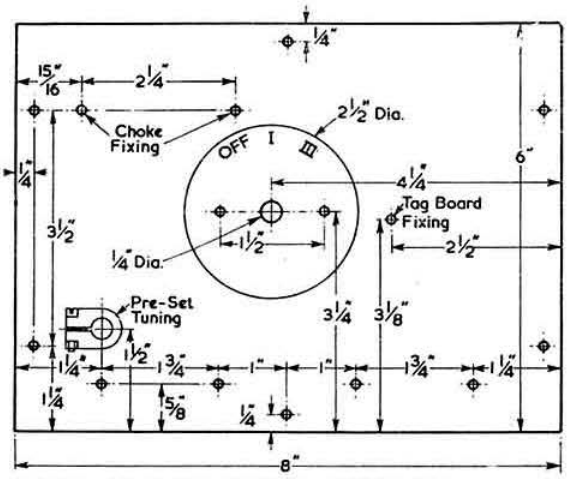
the absence of experience premature, to discuss modifications for such receivers. However, a difficulty which can be foreseen when the obvious attempt is made to retune to the lower sideband is that the existing sound rejector circuits will prove inadequate. Receivers for double sideband reception should be easier to retune or may be satisfactory without modification, provided over-emphasis of the lower video frequencies which may result, does not prove troublesome. For details of the sidebands used in commercial receivers, reference should be made to the R.S.G.B. booklet *Television Interference* and its *Supplement*.

Anode bend detection has been chosen for frequency changing because of the high gain obtainable. The grid circuit of the mixer consists of L7 and C14. The latter is adjusted to give a just noticeable change in voltage at the anode of V2a when the vanes of C12 are touched with the oscillator tuned to the required frequency. Peaking up of the Band III signal is accomplished by tuning C6.

The I.F. Stage

This stage is quite straightforward. L8 is wound on an Aladdin former using eyelets 1 and 3 whilst L9 uses eyelets 1 and 4 of a similar former, which enables the connections to be very short. In other respects the coils are identical. With the winding data given, iron cores will permit the London Band I frequency to be tuned and brass cores the Birmingham channel.

A sub-assembly made of a piece of copper strip bent into an angle 5/16in. by 5/16in. and 1in. long is used to mount the decoupling components. One edge is provided with four saw cuts ¼in. apart into which C4, C19 and C20 are mounted and soldered. R10 and R15 are mounted on top of each other and soldered into the last slot (Fig. 3). The assembly is then screwed to the chassis.



All holes are 6 B.A. clearance unless otherwise stated

Fig. 8. Drilling details for the front panel.

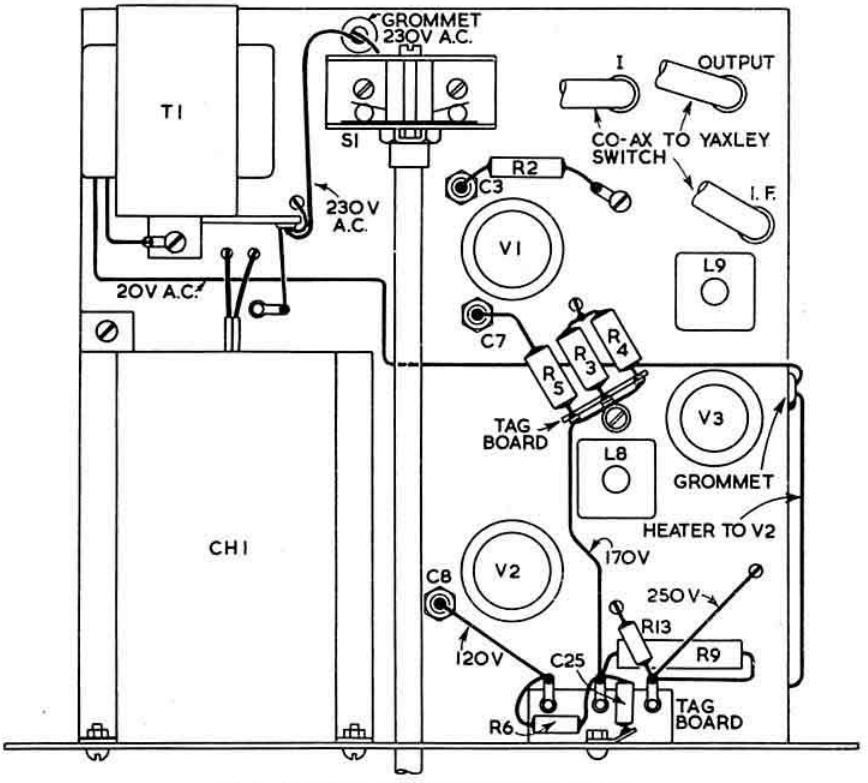


Fig. 7. The above-chassis layout of the components.

Construction

The converter is built on a 6¼in. by 6¾in. by 1½in. chassis made of 16 s.w.g. aluminium with riveted corners. Details of the drilling of the chassis and panel are given in Figs. 6 and 8 respectively. To prevent any movement between the chassis and cabinet a square piece of brass ¼in. by ¼in. by 1½in. long is fitted to the back of the chassis which can then be bolted to the bottom of the cabinet.

The smoothing choke CH1 is mounted horizontally, with the base fastened to the panel by two bolts and nuts. A third anchoring point is provided by a bracket holding the top of the choke to the chassis (Fig. 7). The transformer T1 is mounted as shown in the photograph, one end being held by a copper bracket soldered to the yoke and screwed to the chassis (Fig. 7).

Great care must be taken when handling the miniature bypass condensers because the hi-K ceramic used is very fragile.

Alignment

Lining up can be undertaken with a simple signal generator and an output meter of the type shown in Fig. 9 plugged into the output socket. A folded dipole should be connected to the Band III input *via* 300 ohm ribbon. The bandwidth is 4 Mc/s with 3 db drop at both edges. It can be widened by slightly double-humping the response curves of L8 and L9.

Results

Early work was done with a signal generator and apart from occasional chequer and dot patterns which may have originated from field tests or from the laboratories of set manufacturers no regular transmissions were received until the Belling and Lee experimental transmitter G9AED came into operation.

It was known that the 15 mile path from the writer's address to Beulah Hill was a good one. A simple aerial consisting of a folded dipole and a director was erected at a height of 25 feet above ground making a total height of 130ft. a.s.l. Without any adjustment to the converter, but with an advance of the contrast control of the receiver, the test card appeared on the screen. The first thing to be noticed was that the upper rectangular areas inside the circle were peak white and not a shade of grey as shown in the April issue of the BULLETIN. An enquiry to the Belling & Lee engineers confirmed that they should indeed be white. This applies also to the lower half of the wavy line and to the numbers 1 to 4.

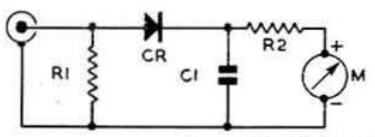


Fig. 9. A simple output meter for use in aligning the converter. C1, 1000 $\mu\mu$F, T.C.C. type CM20N; CR, germanium diode; M, 0-1 mA m.c. meter; R1, 82 ohms ½ watt, 20 per cent, Erie type 9; R2, 1000 ohms ½ watt, 20 per cent, Erie type 8.

A critical close-up inspection of the screen and a comparison with the B.B.C. transmissions on Band I, showed that there was more noise on it; that ignition interference was worse, leading to occasional frame slip; and that verticals had slightly unsteady edges. It was clear that a more powerful aerial ought to be tried. A reflector and one more director were added making it a 4-element Yagi. This removed the minor defects and so far as one can judge by the contents of the test card the results obtained from the converter are highly satisfactory.

The wavy line in conjunction with the numbered vertical lines on the test card serve to find the origin of reflected signals. If a ghost image of the wavy line appears on the card then the number of the vertical line at which it is found indicates in miles the additional path travelled by the ghost. In this case no images were found.

With the contrast control on the main receiver advanced, and in the absence of a transmission, ignition interference is intense. No doubt this is due to the great gain of the converter. The valve manufacturers claim a gain of 23 db from the aerial input to the frequency changer grid. In addition there is about 12 db conversion gain and whatever the additional i.f. amplifier will give. At this stage it would be rash to subscribe to any suggestion that intereference suppressors are less effective on Band III than on Band I.

It is clear that if the Band III transmissions are of the same local field strength as those on Band I the gain of the converter will be too great and an attenuator will have to be introduced in the co-axial lead from V3 to the switch. However, it is likely that, to start with anyway, the new transmitters will be less powerful.

Tests have been made on 2 m by screwing the trimmers right home. There can be no doubt that the circuit would make a powerful converter for this band. However, for best results some changes would have to be made.

Acknowledgements

The writer wishes to thank D. N. Corfield, D.L.C. (Hons.), A.M.I.E.E. (G5CD) for his suggestions and advice and for his assistance in providing data concerning the valves.

Yagi Aerials for Band III Reception

THE table below gives dimensions of reflector, folded dipole and directors of ¾in. diameter tubing to suit 300 ohm balanced feeders for the London and Birmingham channels. The number of elements required depends on the local signal strength. For aerials consisting of 1 to 3 elements the through part and the split part of the folded dipole are both ¾in. diameter and centre-spaced 1in. For aerials consisting of 4 to 6 elements the through part is ¾in. diameter and the split part ¾in. diameter, centre-spaced ¾in. A three element aerial would consist of 1 reflector, 1 folded dipole and 1 short director. A six element aerial would consist of 1 reflector, 1 folded dipole, 3 long directors and 1 short director. The short director is always the outermost. The elements can be fitted to a boom of wood or metal. In the latter case the mid-points of all elements may have metallic contact with the boom. The split part of the folded dipole which is attached to the feeder must be insulated of course.

Element	Channel	
	London	Birmingham
Reflector length	30½in.	31½in.
Radiator length	27½in.	28 in.
Long Director length	27½in.	28 in.
Short Director length	24 in.	24½in.
Reflector spacing	14½in.	15 in.
Director spacing	13½in.	14 in.

Transmissions from G9AED

FOR the last few weeks of experimental transmissions from their television station G9AED at Croydon, Belling & Lee Ltd., have extended the hours of operation which are now as follows:—Monday to Friday, 9.30 a.m. to 12.30 p.m., 2 p.m. to 5.30 p.m. and 7.30 p.m. to 8.30 p.m. The Saturday transmissions remain 10 a.m. to 1 p.m. In a statement to the Press, the Company points out that transmissions from G9AED are not I.T.A. transmissions. The station was designed, built and financed entirely by Belling & Lee Ltd.

Changes of Address

When notifying Headquarters of a change of address Society Representatives should state clearly that they *are* Representatives. Frequently a change of address is received and entered on a member's record card but as no mention is made in the notification that he is a Representative the master file of Representatives is not corrected.

Radio Astronomy and the Radio Amateur†

Part II

By R. C. JENNISON, Ph.D., B.Sc. (ex-G2AJV)*

THE large radio telescopes which have recently been constructed have the great virtue of enormous collecting power, but they are far beyond the reach of any amateur's pocket and are quite unnecessary for the study of many of the problems in radio astronomy. The fine beamwidth, or high resolving power, of the very large aerial systems may be obtained with only two dipoles if they are connected as an interferometer, that is to say they are connected together by equal lengths of feeder but are spaced many wavelengths apart. This arrangement was referred to by Martin Ryle in the *Proceedings of the R.S.G.B.* some years ago. The system of two aerials gives a polar diagram consisting of a number of fine lobes, the width of each being half that which would be obtained in the main beam of a single aerial system of such a size that it filled all the space between the two dipoles! The transit of a radio star through an interferometer aerial beam gives a bump caused by the broad polar diagram of the individual aerials, modulated by very clearly marked fringes as the source passes through the interference pattern of fine lobes (Fig. 4). If the radio star has an angular diameter smaller than the width of these lobes the modulation of the bump by the fringes will be 100 per cent, but if the source is larger than the lobes the modulation will be reduced and may not even appear. The interferometer system therefore is ideally suited, not only for the detection of very small regions of emission, but also for their accurate positioning and the measurement of their size.

Interferometer techniques have been greatly improved during the last few years. One great improvement, due to Martin Ryle, was to incorporate a switching mechanism whereby a half wavelength of feeder was rapidly and periodically inserted in one of the two main feeders; the output of the receiver was then arranged to record only the difference of noise level between these two states by inserting a synchronized relay in series with the meter (Fig. 5). The great advantage of this method is that stability requirements are considerably reduced and the receiver may be given heavy a.g.c. without appreciably affecting the size of the fringes in the output. A more recent and equally important improvement has been to rotate the phase of one of the two limbs of the interferometer and thus to generate artificial fringes in the presence of radiation from a small source; with this arrangement the natural

†Based on a lecture delivered to the Society at the Institution of Electrical Engineers, London, on February 25, 1955.

*Jodrell Bank Experimental Station, Lower Withington, Macclesfield, Cheshire.

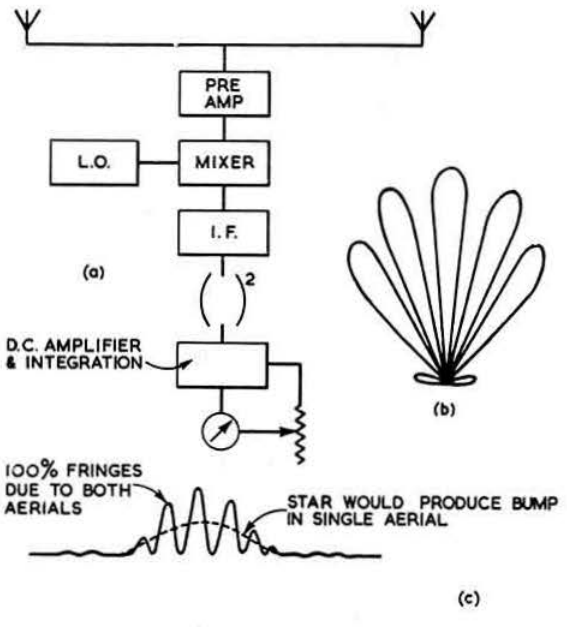


Fig. 4. (a) The simple spaced aerial interferometer. (b) Polar diagram. The polar diagram is crossed by the fine interference lobes between the two aerials. (c) Reception pattern on the recording chart. The bump due to the star crossing the aerial polar diagram is modulated by the interference fringes.

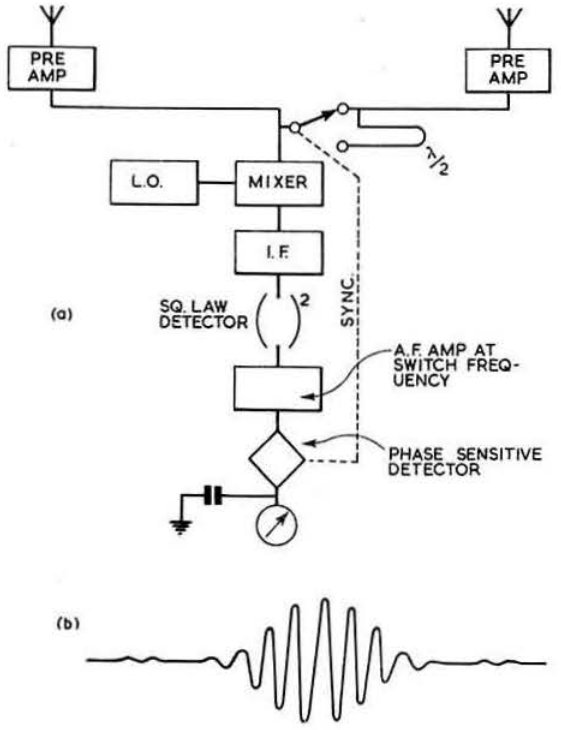


Fig. 5. (a) The phase switched interferometer. A half wavelength of line is switched in and out of one aerial feeder and the addition of the signal in this channel with that from the other aerial is compared in either position. (b) The resulting record due to the passage of a source through the aerial beam. Note that there is no output in the absence of a source.

fringes may be slowed down or speeded up at will, whilst they may also be produced when the two aerials are on a north-south baseline, a condition which gives no fringes with a simple interferometer. It is permissible to insert separate pre-amplifiers in each aerial lead and to use separate mixer stages so that the two channels may be united at the intermediate frequency, but if such an arrangement is used it is essential to use the same local oscillator to feed both mixers (Fig. 6).

The author recently constructed an interferometer in which the two aerials were once spaced twelve miles apart and this gave excellent results with a beamwidth equivalent to only 30 seconds of arc. This interferometer used a radio link to unite the two channels and in such an arrangement it is necessary to transmit back not only the signal in the distant channel but also all oscillator frequencies used to form the finally transmitted signal. These frequencies must then either be applied to the "home" channel or subtracted from the distant channel at the receiving end.

The spectrum of the radiation from the Galaxy increases very markedly on the lower frequencies, and as we are still near the sunspot minimum the state of ionization of the upper atmosphere is such that, provided we observe the Galaxy when it is almost overhead, the noise can be easily detected on frequencies as low as 10 Mc/s. The spectrum of the individual radio "stars" also rises with decreasing frequency, though not as sharply as that from the Galaxy. Cassiopeia and Cygnus may also be detected at the present time on 10 Mc/s. These two radio "stars," the strongest in the sky, transit at upper culmination, i.e. nearest overhead, about 5 degrees north and 15 degrees south of the zenith respectively. The time of day when they are in this position varies with the time of year, for the stars complete one circuit round the Pole Star in one siderial day, which is four minutes shorter than the ordinary day, so that the time of transit of a particular star moves four minutes earlier every day. If you want to work out when to expect them to transit, Cassiopeia transited at about 11 a.m. G.M.T. on April 1, whilst Cygnus transited at about 7 a.m. G.M.T. on the same day; if 4 minutes are allowed for every day since April 1, the time of transit can be calculated all the year round.

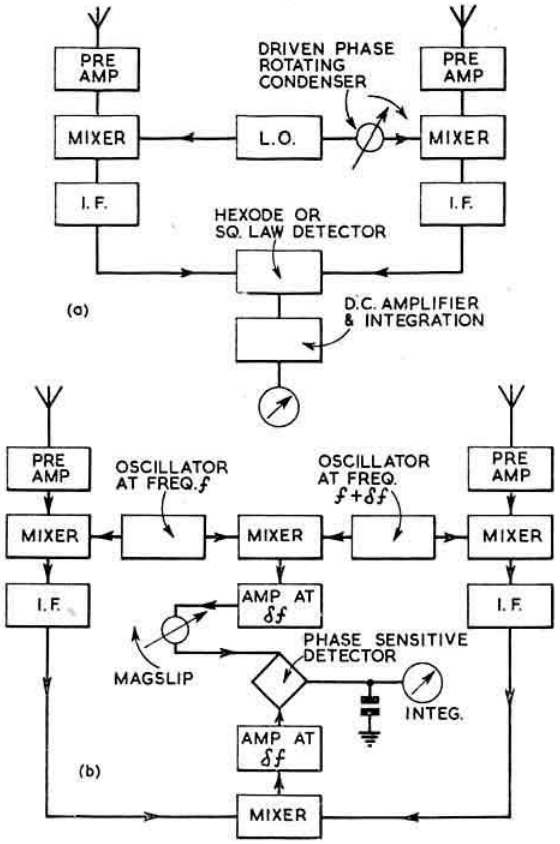


Fig. 6. (a) Simple phase rotated interferometer. This gives a similar reception pattern to that in Fig. 4 (c) but with fringes of any desired period. A phase switch similar to that in Fig. 5 (a) may also be included in one aerial lead, or at i.f., or in the l.o. line, to give a pattern of the form in Fig. 5 (b) but with controlled fringes. (b) A more complex rotating lobe interferometer which directly gives a pattern of the form in Fig. 5 (b) with fringes of any desired period. The difference in frequency between the two crystal oscillators, δf, is about 1000 c/s.

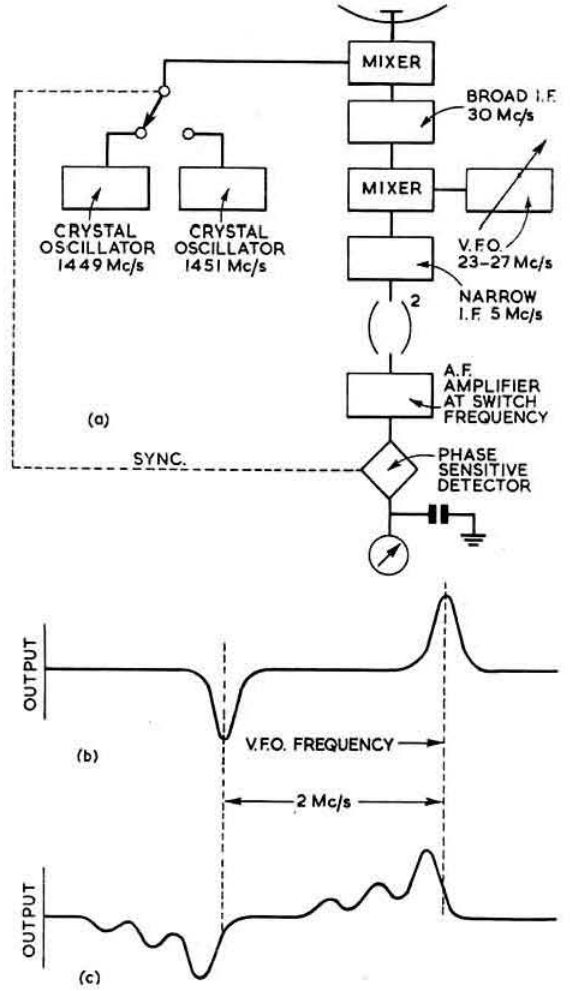


Fig. 7. (a) 1420 Mc/s hydrogen line receiver. (b) Output as v.f.o. is swung to tune receiver through the line on 1420 Mc/s. (c) Output when line is complex. This record is typical of the radiation from three spiral arms when looking along the plane of the Galaxy. The different line-of-sight velocities result in different frequency shifts.

An entirely different type of signal to that already described may also be detected from the Galaxy. This is the hydrogen line which occupies only a very narrow frequency band centred on 1420 Mc/s. This frequency is emitted by the neutral hydrogen atoms in the Galaxy when the nucleus of each atom decides to spin the other way round. The very important point about this signal is that it gives us an estimate of the speed at which different parts of the Galaxy are moving, and from our knowledge of the approximate shape of the latter we are then able to fill in the accurate details of its structure. The reason that we are able to measure the velocities of the transmitting regions from this signal is that the motion of the transmitter shifts the frequency of the transmitter. This is exactly the same phenomenon as that which causes the note of a locomotive whistle to apparently change as the train passes through a station; if we measure the change of note we can calculate the speed of the train.

The most usual form of the apparatus used to study the hydrogen line consists of a receiver in which the noise in two channels is compared in level whilst both channels are tracked together over a frequency range from about 1418 to 1422 Mc/s. The line appears first in one channel and then in the other. The output of the receiver is first deflected in a positive and then in a negative direction, in each case tracing the contour of the line (Fig. 7). The minimum aerial requirement for satisfactory results from the hydrogen line is probably a 10 ft paraboloid. This paraboloid would have to be accurate to a tolerance of 1 in. but could be made very simply by stretching chicken mesh across three or four hoops rigidly fastened to a frame in the form of two Vs at right-angles joined together at the apex.

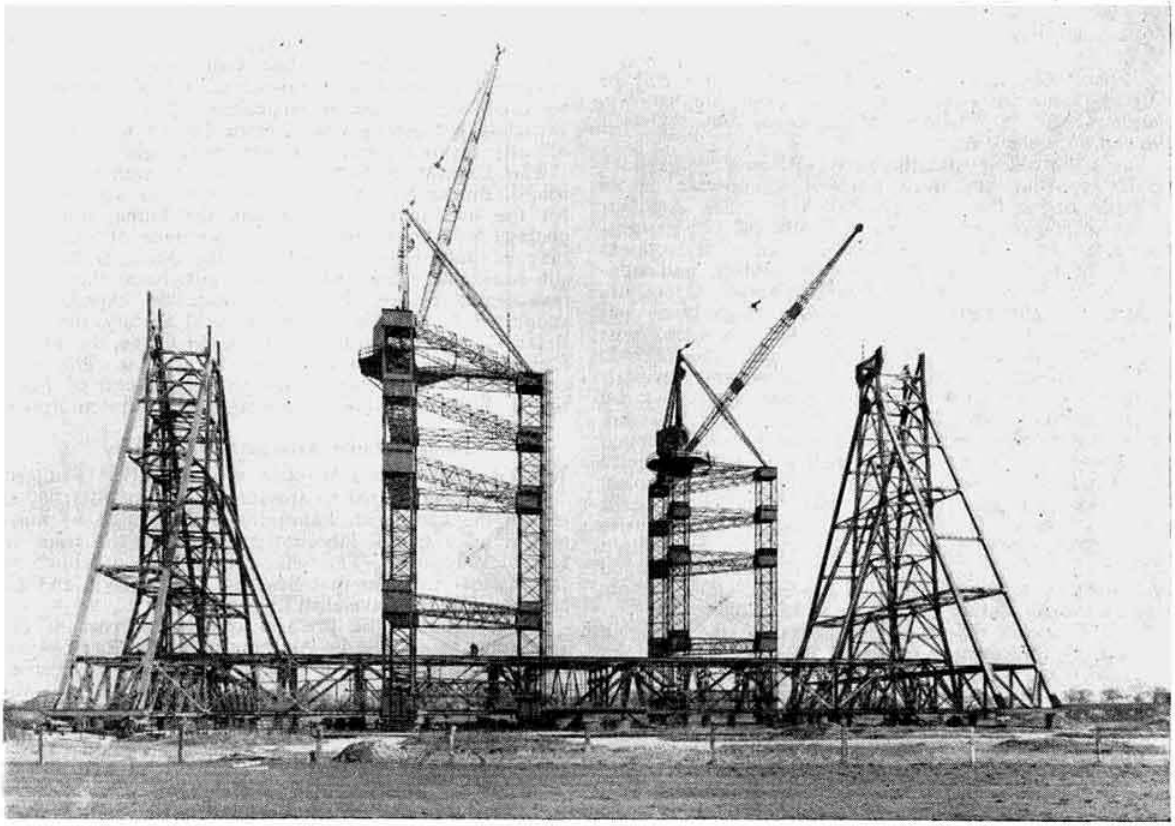
Signals from the planet Jupiter have recently been detected. These signals are very like ordinary atmospheric interference and only occur below about 30 Mc/s. They are very strong in the 14–20 Mc/s range and may be detected about one night in three on a very elementary receiver.

Amateur Research

For all this work the greatest snag as far as most amateurs are concerned will be an inherently unsuitable site. As most of the work requires the lowest possible noise level, any QTH within 5 miles of a town will be in danger of being swamped by local QRM.* If, however, a suitable site is available, many of the techniques that have been briefly described are quite within the scope and the pocket of the average amateur.

For those who are interested in the various radio noise phenomena the problem of recording the noise level represents the most difficult stumbling block.

*Interferometers with aerial spacings in excess of 50λ are exceptional, and may possibly prove satisfactory, if space is available, in a built-up area.



The 250ft radio telescope at Jodrell Bank under construction. In this photograph the two towers are almost complete. The bowl will be slung between them, pivoted at either end so that it may be controlled in elevation. The whole structure shown revolves on bogeys beneath the two towers on a circular railway track 350ft in diameter. Note the two men standing together on the main cross girder, just to the left of centre.

Don't be disheartened by the enormous cost of commercial pen recorders; I made one myself when a schoolboy out of odd bits of Meccano, and I dare say many others have done the same. The great secret here is that the recorder itself does not have to be sensitive, for it is not difficult to supply it with power from the equipment. The pen may be made by drawing a piece of glass tubing over a gas flame; methylene blue, obtainable at most chemists, is very suitable as an ink. With regard to the rolls of paper, there is, of course, a very obvious source. Usual chart speeds are about 6 in. an hour for work on the radio "stars" or the Galaxy, and 3 ft an hour for work on the ionosphere scintillations. The most suitable recording system for meteor, aurora and Moon observations is a cathode ray tube, though the meteors can actually be heard on a communications receiver by listening to an unmodulated c.w. signal (the whistles caused by the meteors are due to the fact that the signal reflected from the meteor trail suffers a Doppler shift, like the train whistle, and beats with the transmitted signal to produce an audible sound).

Aerial systems should present little difficulty, especially for country dwellers, and I would strongly recommend an interferometer system to those interested in noise work. Keep the noise factor of the receiver as good as possible. Surplus 6AK5s are not very dear and give excellent results if triode connected in a cascode with, say, a 6J6. Below 80 Mc/s a grounded grid input stage will suffice, and below 40 Mc/s a decent pentode is all that is needed.

It is a common failing of most of the big research establishments that the larger experiments are undertaken at the expense of numerous smaller ones which may yield equally valuable results. There is considerable scope for the keen amateur with a small interferometer, or even a most elementary single array, in many of the branches of radio astronomy. A few of the most important simple experiments are a study of the polarization of the sources; their spectra, especially on frequencies below 30 Mc/s; the size of the sources at centimetre wavelengths; the study of the ionosphere scintillations; and all aspects of the ever changeable Sun.

Given a suitable site and an average amount of amateur equipment (especially the junk box), all that is required is a little initiative and ingenuity. Remember that throughout the history of science, the simplest and cheapest apparatus has often yielded the best results. Try your luck at the stars: they're easy, but, unless you hold a W call, don't reach for the Moon!

Gough Island Scientific Expedition

MEMBERS of the eight-man scientific expedition to Gough Island, a lonely, uninhabited strip of land about eight miles long and 260 miles south-south-east of Tristan da Cunha, leave England at the end of August. The party will be taken from Simonstown, South Africa, in a frigate of the Royal Navy towards the end of September.

The radio officer with the party will be P. J. Mullock (G3HPM) who has been licensed to operate as an amateur under the call-sign ZD9AD. The Amateur Radio equipment will include a Panda PR-120-V transmitter, an Eddystone 680X receiver, six 45 ft sectional masts, 3,000 ft of various types of feeders, and sufficient wire for a variety of aerial systems. Operation, expected to commence in the middle of October, will be on all bands covered by the transmitter with, most likely, emphasis on 21 Mc/s phone and c.w. ZD9AD will also operate on Top Band if the necessary crystals in the range 900-1000 kc/s (half signal frequency) can be obtained before the Expedition leaves England. Offers from members, on a loan basis, would be much appreciated. It is hoped that A.R.R.L. will recognize Gough Island as a separate country for DXCC purposes.

Mr. Mullock states that he will not reply to calls within 10 kc/s of his own frequency. Stations who call ZD9AD while he is in contact with another station will be blacklisted. QSL cards have already been printed and will be sent out via the R.S.G.B. QSL Bureau. Incoming cards should be sent the same way.

Mr. Mullock's official duties as radio operator will include the transmission of important daily metereological reports to the South African Weather Bureau. Permission has been granted for the transmission of official traffic in the amateur bands as far as Tristan da Cunha only. The communication equipment includes a Pye PTC790 60 watt crystal controlled h.f. station (transmitter and receiver) powered by a 2 kW Petter-Diesel generator supplied by Dale Electrical, Ltd. The generator provides standard mains voltages.

Other equipment includes an Army 62 set for internal communications on the island, v.h.f. walkie-talkies for survey work and two tape recorders—a Vortexion and a Boosey & Hawkes—for recording scientific reports, survey notes, bird songs and animal noises. An electric fence for warding off sealions is also being taken!

Mr. Mullock will act as temporary Postmaster on the island. Members who are also stamp collectors may be interested to know that Tristan da Cunha stamps will be used with a special Expedition date stamp. It is expected that fishing vessels from Tristan will call periodically during the scientists' stay on Gough.

The Expedition hopes to spend six months on the island, during which it will be surveyed and mapped for the first time. In addition, the fauna, flora and geology will be studied. The importance of this work may be judged by the fact that the island is the only sub-Antarctic island which has not been thoroughly investigated before. For this reason, the expedition is supported by the Royal Geographical Society, the Scott Polar Research Institute, the Colonial Office, the Mount Everest Foundation and many other bodies. The Society's Patron, His Royal Highness the Duke of Edinburgh, K.G., is taking a keen interest in the enterprise.

Mullard Radio Astronomy Laboratory

FROM the *News Chronicle* we learn that Mullard, Ltd., have offered to provide the sum of £100,000 to enable the Cavendish Laboratory, Cambridge, to build and equip a special laboratory devoted to the study of Radio Astronomy. The offer is made as a tribute to the pioneer work in that field by Martin Ryle and his colleagues at the Cavendish Laboratory.

As recalled in the preface to the first part of Dr. Jennison's paper "Radio Astronomy for the Radio Amateur" (July 1955, issue) Martin Ryle (who is licensed as G3CY) was the first to deliver a lecture to the Society on the subject of Radio Astronomy. The lecture was given more than eight years ago at the Institution of Electrical Engineers.

Radio Navigation by the Sun

ACCORDING to a report in *Industrial Communications*, quoted by the *I.T.U. Journal*, equipment has been developed for radionavigational use which depends upon the reception of radio energy emitted by the Sun.

An Introduction to Amateur Transmitting

Part 7—More about Aerials

By LORIN KNIGHT, A.M.I.E.E. (G2DXK)*

LAST month we saw how the transmitter could be connected directly to the end of a half-wave aerial. An alternative method is to use a tuned feeder as shown in Fig. 29 (a). The feeder is approximately balanced with respect to earth and thus the voltages on the two wires at the top will be equal and opposite in phase. The effect of the aerial will be as if a resistance of several thousand ohms had been placed across the upper end of the feeder.

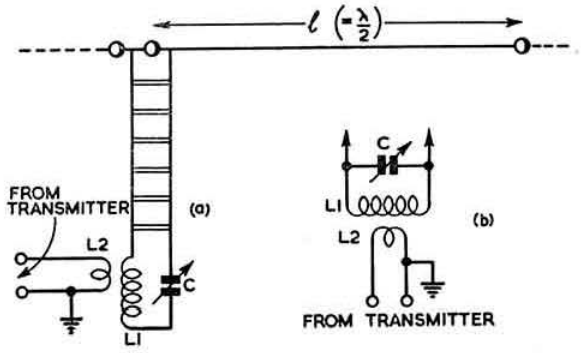


Fig. 29. Zeppelin Aerial. (a) Feeder an odd multiple of λ/4 long. (b) Suitable aerial tuner for a feeder which is an even multiple of λ/4 long. The length of the aerial *l* ≏ 490/*f* ft where *f* is the frequency in Mc/s.

Thus, if the feeder has a characteristic impedance of about 600 ohms and is an odd number of quarter wavelengths long, it will act as a transformer and the lower ends of the feeder wires will appear to have a resistance of perhaps 50 to 100 ohms between them. If the feeder is a little short this resistance will appear to have a small inductance in series. Conversely, if the feeder is a little long it will have a fairly large capacitance in series. The bottom of the feeder is therefore connected in series with a coil and a capacitance, the latter being made variable so that it can be used to tune the whole system to resonance.

With the feeder an even number of quarter wavelengths long the bottom of the feeder will appear as a resistance of several thousand ohms. This will appear to have some associated capacitance if the feeder length is short and some inductance if the length is long. The most convenient type of aerial tuner would be as in Fig. 29 (b).

With a suitable aerial tuner it is possible to accommodate any length of feeder but in order that some easy assessment can be made of the aerial tuner requirements it is preferable to make the length a whole number of quarter-waves. The tuner will also compensate for any errors in the length of the radiating section itself but it is advisable to keep this length as near the correct value as possible so that the feeder is balanced. With an unbalanced feeder the high current points in the two wires will not be opposite and there will be some radiation from them.

28a Glebe Road, Letchworth, Herts.

Centre-fed Aerials

There are often advantages in feeding an aerial at the centre. We have already seen that the impedance here is low and if, in fact, we break open the centre of a dipole the two ends thus formed appear to have a resistance of about 72 ohms between them. This means that we can take a 72 ohm coaxial cable direct from the aerial to the transmitter as shown in Fig. 30. Ideally a balanced feeder should be used but since the impedance is low the unbalance caused by using coaxial cable is usually negligible.

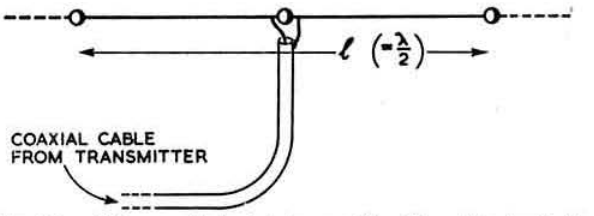


Fig. 30. Half-wave dipole fed by co-axial cable. The length *l* ≏ 470/*f* ft.

It should be noted that 72 ohms is the theoretical figure for a half-wave aerial of thin wire which is well clear of the ground. With a practical aerial the value will often be more like 50 ohms and some standing waves will occur. Nevertheless, provided that the aerial is not more than a few per cent off tune, the standing wave ratio will normally be less than 2:1. Any inductive or capacitive components appearing at the transmitter end of the coaxial cable, due to the latter not being an exact multiple of quarter-waves long or due to the aerial being slightly off resonance, will be fairly small and will be compensated for in the tank circuit tuning.

Fig. 31 shows the dipole centre-fed by a tuned line. Since the feed-point impedance of the aerial is low the impedance "seen" at the lower end of a given length of feeder will be the opposite to that with the end-fed version. Unlike the latter the whole aerial system is symmetrical and consequently the length of the radia-

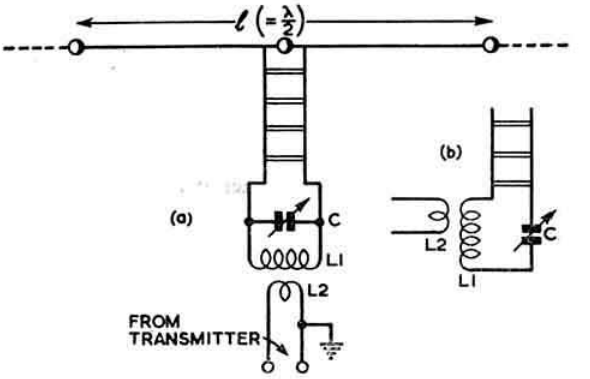


Fig. 31. Half-wave dipole fed by tuned line. (a) Feeder length an odd multiple of λ/4 long. (b) Suitable aerial tuner for feeder whose length is an even multiple of λ/4. The length *l* ≏ 470/*f* ft.

ting section is not particularly important since it can be compensated for by the aerial tuner without affecting the balance of the feeder.

The Folded Dipole

If a dipole is composed of two parallel wires joined together at their extremities the current will be divided between them. If we break open only one of these wires at the centre we find that the resistance there is not 72 ohms but more like 300 ohms. The reason for this is not difficult to understand. We know that the power in any circuit is given by I^2R, where I is the current and R the resistance. If, therefore, for the same aerial power we are only going to cause half the current to flow the resistance must be four times as large.

An aerial utilizing this fact, and usually known as a folded dipole, is shown in Fig. 32. Advantages of this type of aerial are that it is broadly tuned and that the standing wave ratio on the feeder is normally very low. The radiating portion of the aerial can be composed of two parallel wires spaced a few inches apart, or can be constructed from a length of the 300 ohm feeder itself.

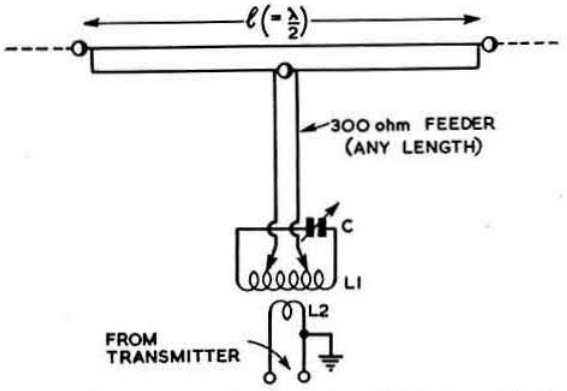


Fig. 32. Folded dipole. The length $l \simeq 460/f$ where f is the frequency in Mc/s. The taps on L1 should be about 2/5 of the way in from either end.

The Quarter-wave Aerial

On Top Band half a wavelength works out to about 250ft and becomes impracticable for the average amateur. For this reason a quarter-wave aerial as shown in Fig. 33 is usually employed. Such an aerial relies on the fact that the earth acts as a reflector and, in effect, produces an image quarter-wave underneath to complete the half wavelength.

At resonance the aerial would appear to the aerial tuner as a resistance of about 36 ohms if the radiator were vertical. In practice the aerial is usually bent into an inverted-L shape, the value being somewhat lower. L1 and C are chosen to resonate at the transmitting frequency but C will, in fact, be tuned to compensate for any errors in the aerial length.

It is very important that such an aerial should have an efficient earth connection. If care is not taken the latter may have a resistance greater than the feed-point resistance of the aerial; in such a case less than half the r.f. power would be radiated, the rest merely heating up the garden. A simple and efficient earth can often be obtained by connecting to a water pipe. Otherwise a connection can be made to several plates of copper or galvanized iron buried a foot or so beneath the surface, the soil being watered if necessary to keep it damp in dry weather.

Where space is severely restricted the length can be reduced below a quarter-wave. This will make the aerial appear as a resistance and capacitance in series, and a larger value of inductance may be required to restore resonance. Under these conditions the aerial resistance may be 10 ohms or less and very special care will be needed with the earth connection.

Multi-band Operation

One advantage of the aerial in Fig. 29 is that it can be operated on harmonic frequencies. At twice the design frequency, for example, the top is effectively two half-wave sections joined together. The centre is no longer a high current point but a high voltage point. Nevertheless there are still high voltage points at the ends and the aerial can be fed just as for the fundamental frequency. All that will be required is a suitable modification to the aerial tuner, bearing in mind that the feeder length will now be a different multiple of quarter-waves. When a horizontal aerial is several half-waves long the low-angle radiation tends to be fairly evenly distributed in all compass directions.

The aerial in Fig. 31 can also be operated on harmonic frequencies. On the second harmonic each section will be a half-wave and the feed-point of the aerial will therefore have a high impedance. When operated on its second harmonic frequency the low-angle radiation tends to be concentrated in directions making angles of 45° to 135° to the aerial wire but on higher harmonics the low-angle radiation tends to be omnidirectional.

The simplest and most versatile multi-band aerial of all is a single wire about 132ft long and terminated at the aerial tuner. This can be operated as a quarter-wave on 1.8 Mc/s, an end-fed half-wave on 3.5 Mc/s and as end-fed multiples of half-waves on 7, 14, 21 and 28 Mc/s.

The Aerial Tuner

The aerial tuner should have a high Q when unloaded; the load of the aerial should reduce the Q to around 5 or 10. Under these conditions the r.f. power absorbed by the tuned circuit will only be a small proportion of that absorbed by the aerial. A low value of Q reduces the aerial tuner's capabilities for rejecting harmonics but if there has been adequate harmonic suppression elsewhere this should not be detrimental.

The values of L and C given in Table 4 are only meant as a rough guide and some deviation from these will often be necessary. Some indication of the Q can be obtained by comparing the sharpness of the tuning with that of the p.a. tank circuit on the transmitter. If the aerial tuner efficiency is low it will be noticed that its coil becomes warmer than that in the tank circuit.

Before feeding a transmitter into the aerial tuner for the first time it is advisable to adjust first the tuning of the transmitter tank circuit with the transmitter feeding into a 72 ohm dummy load. This should have as little inductance as possible and might conveniently consist

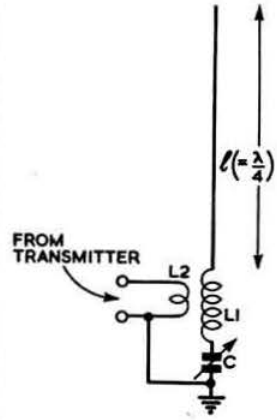


Fig. 33. Quarter-wave (or Marconi) aerial. The length $l \simeq 230/f$ ft where f is the frequency in Mc/s.

of a suitable series-parallel combination of one watt resistors. The dummy load should be capable of handling the r.f. power output although with carbon resistors it is often possible to overload them by as much as 10:1 provided that they are only dissipating power for short periods.

After adjusting the tank circuit the dummy load should be replaced by the aerial tuner. By means of the tuning capacitor, and by experimenting with the coupling coil and the taps on the main coil, the aerial tuner should then be adjusted until maximum power is absorbed by the aerial. The transmitter tuning can then be readjusted as a last refinement.

Having found the optimum adjustments for any aerial on any waveband it is advisable to record the important details. This will then make it easier to change from one band to another or from one aerial to another. Many amateurs go even further and have several pre-adjusted aerial tuners in one box and use a rotary switch (with ceramic insulation) to select the one required.

Some indication of the power being fed to the aerial can be obtained from the p.a. anode current meter. This indication should not be relied on implicitly however, because the meter cannot differentiate between power absorbed by the aerial and that taken by the aerial tuner. When the aerial feeder presents a low impedance to the tuner it is better to check the current flowing into the feeder with an r.f. ammeter or a suitably rated flashlamp bulb.

When the feeder presents a high impedance to the aerial tuner the current will be too small for easy measurement. It is then easier to use the voltage indication given by a small neon lamp held near the feeder.

Practical Considerations

So far we have been mainly concerned with electrical details but there are a number of practical considerations which should be noted.

Due to various reasons the physical length of an aerial needed to produce resonance is usually a few per cent less than that which might be expected from simple theory. This discrepancy has been taken into account in the formulae which have been given here for aerial length. The physical length of a quarter-wave open line is also a few per cent less than might be expected; with commercial twin feeder the physical length is often 20 per cent less and with co-axial cable 30 per cent less.

Either wooden or metal poles are satisfactory for a horizontal aerial but a metal pole is not recommended for supporting a vertical aerial as it will couple to the radiator and distort the radiation pattern. Long guy wires are liable to interact with both horizontal and vertical aerials and should preferably be broken up electrically by inserting a compression type (egg-shaped) insulator about every $\lambda/10$. Trees and buildings can also have detrimental effects and the aerial should, therefore, be as much in the open as possible. The feeder should be kept at right angles to the aerial for as far as is practicable in order to minimize the intercoupling between them.

The quality of the insulators required will depend to some extent on their position. At the extremities of a half-wave aerial the voltages will be high and the insulators should be of glass or glazed ceramic and be several inches long. But in the centre of a half-wave aerial which is always used on its fundamental frequency the r.f. voltage will always be low and a poorer quality insulator will be acceptable. When high voltage points of the feeder, or of the aerial itself, come into the house, good insulation must be provided here. On the other hand, if the feeder has a low impedance as it enters the house less care will be necessary.

The rope used for halyards should be of good quality and preferably waterproofed by impregnating it in heavy oil or wax. Some allowance should always be made for shrinkage in wet weather.

TABLE 4.

Approximate circuit values for the aerial tuners shown in Figs. 26 (Part 6), 29, 31 and 32.

Band (Mc/s)	C ($\mu\mu$F)	L1 (μH)	L2 (turns)
1.8	120	60	3 — 6
3.5	60	32	2 — 4
7	30	16	2
14	15	8	2
21	10	5	1
28	8	4	1

L2 can have a slightly larger diameter than L1 and be slipped over the part of L1 having the lowest r.f. potential to earth.

Bibliography

In this series it has only been possible to give a very brief outline of aerial theory and to indicate how some simple aerials can be constructed and operated. The newcomer wishing to pursue the subject more deeply, or to study the many directional aerial systems which have been devised, is recommended to peruse some of the works listed below.

(1) *Antenna Book*, A.R.R.L.

(2) *Antenna Manual*, Editors and Engineers, Ltd.

(3) *Radio Amateur's Handbook*, A.R.R.L.

(4) *Radio Handbook*, Editors and Engineers, Ltd.

(5) "Radiation Patterns of Horizontal Aerials," Segrott, R.S.G.B. BULLETIN, March, May and June, 1954.

(6) *A 5-Band Antenna Coupler*, McCoy, *QST*, April, 1955.

(7) *Meet the S.W.R. Bridge*, McCoy, *QST*, March, 1955. (Non-technical description of a simple instrument for giving an indication of standing wave ratios in coaxial cables.)

(To be continued)

Pye Fishfinder Equipment

DEVELOPED solely as a means of locating shoals of fish this equipment differs from previous echo sounding equipment in that it is entirely electronic in action, there being no mechanical processes involved. Working on radar principles it is able to show the depth at which shoals of fish are swimming in relation to the bottom of the sea, and as it is very compact it can be fitted to the smallest fishing vessels.

The equipment was shown to representatives of the fishing industry and local business people at a reception given by the Directors of Pye Marine, Ltd., at the Royal Hotel, Lowestoft, on July 4.

Correction

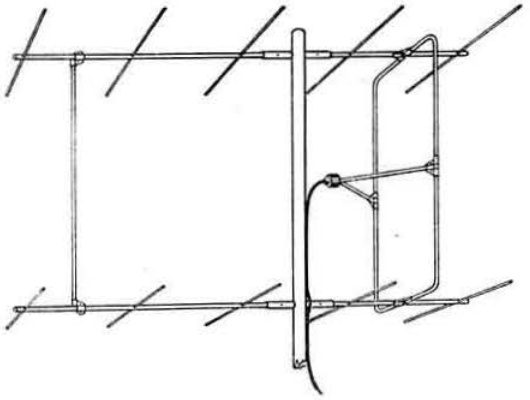
IN the Small Advertisement section of our last issue, under the heading "Complete Station for Sale," the address of Mr. V. G. P. Williams (G3FYY) was quoted as 48 Melrose Avenue, Cricklewood, London, N.W.10, instead of 49 Melrose Avenue, Cricklewood, London, N.W.2.

The Slot Beam

By B. SYKES (G2HCG)*

RECENT developments in Band III television aerials have led to the combination of the Yagi and skeleton slot aerials. The result has the advantages of both types without the disadvantages of either.

The fundamental problem with the Yagi is the great reduction in feed point impedance when parasitic elements are added to the simple dipole. This means that when tuning up such an array it is necessary to adjust the matching at the same time as the elements are tuned to length and the spacing altered. This almost always results in a Yagi with the spacing adjusted for optimum matching rather than optimum gain. Further complications arise when attempts are made to stack Yagis and it is frequently found that two perfectly good four element Yagis giving, say, 8.5 db gain each, flatly refuse to give a further 3.5 db when stacked. The problem again is that of impedance matching. A suitable matching system is of necessity somewhat complicated both electrically and mechanically.



A typical six-over-six slot beam. The gain is 13 db over a dipole, the back to front ratio 40 db and the horizontal beam width 20°.

The search for simplicity and wide bandwidth led to further investigations into the operation of the skeleton slot aerial. The results indicated that parasitic reflector and director elements could be used with the skeleton slot aerial. In addition, the bandwidth was greatly increased by the use of a non-frequency sensitive delta-matching system.

Further examination of the operation of the skeleton slot indicates that the centre portions of the vertical sections are simply transmission lines feeding two bent dipoles consisting of the horizontal sections and the ends of the vertical sections. The important point to note is that the dipole can "choose" its own length to suit the operating frequency; in other words, the point at which the vertical sides of the skeleton slot cease to be transmission lines and become the ends of a bent dipole is governed by the *frequency* and not by the *size* of the aerial. There is, of course, a limit but the bandwidth can be very wide indeed.

The skeleton slot, therefore, consists of two stacked end-fed dipoles. The addition of parasitic elements to an end-fed dipole does not alter the feed impedance but the tuning; i.e., the length of the dipole does alter. Since the dipoles in a skeleton slot array can "choose" their own lengths it follows that a skeleton slot can be converted into a stacked Yagi with no matching complications. This is confirmed in practice where such an array may be set-up giving a standing wave ratio of 1.2/1 and reflectors and directors added and tuned for maximum field strength, increasing the forward gain by about 10 db. It is then found that the standing wave ratio has not altered. The age-old problem of matching Yagis and stacked Yagis is therefore solved and all elements can be tuned for maximum radiation with no fear of feed-point impedance changes.

*41 *Booth Lane North, Boothville, Northampton.*

Long-distance Waveguides

AS recently announced by the Bell Telephone Laboratories, a long-distance waveguide—a new and radically different medium for transmitting telephone conversations and television—has been used successfully in experiments.

The new medium, markedly different from modern cable or radio relay systems, uses hollow metallic tubes roughly two inches in diameter, and may some day simultaneously carry tens of thousands of cross-country telephone conversations along with hundreds of television programmes. Top capacity for the most modern of coaxial cable systems is 1,860 two-way telephone conversations, or 600 such telephone conversations and two television programmes simultaneously on a pair of coaxial tubes. Modern coaxial cables have eight such tubes.

Waveguides made of solid metal tubing have been widely used for some time for short distances, and it would be possible to use these for long distances if they were perfectly straight, but this is impractical.

The new long-distance waveguide is also a hollow tube, but it is constructed of a thin copper wire, very tightly coiled—like a spring under pressure—and wrapped inside a flexible outer coating which holds the coiled wire in place. This type need not be straight and can actually carry signals around corners.

Experiments indicate that both the solid tube type waveguide and the new coiled wire or "helical" type of waveguide can be used together in communication systems, the first for short distances and the latter for long distances.

The new transmission system operates in a frequency range so high that it has never before been put to practical use for communications. The carrier frequency for the new waveguide is about 50,000 Mc/s.

A major difference between transmission through the new waveguide and through previous systems is that *the higher the frequency in the waveguide, the less the loss through attenuation.* This is exactly the reverse of other forms of transmission.

The long-distance waveguide also presents the possibility of learning how to use tiny wave lengths of the order of one millimetre, about one 25th of an inch. If this becomes possible, the waveguide of the future may be no thicker than a fountain-pen and still carry tens of thousands of telephone messages.

(From *Wire and Radiocommunications*, quoted by the *I.T.U. Journal.*)

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

at 12.30 p.m. on Friday, August 19 and September 16, 1955.

Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

Amateur Television

By M. BARLOW (G3CVO)*

G2WJ/T now transmits the sound accompaniment to his pictures the correct 3.5 Mc/s below the vision frequency of 436 Mc/s, so that a simple converter in front of a domestic TV set will cause both sound and vision to be received together, provided the head amplifier has sufficient bandwidth. The sound transmitter uses a QQV03/20 p.a. and a 16 element aerial, whilst the vision transmitter uses a QQV06/40 and a 64 element array. A larger transformer in the vision transmitter power supply has enabled the peak white output power to be raised. At G3CVO this has meant some 6 db improvement in signal/noise ratio.

Ian Waters (B.R.S.17906) hopes to have a /T licence soon, as does G3FRG (Worthing). Ian's camera was

A view of the aerial system at G2DUS/T, Wallington near Baldock, Herts. The home-made 40 ft tower supports a 12 ft rotatable head which carries a 32 element array for 70 cm and a 12 element 2m beam.

mounted on a mobile crane chassis during a show at Henlow, and some first-class pictures were transmitted. Efforts are still being made to receive G2WJ/T and G2DUS/T (Baldock) at Henlow. The latter has his vidicon camera in action, and has also demonstrated his very fine Test Card C monoscope unit at various meetings. The entire monoscope, pulse generator, mixer and r.f. unit mounts in two TU6B cases, so that the whole TV system is very easily transported; any television set can be pressed into service as a monitor. G2DUS is willing to demonstrate the gear at club meetings.

Brian Partridge (Bishop's Stortford) has completed his pulse generator test waveform generator (giving cruciform, spike, sawtooth, bar and grating pictures), the monitor and 70cm driver stages. G3CVO has now finished both stabilized power supplies, a test monitor unit, modulator and most of the transmitter. The entire vision transmitting equipment fits into a 15in. rack four feet high, very suitable for getting into cars. The aerial system is being changed to a 32 element stack at 45ft, and the vision frequency will be 430.3 Mc/s. PA0ZX will be restarting his TV transmitters' sked at 16.00 on Saturdays on 3750 kc/s.

Club secretaries may like to note that the four tape lectures "Getting Started with Amateur Television," "Amateur Colour TV," "70cm Receiving Equipment for Amateur TV" and "Flying Spot Scanning" may be borrowed at any time. A 16mm "B.A.T.C. Television Newsreel" is in preparation.

Readers are reminded that there will be a National Convention of TV Transmitters on October 1 next at the Bedford Corner Hotel from 10 a.m. to 6 p.m. There will be demonstrations of equipment, lectures, a film show and plenty of opportunity for talking. Everyone is welcome. Tickets may be obtained from D. Reid, 4 Bishop Road, Chelmsford, Essex.

*10 *Baddow Place Avenue, Gt. Baddow, Essex.*

The Institution of Electronics Tenth Annual Exhibition

THE Tenth Annual Exhibition of Electronic Devices organized by the Institution of Electronics was held in the College of Technology, Manchester, from July 14 to 20. This Exhibition covers all the latest electronic equipment and is a veritable wonderland for any engineer or technician whatever his basic interest. There were fifty-five exhibitors showing products ranging from Absorptiometers and Accelerometers to a Yarn Twist Recorder. Forty-one lectures and sixteen film shows were given on a wide range of subjects.

To an amateur the most interesting part of this exhibition was the Research Section in which, among other things, Bradford Technical College was showing colour television and a transistor receiver. The British Rayon Research Association was exhibiting a Yarn Patterning Predictor and the D.S.I.R. Radio Research Station was plotting thunderstorms. Elliott Brothers (London), Ltd., were showing an Absolute Attenuation Calibration Equipment working at 10,000 Mc/s which could in principle operate at any frequency, and Siemens Brothers' Group Research Laboratories were demonstrating The Phenomenon of High Frequency Oscillation in Certain Types of Vacuum Filament Lamps (shades of early TVI).

The commercial exhibit which most took the writer's eye was an Automatic Frequency Monitor by Cinema Television, Ltd., which measured an applied frequency in cycles per second up to a maximum of 20 Mc/s accurate to $\pm$ 1 part in a million $\pm$ 1 cycle and displayed the answer on 8 meters scaled 0-10 entirely automatically. Just the thing for a frequency measuring contest! Unfortunately there were no free samples and it was rather large to slip into a pocket.

Altogether a very interesting exhibition.—G3JST.

Tops C.W. Club Meeting

THE Third Annual Meeting (Midlands Area) of the Tops C.W. Club will be held at "The Swan," Lichfield, on August 27, commencing at 2 p.m. Tickets (including tea) may be obtained, price 7/6 each, from C. J. Morris, D.F.M. (G3ABG), 24 Walhouse Street, Cannock, Staffs.

During the meeting, G3FZW/A will operate on Top Band, G3DZT/A on 3.5 Mc/s and G2COP on 144 Mc/s.

Single Sideband Technique

Part V—The Alignment of Linear Amplifiers

By H. M. HUMPHREYS (GI3EVU)*

ONCE the linear amplifier has been built, bearing in mind the considerations dealt with in Part IV (published in the April, 1955, issue of the BULLETIN), it must be correctly aligned. The only really satisfactory way to do this is to use an oscilloscope and an audio oscillator. This is not intended to imply that there is anything difficult in the task, but anode and aerial current meters unfortunately offer no ready indication of how the stage is behaving. Happily, the simplest of oscilloscopes will serve quite well. A vertical amplifier is not needed, and although a linear horizontal sweep, which can be synchronized by the audio oscillator, is an advantage, it is not absolutely essential. Even a 50 c/s mains sweep may be used by expanding the pattern so that only the almost linear centre of the trace is used. If this is being done the pattern may be made to stand still on the screen by careful adjustment of the audio oscillator frequency.

The linear amplifiers depicted in Figs. 31, 32 and 33 have more than adequate capacity to handle the maximum legal input permitted in the United Kingdom, a situation which differs from that facing American amateurs. Their primary interest lies in getting the utmost from the power-handling capabilities of their output stages. Because of this the adjustment procedure recommended in the following paragraphs will be found to differ in some respects from that given in contemporary American handbooks and magazines.

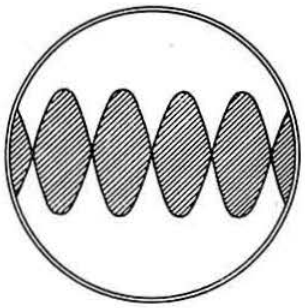


Fig. 36. Double Sideband Suppressed Carrier test signal with correct drive and loading.

As a single tone s.s.b. signal is virtually a pure c.w. oscillation, it is obviously useless for testing the linearity of an amplifier. Fortunately, a double sideband suppressed carrier signal is ideal for the purpose and can be produced without any trouble.

The fashionable way of alignment used to be to simulate a d.s.s.c. output by using the full s.s.b. transmitter, into the speech amplifier of which were connected two audio oscillators of approximately 100 and 1000 c/s. The waveforms of both oscillators had to be as good as possible and their amplitudes equal. This is an unnecessarily complicated method because equally good results may be obtained by using a single tone oscillator at about 1000 c/s and temporarily disabling the arrangement for suppressing the unwanted sideband. In a filter rig a short circuit across the filter will do the trick; in a phasing type transmitter one of the balanced modulators may be put out of operation.

*94 Locksley Park, Finaghy, Belfast

In the circuit of Fig. 25 a third position has been provided on the sideband selector switch solely to allow a double sideband suppressed carrier signal to be generated, but it is recommended that no form of switching should be used with a filter type exciter. The stray capacitances which the wiring would introduce might seriously impair the performance of the filter.

The Double Sideband Test Signal

The double sideband test signal should look like Fig. 36 when displayed on the oscilloscope. At a cursory glance, this may seem to resemble a conventional a.m. signal with single tone modulation, so it is extremely important to note and understand the essential differences between the two. For ease of reference, an a.m. signal with single tone sinusoidal modulation is shown (as it would appear on the oscilloscope) in Fig. 37. The envelope of the a.m. signal consists of two sine-waves, equal in amplitude but opposite in phase, each of which is symmetrically disposed about a line representing one of the boundaries of the unmodulated carrier. The troughs of the d.s.s.c. signal likewise consist of two sine-waves, equal in amplitude and opposite in phase, but both sine-waves are symmetrically disposed about the same axis; that is, the "no carrier" trace which appears on the oscilloscope in the absence of modulation. The troughs are sharply angular, quite different in shape to the rounded peaks. The waveforms should be perfectly sinusoidal and it is obvious that any departure from this condition indicates distortion.

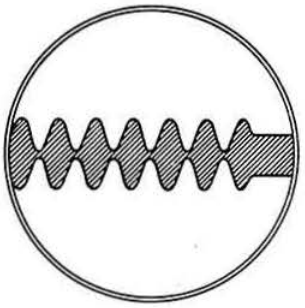


Fig. 37. Amplitude modulated signal with single tone sinusoidal modulation.

The only remaining point to be cleared up before getting on with the alignment proper is to decide the power input relationship between the d.s.s.c. test signal and the peak s.s.b. signal under which amplifiers are conventionally rated. This may, of course, be determined experimentally and extremely accurately for any particular amplifier, but for most purposes it will be safe to assume that with a pure class B linear stage an indicated input of 100 watts will correspond closely enough to a peak input of 150 watts. With a class AB2 amplifier, the average input for the same peak power will be approximately 115 watts.

Alignment Procedure

A block diagram of a suggested set-up for alignment is given in Fig. 38. Before applying audio modulation a preliminary check should be carried out with the oscilloscope pick-up link coupled to the output circuit,

just to make sure that there is no break-through of the unwanted carrier. If there is, it should be eliminated, because it invalidates the procedure to be described. The load should next be coupled to the final amplifier and audio drive applied until the anode current meter indicates the appropriate input for the class of amplifier

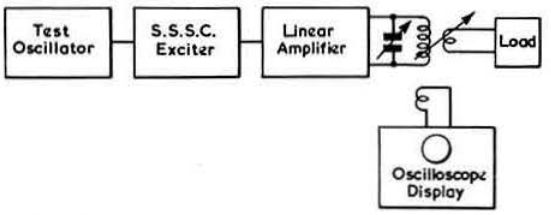


Fig. 38. Block diagram of the suggested arrangement for testing a linear amplifier.

as explained in the previous paragraph. It facilitates adjustment to start with the coupling fairly loose; if this is the case the oscilloscope pattern should look something like Fig. 39. The flattening of the peaks indicates that limiting is taking place in the final anode circuit. This may be eliminated by increasing the loading, while decreasing the drive to maintain constant input, until all evidence of distortion disappears and the pure waveform of Fig. 36 is obtained.

If fixed bias is being used, and it is not correctly adjusted, it is possible to get a small kink in the envelope of the pattern at the cross-over point. A typical oscilloscope indication of this fault is shown in Fig. 40. The remedy is to make small adjustments to the bias voltage until the distortion disappears. One would not normally expect to meet this kind of fault with zero bias triodes yet the writer has had experience of a very odd form of distortion of this type with a pair of TZ40s. It was clearly due to something wrong with the bias, although checks made with a test meter indicated everything was correct. The trouble was eventually traced to a small amount of oxidation on one pin of a plug-in coil in the grid circuit. With linear amplifiers, too much care cannot be taken !

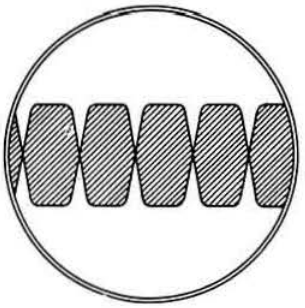


Fig. 39. Distortion of d.s.s.c. test signal due to overdrive and underloading.

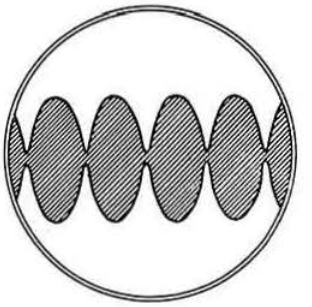


Fig. 40. Distortion of d.s.s.c. test signal due to incorrect bias.

Obtaining the greatest efficiency

The elimination of distortion brings the end of the job in sight, but it does not quite complete it, as the final stage may not yet be operating at the highest efficiency of which it is capable. This may be checked by making small adjustments to the drive and loading while watching the pattern on the oscilloscope. If the input is maintained at a constant level, the peak-to-peak amplitude of the display will serve as an indication of efficiency. The settings which give maximum distortion-free amplitude are, of course, those to adhere to.

Operation and Monitoring

If the oscilloscope is to be used for continuous monitoring—a practice which the writer favours for *all* telephony work—it is useful to draw a couple of lines on the cathode ray tube graticule with a chinagraph pencil to indicate the peak amplitude under maximum input s.s.b. conditions. This may be ascertained by switching the exciter to s.s.b. and applying a sinusoidal audio signal to the input of the speech amplifier. The audio gain control should then be adjusted until the anode current meter indicates an input of exactly 150 watts. Thereafter the gain control should be used judiciously to keep speech peaks just inside the indicated boundaries, thereby satisfying Post Office requirements and at the same time keeping distortion at a minimum. If the oscilloscope cannot be spared for monitoring a rough guide may be obtained before disconnecting it by noting the average input to the final under normal speech conditions. If the anode current meter is not permitted to rise above this point during subsequent unmonitored transmissions, it is not likely that much harm will be done. The drawback to using the anode current meter is that few amateurs can really believe that an average input of 15-25 watts may contain speech peaks of 150 watts. Unless the oscilloscope is there to provide continuous proof it is often difficult to dispel the feeling that the best is not being obtained from the equipment.

On the Subject of Dummy Loads

In conclusion, and at the risk of considerable criticism, the writer would like to pass on his experience regarding the use of dummy loads for adjusting linear amplifiers. They are of course invaluable for preliminary tests and experimental work but they do not give an amplifier the "work-out" which it gets from an aerial test. A final stage which may do all the right things under purely resistive load conditions may not behave nearly so well when coupled to an aerial.

If done with a little foresight, tests on the air need cause no interference to others because all the testing anyone is likely to need can easily be done during one of the "dead" periods which are all too frequent on the amateur bands these days. Incidentally, do not forget to give your call-sign: it is required under the terms of the Amateur (Sound) Licence. It also pays to say briefly what the object of the test is—it is surprising how many useful and interesting listener reports may result from a test transmission.

(*This article was prepared before the regulations reported on page* 292 *of the December,* 1954, *issue came into force. Alignment instructions to cover the new definition of maximum power are in preparation.*)

TWO METRES AND DOWN

By F. G. LAMBETH (G2AIW)*

FROM some of the correspondence received it appears that much cogitation is going on about operating tendencies on 2 m and 70 cm. It seems that these bands (especially 2 m) tend to become a "closed shop" in that after local stations have been contacted for the score and the record, they are henceforth ignored by those who show possibly undue hankering after DX. It is perfectly true that this practice goes on, but let us be charitable and assume that the culprits consider they can always go back to their "locals" when there are no signals from further afield. From the writer's experience, the best of friends will ignore each other when European DX comes through! However, let us remember the stations who prefer local rag-chews, and contact them once in a while. Further, let no v.h.f. man think that because he is "local" he is not wanted. There has been an encouraging increase in the populations of the bands; to these newcomers we extend a hearty welcome and hope they will remain long with us. To the veterans, we would say that the new operator needs their co-operation and help, and one of the surest ways is to give a QSO even though there is no apparent thrill in it.

Manchester V.H.F. Convention

EI2W and **G5YV** both expect to be at the V.H.F. Convention to be held at the Grosvenor Hotel, Manchester, on September 17. Many other notable v.h.f. personalities are going and it is urged that intending visitors should apply without delay for tickets (15/- each) to H. B. Shields, 10 Deal Street, Newton Heath, Manchester, 10. Applications for hotel reservations should be made as promptly as possible. A complete 2 m station will be operating from the hotel (aerial height 135 ft) and during the afternoon four mobile stations will be "talked in" to the hotel door. A visit to Ringway Airport has been arranged, the Control and Radar Rooms being available for inspection.

Station Reports 2 m

During the period under review conditions on 2 m have been excellent. Some records have been made and certainly no one interested in DX can complain of inactivity on the band, although one would have expected more stations to be operating abroad. At one time or another stations have been heard and worked in the Home Counties from all points of the compass. GM, EI, F, ON4, PA0, DL, SM, OZ and LA have all been coming through at great strength. In other parts of the U.K. similar results have been achieved. On July 19, a station signing SP1AC was heard by many G stations. Did anyone work this station? Congratulations to EI2W (Dublin) and G5YV (Leeds) who made the first EI–G contact on 70 cm on July 14.

B.R.S. stalwarts **'3003** (Coulsdon), **'6327** (Earlsfield), **'16075** (Southampton) and **'19162** (Dewsbury) all report increased activity and openings. '3003 found July 16 about the best for European stations. ON4, DL and PA0s were heard at terrific strengths. Seven countries have now been heard at Coulsdon although the 12 element stack is still temporary! '6327 has been comparing a four element Yagi and a pair of slots. He finds the Yagi better, probably because the lower slot is sometimes screened by the roof-ridge. The differences are noticeable on distant stations, but not locally. '16075 has replaced the 6BQ7A in his converter by a 6BZ7. The results are excellent but comparative noise figures have not yet been obtained. '16075 says that outstanding signals have been from F9JY, F3LP, and GC3EBK, the latter having an S5 spacer! G5OB (Southampton) is nearly ready for 2 m. '19162 found conditions poor at the beginning of the period but they improved with the fine weather. In the contest GW3GWA was logged, otherwise only locals were heard. G6AG/P was heard on July 19 from Penrith and G3EPW (Bury, across the mountains) although only 24 miles away, received at last. '19162 asks again, will phone stations *please* sign correctly? Calls made by Jack to Fred are useless to an operator waiting for a call-sign.

G5YV (Leeds) has heard signals from all parts of the U.K. rolling in night after night, with a fair number of Continentals from time to time. The countries worked on 2 m since July 1 are G, GC, GI, GM, GW, EI and PA. **G3DGI** (Barnet) managed to erect a 4-over-4 Yagi 1½ hours before the Two Metre Open Contest, which proved a good test, as 47 stations were worked on phone with G5YV as the most distant.

G8LN (Plumstead) has no activity to report because (he says) there is no one on in the early evening and the remainder are DX thirsty; '8LN as bait is not tempting enough! He has been completing a modified CR100 ready for taking various i.f.s from 2 m and 70 cm gear. **G3IKW** has reappeared on 2 m and worked an ON4 on July 16. '8LN thinks that in the results of v.h.f. contests a better analysis could be given viz: number of QSOs, number of Regions worked, etc.

G3HHY, late of Solihull, and now in Bristol, sends 73 to all friends. He is to be married on September 17 (all good wishes, OM) and will be on 2 m from Bristol later. **G3WW** (Wimblington) has sent a very comprehensive report. For part of the period the speech amplifier was out of action. On July 7 it seemed like the old 5 m days to hear Yorkshire and Lancashire stations working "across" G3WW to strong London stations with G3WW unable to reach either! The near sea mist condition has come in most nights lately. G3JZN/P was working from a caravan site near Fleetwood and G2FNW was heard asking if G2AIW was calling G2FO on 2 m as he could hear G2AIW on 70 cm on c.w. (must really make use of the harmonic—Ed.). On July 14 conditions improved again; two Basingstoke stations were worked, followed by EI2W at loudest ever (S7–8), West Lancashire and Devon. When G3WW retired conditions were still improving. July 15 brought QSOs with the Isle of Wight, F8MX and G2XV/P at Runton, nr. Cromer. July 16 was a night of nights. First GC3EBK was worked at 569/56, then Derbyshire, Belgium and Holland. At midnight ON4BZ was 59+ followed by PA0LBS and PA0HRX and many DL

*21 *Bridge Way, Whitton, Twickenham, Middlesex*

stations. The good conditions continued on July 17–18 with G6AG/P (Westmorland) and GW3GWA and GW3INV (Wrexham) as outstanding. '3WW says thanks are due to '3GWA for standing by '3INV and making the QSOs possible, when he must have been tempted to go after the DX himself! G6AG/P was also worked at Penrith (Cumb.).

G2HIF (Wantage) says the first part of the period was taken up with preparations for the Open Contest and the second part looked like being equally inactive owing to reaction! G2HIF wants Rule 2 of this contest to be well and truly buried before the next time; he says half the pleasure in field days is getting together with friends and working as a team. '2HIF operated with Bournemouth amateurs and although stations were worked at a steady rate, it was never felt that conditions were good; in fact, to the north they were poor. Sixty-nine stations were worked and a good time was had by '3HLW, '3JAU and '3JIH who co-operated with '2HIF at the site at Okeford Hill near Blandford (Dorset). **G3IIT** (Trumpington) sends a healthy list of stations worked, with 30 counties since September last. The transmitter runs 15 W to an 832, with four stacked slots at 40 ft. His signal comes into London and the Home Counties extremely well.

G8JM (Chingford) reports that P.C.A. Radio loaned a "Hamobile" for 144 Mc/s operation from GB3GP during the ten day London International Patrol Scout Camp at Gilwell Park. **G3CCH** (Scunthorpe) sends a Ladder score which although too late, is worthy of mention. His final figures were 15 Regions, 169 QSOs and 9 countries. **G3KEQ** (Sanderstead) has worked 89 stations in 28 counties (25 W to an 832 and a pair of slots) since April 13. **EI2W** (Dublin) was received by G2HGR (Bolton) on July 11 on a handy/talkie, a novel experience for a 2m station in a different country—pity it was not a QSO. EI2W returned to the band on July 2 and found conditions reasonably good. GM and GI stations were very active, and many stations in Lancashire were heard. GI5HV has at last made his debut on 2 m and received EI2W solidly at his QTH in Whiteabbey, co. Antrim. GI3AXD had a 100 per cent QSO with EI2W on the night of July 13. Other important contacts by EI2W during the period were with G2ADZ who is being solidly received in Dublin, and G2HCJ/M who worked into Dublin from his car while travelling between Dartsbury and Warrington. DL3VP was also heard on the night of July 11 very weakly. Several calls from Dublin failed to hook him!

A late opening to the Continent occurred during the night of July 14-15. When EI2W was about to close down twenty minutes after midnight he was called by G5TZ (I.o.W.). The beam was then turned on London and G8AL in Essex was worked. EI2W was called later at 00.40 B.S.T. by ON4BZ who was RS44. Guy mentioned that the band was dead as far as England was concerned as he was unable to work more than *two Gs.* He gradually got stronger and at 01.26 was RS58 in Dublin when a further QSO took place. EI2W's signals were the same in Brussels. An effort was then made to alert GM3EGW who was in QSO with G3FGT, but all efforts to raise him failed as he was beaming south. EI2W gave the frequency of GI3GWY (who was working G–DX) to ON4BZ, at the same time alerting the GI stations. The Continental operators must have also gone to bed, as only ON4UD was heard on 144.5 Mc/s. **G2XV** (Cambridge) reports phenomenal signals from EI2W whilst working on Snowdon as GW2XV/P during the Open Contest. **G3CQC** (Kingskerswell, S. Devon) sends a good list and notes that the outstanding feature of operations recently has been the consistent path to the north. Conditions eastward have been comparatively only fair. **G3JGJ** (Plympton) has erected his 2 m/70 cm beam on a 48 ft tower but so far only GC2FZC has been worked. G2ADZ, '2BAT, '2BSA, '2FKZ/A, '3AUS and '3HZH were heard. **G6XX** (Howden) has worked many new stations as well as G2ADZ (Woolacombe), EI2W, GI3GXP, several GMs, and a first QSO with South Wales (GW8UH). '6XX suggests that the Ladder scoring be changed to Regions, Countries and Stations Worked in that order.

G2AHY (Crowthorne) is active on 2 m with 25 W to 4-over-4 indoor Yagi, which is shortly going up outside his new house. His frequency is 145.34 Mc/s. **G3CCH** (Scunthorpe) worked over 40 different stations in two weeks; quite a number of Continental stations were heard. '3CCH refers to an article in the July BULLETIN and says that most of the Service operators on 2 m seem to be British, not American. If Service frequencies were known, it might save 2 m operators from purchasing crystals which clash with them! **G8VN** (Rugby) is well again and reports a good month. Among 9 Regions worked appears No. 15! Still using the "despised" indoor aerial, G-DX has been excellent, but '8VN says there are still many well-known stations he hears who do not apparently hear him. The path to the south-west is difficult, however, and GC and GW (South Wales) have yet to be heard.

G3KHA (Bristol) found conditions difficult on the Sunday of the Open Contest. The northern high power stations can now be heard, and G8BP (Wolverhampton) was worked in '3KHA's bad direction. A sked with G2FJR (Sutton Bridge) had no failures during the first week. The input is going up somewhat in an effort to work some of the others heard. **G5MR** (Hythe, Kent) had excellent results, with F stations in the Two Metre Open and 16 were worked. Gs, in contrast, were very

Two Metres Comes Into Its Own

The weekend July 23–24 was the culmination of the longest period of good conditions yet remembered on 2 m. The superlative propagation conditions were helped by the presence of GM5KW/P and /M, and GM6AG/P. The former, operating 1,500 ft a.s.l. not far from Stonehaven (Kincardineshire), was an excellent signal in the south for long periods, and actually worked mobile into London! GM2FHH was with '5KW on the Sunday. GM6AG/P worked many stations from Burrow Head and Mull of Galloway, Wigtownshire. GM3BDA/A (North Berwick) was also a strong signal in the south on the Sunday night, and worked a long queue of eager Sassenachs. GI3GQB (Newtownards, co. Down) was worked by G2AIW (the first GI ever heard by him on 2 m). The northern stations were working France quite comfortably, the Channel Islands stations were terrific signals, in fact the 2 m band really *was* wide open. Lancashire and Yorkshire stations received in London were "needle benders" and generally the band sounded a little like 10 m did in 1946–7. It would be difficult to imagine a better week. G5MR (Hythe, Kent) worked LX1AS (Luxembourg) on July 23. This is believed to be the first G/LX contact on 2 m. G5TZ heard two HB1 stations, and SP1AC was heard again. G5YV worked F8MX (St. Valery-en-Caux) on 70 cm on July 24 ('5YV's first 70 cm contact with France). The signals were S9 part of the time.

poorly received. The average distance per contact was, however, 112 miles. The most distant new stations worked were G3KFT (Cheltenham) and GC2FZC (Guernsey). G8AL (Chingford), a newcomer to 2 m, was worked for the first time since 5 m days! No Scandinavians were heard when they were being worked from London. Local conditions were then quite poor. '5MR and G3CCH have queried the Ladder scoring dates; it should be made clear that the Ladder commences on July 1. If anything remarkable occurs in the last few days of June to alter the positions this can usually be taken care of. **G5UM** (Knebworth) also reports working G8AL 7 years after 5 m days!

G2CZS (Chelmsford) notes several DX openings, his best QSOs being with F8AA, G3ENS/P, '3KFT and '4JJ/P. July 10 produced "super conditions" with stations "roaring in" as never before. On July 15 DL1LB was worked at 599 both ways. Several PA0s and ON4s were heard. It was very pleasant to work G8IL (near Salisbury) after a long absence. EI2W was heard on July 14, the first time in 2 years. **G3IJW** (Bexleyheath) reports for the first time. He is using an 832 at 12 watts to a 4-over-4 Yagi and missed all the good spells until July 10 when G5YV was worked and '6XM heard. ON4OZ (59 both ways) was the first Continental QSO followed by PA0 and DL stations.

On the night of July 18-19 Norwegian stations were audible in the Home Counties and on the n.e. coast. LA1KB, '8RB and LB9T were worked by G2AIW and G5DS. They were also heard in QSO with G2FJR (Sutton Bridge) and G5BD (Mablethorpe). The following evening SM6ANR (Gothenburg) was worked by some stations in the London area, as also was OZ1PL (Grenaa). A station signing SP1AC was heard calling on c.w. (569) but did not appear to reply to calls. Whether this station is genuine is not yet known. **G5YV** worked LA1KB, OZ1PL, '2IZ, PA0YZ, and SM6ANR, who was again worked by G2AIW on July 21 (569), G5DS and G2HDZ among others. DL1FF (nr. Kiel) was very strong in the London area whilst calling the north and Scotland, but no other Continentals were heard. **G3IOO** (Oswestry) worked ON4BZ.

G2UJ reports that CN8MM, heard in contact with VQ4AQ, said that he (CN8MM) is on 2 m with 100 W and a 10 element rotary beam. There are 6 stations active in CN8. They work Tangier (250 miles away) every evening. Tests are going forward between CN8MM and VQ4AQ on 2 m. This news is confirmed by EI2W after a 14 Mc/s QSO with CN8MM.

Two Metre News from Scotland

Pride of place here must go to **GM2FHH** (Aberdeen) who rocketed into the London area and the South on July 10. It appears that Glasgow and Edinburgh stations did not share the good fortune on that occasion. The aerial now in use is a pair of slots, but '2FHH is going back to his 12 element stack.

GM6WL (Glasgow) reports that the heat wave produced some good QSOs. GM3IBV contacted G6KK, '2CVR, '3IUD, '6XX and '5BD, who was also worked by GM6KH. G3CCH is often the only station audible. EI2W was heard at good strength on July 7 in QSO with GI3XP. On July 9 EI2W was outstanding (S9+), and was worked by GM6WL. On July 12 '6WL worked G3GPT (Preston); the latter worked GM2FHH (Aberdeen) and '3EGW on phone. G6XM has been well received and G5YV worked. G2CVR (nr. Liverpool) was a very good phone signal to GM3EGW recently. The encouraging point is the increasing tendency of stations in Lancashire and neighbouring counties to beam towards Scotland. GM3DDE (Edinburgh) has raised his mast with a 4-over-4 Yagi and now puts a very strong telephony signal into Glasgow.

GM3EGW (Dunfermline) is hearing many continentals but hasn't raised any. Conditions to the south have been excellent, especially during the period July 9-15, when G8KW, G6RH (Kent) and G2ADZ (Woolacombe) were worked.

Channel Islands

GC2FZC (Guernsey) has worked G2ADZ (Woolacombe) on phone but his best contacts have been with G3GPT (Preston) and stations in Wales. **GC3EBK** has also been active, and among others had several QSOs with G2AIW.

Wales

GW5BI and **'8UH** (Cardiff) send lists. '5BI reports hearing EI2W, G6XM and '5YV etc. recently from a poor QTH. He uses 25 W to an SCR522 and a pair of slots 32 ft high. '8UH had three slots up recently but had to remove one, owing to excessive whip. This hasn't impaired his signal to London however.

GW3GWA (Wrexham) has been somewhat inactive lately, having been indisposed. GW3INV is now active from Wrexham with an indoor beam (frequency 145.6 Mc/s). Nothing has been heard in N. Wales of the recent Continental activity. GW3BOC/P has been operating from Nerquis nr. Mold (Flint.) and GW3DA/P from Hope Mountain (Flint.). '3DA/P is equipped for 2 m and 70 cm.

Seventy Centimetre News

G5YV and **EI2W** have both reported on the first EI–G QSO on 70. G5YV also had a nice contact with GW3DA in Flintshire on July 17 ('5YV phone S8 and '3DA QRP c.w. 569). During the period '5YV worked the following on 70 cm: G2BVW, '2FNW, '2WJ, '3GMX, '3IOO, '3JZY, '3KEQ, '3WW, '5LL, GW3DA/P, EI2W and PE1PL. G3GDR and '5ML were heard. PE1PL (130 W, 102 element beam) is always heard at Leeds when testing. '5YV is going to push his power up to 30 W (QQV06/40) shortly.

EI2W confirms that he and G5YV established the first EI–G contact at 22.46 G.M.T. on July 14. EI2W used a new W1HDQ-type converter and a 5-over-5 Yagi with full wave spacing. The reports were: G5YV RS44, EI2W RS43/4. Earlier (at 21.48 G.M.T.) 2 m signals were so strong (RS59+) from G3DMU (Scunthorpe) that the path was considered very favourable for tests. Earlier in the week under less favourable conditions, tests were carried out with G2ADZ without result. The London U.H.F. Group is keeping a regular sked on 70 cm with EI2W commencing at 20.30 G.M.T. nightly.

G2RD's activity list for the period June 23–July 21 is as follows: G2AIH (435.15), '2DD (434.82), '2DD/M (434.82), '2DDD (435.66), '2DSP (434.97), '2FKZ (435.95), '2FNW (433.3), '2HDY (435.5), '2QY (435.1), '2RD (435.53), '2WJ (436), '2XV (435.1), '3EOH (434.55), '3FP (434.98), '3FSD (435.42), '3GDR (435.39), '3IRW (434.4), '3KEQ (435.05), '3IOO (432.8), '3WW (435.3), '4RO (434.16), '5CD (435.6), '5DS (435.68), '5DT (434.9), '5RD (435.25), '5UM (434.37), '5YV (432.7), '6NF (435.4), '8SK (435), PA0WAR (434.7).

G3KEQ (Sanderstead) worked G2FNW, '2BVW and '3HKD (for the first time) on May 31. Thirteen counties on 70 cm, with G5YV and PA0WAR as the best DX, is a good record for 5 weeks on 70. During the 420 Mc/s Contest, in conjunction with G3JQN, 31 stations were worked, the most distant being G2XV, '3GZM/P and '3EGV. '3KEQ has also worked G3IOO and has a sked on Tuesdays and Fridays at 22.30 with G2FNW.

Scottish News–70 cm

GM3GAB is active, testing new gear, and several "inter-Glasgow" QSOs are being made. GM8AH has heard Glasgow for the first time as well as GM4HX (Paisley). GM3NG (Carluke) and '3GAB (nr. Glasgow) have had a 70 cm phone contact.

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Owing to the many letters this month and resultant pressure on space, some rather ruthless editing has been done. Late reports have been unavoidably held over. Please send reports for the September issue to *arrive* not later than August 20 as the writer will be going on holiday just after that date.

Worked and Heard on Two

(Lists of stations heard by transmitting members have been shortened due to pressure on available space.)

B.R.S.3003 (Coulsdon) June 17–July 16.
Heard: DL1LB, G2BMZ, 3ANB, 3BPD, 3CCH, 3CGQ, 3DLU, 3FAN, 3FIH, 3GOP/P, 3IIT, 3ION, 3IRA, 3KHA, 5TZ/A, 5YV, 8DA, 8KW/P (nr. Bristol), GC3EBK, GW3EJM, ON4DW, PA0BL, 0HA, 0VIM, 0YZ.

B.R.S.6327 (Earlsfield) June 11– July 11.
Heard: DL1AH, 1EB, 1LB, 9MZ, F3LP, 9CQ, 9EA/P, G2AHL, 2BDN, 2DSW/P, 2HCG, 2HI/P, 2UN, 2YB, 3ANB, 3BDP, 3BSU, 3CGO, 3CZY, 3DDD, 3FD/P (Dunstable), 3FGT, 3FRG/P, 3GJJ, 3IWJ, 3JFR, 3JHM, 3KFT, 4FP, 4PS, 5KW/M, 5LK, 5TP, 5TZ, 6FO, 6JK, 6XM, 8PX, ON4CA, 4HN, PA0BN, 0DSW, 0SK.

B.R.S.16075 (Southampton) June 19–July 18.
Heard: F3LP, 9JY, G2AIW, 2BAT, 2BMZ, 2DDD, 2DSP, 2DSW/P, 2DVD, 2HIF/P, 2UN, 2YB, 3AUS, 3DLU, 3FIH, 3GDR, 3GJJ, 3GOP/P (Exmoor), 3JFR, 3WW, 4SA, 4GR, 5KW/P, 6AG, 6JK, 6TA, 6NB, 6OX, 8DA, 8KW/P, 8UQ/P, GC2FZC, 3EBK, GW2ACW, 3EJM, 5BI, 8UH.

B.R.S.19162 (Dewsbury) June 16–July 17.
Heard: G2AIW, 2ATK, 2BVW, 2FNW, 2FJR, 2HCG, 2WJ, 3CC, 3DGI, 3GGJ, 3GHO, 3GHU, 3GSO, 3GPT, 3IIT, 3IRA, 3WW, 4OT, 5AU, 5BD, 5ML, 5TZ, 6AG/P (Penrith), 6LI, 6NB, 6RH, 8AL, 8BP, 8KW, 8SB/P, GW3DA/P, 3GWA/P.

EI2W (Dublin) July 2–14 only.
Worked: EI5Y, 6A, G2ADZ, 2CBR, 2HCJ/M, 2HCJ/P, 2HGR, 3BOC/P, 3BPJ, 3DA, 3DMU, 3EPW, 3GHO, 3GPT, 3IUD, 3IWJ, 3JZN/P, 3WW, 5YV, 6KK, 6LC, 6MI, 6NB, 6XM, 6XX, 8BP, 8SB, GM3DDE, 3EGW, 6WL, GW2XV/P, 8SU. *Heard:* DL3PV, G5TZ, 6XV.

G2AIW (Twickenham) June 22–July 20.
Worked: EI2W, F9JY, GC2FZC, 3EBK, GM2FHH, GW2XV/P (Snowdon), 3EJM, 5BI, 8UH, LA1KB, 8RB, LB9T, ON4UD, OZ1PL, SM6ANR. *Heard:* G3CQC, PA0LBS, SP1AC.

G2CZS (Chelmsford) June 21–July 18.
Worked: DL1LB, F8AA, G2CIW, 2FJR, 2FWW, 3BJQ, 3CGQ, 3ENS/P, 3FUL, 3GJZ, 3IIT, 3KFT, 4JJ/P, 5YV, 6XX. *Heard:* EI2W, PA0ROB.

G2HIF/P (nr. Blandford) July 2–3 only.
Worked: F3ND, 3LP, 8AA, 8MW, 8RK, 9CQ/P, 9EA/P, 9JY, 9NW, 9RL, G2FJR, 3CGQ, 3ENS/P, 3FGT, 3GGJ, 3GHO, 3GJZ, 3ISA, 3VI, 4JJ/P, 5KW/P, 5ML/P, 5YV, 6AG, 8AL, 8QY/P, GC2FZC, 3EBK.

G3CQC (Kingskerswell) May 22–July 16.
Worked: F8MW, 9EA/P, 9JY, 9RL, 9QE, G2ADZ, 2HIF/P, 2HGR, 3EPW, 3FWW, 3GOP/P, 3GPT, 3IOO, 6OX, 6TA, 8BP, 8DA, 8UQ/P, GC2FZC, GW2ACW, 8SU. *Heard:* EI2W, F3LP, GC3EBK, GW3EJM, 8UH.

G3DGI (Barnet) July 4–19.
Worked: G2JF, 2FWW, 3WW, 3BPD, 3CCH, 3CYY/P (nr. Church Stretton), 3DMU, 3EPW, 3GHU, 3GPT, 3IIT, 3JZG, 3KFT, 5BD, 5YV, 6AG/P (nr. Windermere), 6CW.

G3FIH (Bath) June 20–July 14.
Worked: F8MW, G2ADZ, 2BAT, 2DDD, 2DTO/P, 2DVD, 2HDZ, 2MV, 2UJ, 2YB, 3CGE, 3ENS/P, 3EYV, 3FAN, 3FD/P, 3FGT, 3GHO, 3GJJ, 3GOP, 3GSM/A, 3JHM, 3XC/P, 4JJ/P, 5JU, 5KW/P, 5LK, 5MA, 5ML/P, 5YV, 6AG, 6JK, 6JK/P, 6OU, 6OX, 6XM, 6ZP, 8AL, 8DA, 8KW/P, 8QY/P, 8UQ/P, GC2FZC, 3EBK. *Heard:* F8AA, 9CQ.

G3IIT (Cambridge) June 1–July 11.
Worked: G2BVW, 2DVD, 2FJR, 2HCG, 2HDZ, 3DMU, 3DGI, 3GOZ, 3HBW, 3JGY, 3JMA, 3KBL, 3XC/P/M, 4AU, 4OT, 5TZ, 5UM, 6AG, 6AG/M, 6OU, 6TA, 6ZP, 8BP, 8UQ/P. *Heard:* F8GH.

G3IJW (Bexley) July 10–July 17.
Worked: G3IEX, 3INU, 5YV, ON4DW, 4RA, 4OZ, PA0PA, 0ROB, 0UHF. *Heard:* DL1AH, 3DJ, PA0EL, 0HA, 0WO, 0DSW, 0GER.

G3KHA (Bristol) June 20–July 19.
Worked: G2UJ, 2ADZ, 2AIW, 2BAT, 2BRR, 2DVD, 2FJR, 2HDZ, 2HIF/P (Blandford), 3FD, 3WW, 3CGQ, 3CLW, 3DGI, 3EYV, 3FAN, 3GGJ, 3GHU, 3GOP/P (Exmoor), 3HBW, 3ITF, 4AU, 5HN, 5MA, 6AG, 6OX, 6TA, 8AL, 8BP, 8UQ/P (nr. Basingstoke). *Heard:* GC2FZC.

G3WW (Wimblington) May 31–July 18.
Worked: DJ1XX, DL1FF, 1KM, 9BD, 9LU, 9MZ, 9QU, ON4BZ, 4DW, EI2W, 8MX, PA0LP, 0BN, 0DSW, 0ES, 0FC, 0FS, 0GER, 0HRX, 0LBS, 0MEL, 0SK, 0UHF, 0VLM, 0YZ, G2ADZ, 2ANS, 2BMZ, 2BVW, 2CIW, 2CVP/P, 2DUS, 2DVD, 2FJR, 2FNW, 2HDZ, 2HGR, 2MV, 2UJ, 2XV/P (Snowdon), 2XV/P (Norfolk), 3AEX, 3ARL/P, 3BXF/A, 3CCH, 3CCQ, 3CUZ, 3CZY, 3DGI, 3DLU, 3DMU, 3EGV, 3ENY, 3FAN, 3FNL, 3FW, 3GGJ, 3GHP, 3GJJ, 3GJZ, 3GOZ, 3GP, 3GSM/A, 3GSO, 3GVK, 3HTY, 3IIT, 3IRS, 3IVK, 3IUL, 3IWJ, 3JZG, 3JZN/P, 3KBL, 3KHA, 3XC, 3XC/P, 4FO, 4GR, 4JJ/P, 5BD, 5BM/P, 5CP, 5IG, 5KW, 5MR, 5ML/P, 5YV, 6AG/P (Westmorland), 6JK, 6KK, 6LC, 6OU, 6XM, 8IC, 8KW, 8KW/P, 8MW, 8UQ/P, 8RW, 8SB, GC3EBK, GW3EJM, 3GWA, 3INV. *Heard:* F9CQ/P, PA0CAP.

G5MR (Hythe, Kent)
Worked: F3JN, 3LP, 3LS, 3ND, 8GH, 8LO, 8ME, 8MW, 8RK, 9AJ, 9CQ/P, 9EA/P, 9JY, 9NW, 9QB, 9TV, G2DDD, 2HDY, 3COJ/A, 3CZY, 3FKJ, 3FNL, 3GOZ, 3HBW, 3IAM, 3JXN, 3KFT, 3VI, 3WW, 5DS, 5KW, 5YV, 6AG, 6TA, 6YP, 8AL, GC2FZC, 3EBK. *Heard:* F3CA, 3WH, 8MX, 9QE, G2AIW, 2DSP, 2HCG, 2HDZ, 2XV, 3ARX, 3CNF, 3DJX, 3DLU, 3FD, 3GSE, 3IIT, 3IKW, 3SM, 3WS, 4AU, 5BD, 5LK, 5TZ, 5UM, 6CW, 6NB, 6OX, 6RH, 8KW, 8MW, 8UQ/P, GW3EJM, 8UH, ON4BZ, 4CP, 4HN, 4UD.

G6TA (Streatham) June 24–July 20.
Worked: DL3QH, 9QV, G2ANS, 2BAT, 2BPD, 2DSW/P, 2HGR, 2HIF/P, 2YB, 3AEX, 3AUS, 3BEX, 3BJQ, 3BPM, 3CGE, 3CGQ, 3CQC, 3DLU, 3DMU, 3DO, 3DVQ/P, 3FAN, 3FD/P, 3FGT, 3FIB, 3FIH, 3FKJ, 3FNL, 3FRG/P, 3GAV, 3GHO, 3GOP/P, 3GPT, 3IOO, 3ITF, 3IWJ, 3JGY, 3JZG, 3KHA, 3NT, 4FB, 4GR, 4JJ/P, 4SA, 5KW/P, 5LO, 5ML/P, 5YV, 6AG/P, 6JK/P, 6XM, 8IL, 8NM, 8PX, 8QY/P, 8UQ/P, 8VN, 8VZ, GC3EBK, GW2XV/P, 3GWA/P, 8UH, ON4DW, 4HN, PA0LBS, 0WO, 0YT, SM6ANR. *Heard:* EI2W, G2DSP, 2FJR, 3CC, 3EMU, 3KBL, 5QI/P.

G6XX (Howden) July 5–19.
Worked: EI2W, G2ADZ, 2DVD, 4GR, 5TZ, GI3GXP, GM3DDE, 3EGW, 3IBV, GW8UH, PE1PL. *Heard:* GI3CWY.

G8VN (Rugby) June 19–July 18.
Worked: G2ABD, 2CBR, 2FJR, 3ARX, 3CGQ, 2CZY, 3FD/P, 3FMI, 3GPT, 3GSE, 3GUD, 3ISA, 3IUK, 3JZG, 3JZN/P, 4JJ/P, 5BD, 5BM/P, 5YV, 6TA, 8AL, GI3CWY, EI2W.

GC2FZC (Guernsey) May 22–July 16.
Worked: G2ADZ, 2AIW, 2DDD, 2HDZ, 2HGR, 2MV, 3AUS, 3DLU, 3FAN, 3FIH, 3GOP, 3GOP/P, 3GPT, 3HIF/P, 3HBW, 3IOO, 3JGJ, 3JHM, 5DS, 5KW/P, 5LK, 5MR, 6OX, 6TA, 8AL, 8BP, 8DA, 8UQ/P, GW2ACW, 3EJM, 8SU, 8UH. *Heard:* G2BAT, 2DSP, 3CQC, 3GSE, 3FGT, 5TZ, 6NB, 6MX, 6JK.

GM2FHH (Aberdeen) June 17–July 17.
Worked: G2AIW, 2DRA, 3BW, 3CCH, 3DMU, 3GHO, 3GHU, 3GPT, 3KEQ, 5BD, 5YV, 6NB, 8AL, 8KW, GM3BDA, 3EGW, 3FGJ, 3FYB, 3GAB, 3IBV, 4HX, 6XW, 6ZU.

GM3EGW (Dunfermline) June 18–July 15.
Worked: EI2W, 6A, G2FO, 2NY, 2ADZ, 2BDQ, 2CBR, 2DRA, 3BW, 3AGS, 3CCH, 3DMU, 3ENS, 3FGT, 3GPT, 3HAZ, 3IUD, 3IWJ, 3JZN/P, 5BD, 5YV, 6KK, 6LC, 6NB, 6XM, 6XX, GM2FHH. *Heard:* DL1LB, G2OL, 3ARX, 2HCJ/P, G4LX, 5TZ, 6RH, 6UJ, 8BP, 8KW, OZ7SP.

GW3GWA (Wrexham) mainly July 3.
Worked: G2BVW, 2FJR, 2HOP, 3DMU, 3KPD, 6XM. *Heard:* EI2W.

GW5BI (Cardiff) June 20–July 20.
Worked: G2AIW, 2HIF/P, 2BOC/P, 3EXW, 3FAN, 3GOP/P, 3GHO, 3GPT, 3JZG, 5TZ, 6OX, 6XM, 8BP. *Heard:* EI2W, G2UJ, 2ADZ, 2BAT, 2BMZ, 2BRR, 2BVW, 2DVD, 3DA, 3GB, 3WW, 3XC/P, 3AUS, 3CCH, 3CQC, 3DMU, 3EPW, 3FGT, 3FRY, 3HTY, 3IOO, 3IUD, 4SA, 5YV, 6AG, 6JK, 6NB, 6TA, 6XX, 8AL, GC2FZC.

GW8UH (Cardiff) June 20–July 20.
Worked: G2RD, 2AIW, 2BAT, 2HIF/P, 3BOC/P, 3CGE, 3FAN, 3GHO, 3GOP, 3GOP/P, 3HBW, 3IIT, 3IOO, 3IUD, 3IWJ, 3IRA, 3IRS, 3GPT, 3JZG, 5ML/P, 5YV, 6JK, 6OX, 6TA, 6XM, 8AL, 8BP, 8KW/P, 8UQ/P, GC2FZC, GW2XV/P. *Heard:* EI2W, F9CQ/P, 9RL, G2UJ, 2YB, 2ADZ, 2ATK, 2BRR, 2DDD, 2DSP, 2DVD, 3MU, 3NL, 3WS, 3AUS, 3CQC, 3EPW, 3FGT, 3GVF, 4JJ/P, 5MA, 5ML, 5RZ, 5TZ, 6NB, 6AG.

SM6ANR (Gothenburg) July 18–23 only.
Worked: DJ1XX, DL1FF, 1MI, 1SEA, 3IY, 3QH, 6OR, 9MZ, 9QN, F3LQ, G2AIW, 2FJR, 2HDZ, 2XV, 3CLW, 3DMU, 3DVK, 3GDR, 3GHO, 3GPT, 3HBW, 3WW, 5BD, 5DS, 5TZ, 5YV, 6NB, 6RH, 6TA, 6UJ, 6XM, 6XX, 8KW, 8KW/P, GM2FHH, ON4BZ, 4DW, 4UD, PA0BN, 0BP, 0BX, 0DSW, 0FC, 0GER, 0RK, 0WO, 0YZ. *Heard:* DL1YW, G3CCH, PA0AM, 0HA, 0LBS, 0LG, 0WI.

LONDON U.H.F. GROUP

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

at 7.30 p.m., September 1, 1955.

All u.h.f. enthusiasts welcome.

THE MONTH ON THE AIR

By S. A. HERBERT (G3ATU)*

THE almost unprecedented spell of fine weather which is still with us (this commentary is being written out-of-doors in a temperature reminiscent of Rhodesia rather than Roker!), together with what is holiday time for many, has had its effect on the amount of time devoted to indoor pursuits. Most people have been glad to cut down their time on the air to go out to enjoy the sunshine (with your commentator numbered among these, almost forgetting what Morse sounds like), but those who *did* get on were very far from wasting their time, as we shall attempt to chronicle.

Twenty Metres

Interesting things keep happening during lulls in the oft-recurring short-skip sessions, with early mornings often providing W6, 7, KL7, KH6, some Africans and occasionally the odd FK8, KM6, KJ6 and the like. YJ1DL is undoubtedly on, but his frequency (14005 or thereabouts) is in the middle of one of the most appalling rackets possible to imagine. Some twenty kilocycles are cluttered up with what sounds like a convention of organists playing different tunes at the same time. Someone will have to move. Let's hope it's the organists! Odd bits of DX pop up during the day, but things really start moving after early evening when an amazing variety can sometimes be heard. On occasion, JA, KC6, VK4, and VS6 are all workable, mixed up with VQ2s, VQ4s and even South Americans. Later—sometimes until after midnight—the band can produce numbers of VKs as well as the usual American signals. There's no doubt about it, things are looking up.

G5NS (Whickham) is running a successful early-morning sked with YI3WW and has worked numbers of W6, 7, Central Americans and an XE at that time. **G3KBN** (Stockport) worked his very first W6—W6KIG—at 05.30. Other DX to fall to Lynn's 14 watter included 4S7WP, OY1R and VK4YP (23.30—the VK went off to have his breakfast!). VK2PG puts in an excellent signal using only 5 watts to a rhombic! **G3GMY** (Barnet) worked two new ones (CR7AD and ET3LF), 4S7 and ZE, all around 17.30. **G3IAD** (Wakefield) had a good month and accounted for VP5BM (Turks), W6OXS/VP2 (Leewards), OA4ED, YN1AA, JA, KA, OY7ML, VS1GS, KH6s (08.30), ZS9I, CR4AL and the frowned-upon YA6GAL and is doubtless delighted at receiving a QSL from TI9MHB for his 3.5 Mc/s QSO. **G3KBH** (Gravesend) used c.w. and 90 watts to raise fourteen new countries during the month. The tally is OY2H, DU1OR (20.25), AP2O, 2BP, 2Y, YV5BJ, VQ4, VP9AN, FB8BR (15.30), KA7HH (17.50), KR6KS (20.55), KV4AA, ZE, GM and CR9AI. Ken was pleased about the Africans, who are off the end of his aerial and he was staggered to get RST599 from KR6—a mere 579 to him. CR9AI was worked twice, the first contact being ruined by a type who persisted in calling '3KBH during the CR9's transmissions. (There are a number of these pests about, unfortunately. When they hear you working a rare one, they sit on *him* and call *you* at great length—and at great strength—effectively blotting out the DX. In return for all this, they expect you to tell the rare one that they want to work him!). Luckily, the second QSO was brought to a successful conclusion without the help of the above.

B.R.S.20249 (Sutton) heard PX1AR on phone during June, but has had his card returned marked "unknown": HB1OP/HE, heard recently, is good enough. QSL to HB9OP. **B.R.S.20487** (N. Finchley) lists AP2BP, KH6RU, YI3WW, ZC4JA and W9MOC/KL7, heard on phone, while **A1291** (Ashtead) heard EL3A, KH6BX, PX1YR (*he* should be all right), ET2US and KR6KS. Still on phone, **B.R.S.20135** (Newport, I.o.W.) logged KR6AF, YI, ZD3BFC, ZD4BT and VQ5FS. **B.R.S.18017** (Warwick) heard some good ones, with EA0AB, VS6, MP4JO, KL7FAP, ZD6RM, VQ8AG, XZ2YA and XW8AB on c.w. and CR6AJ, OQ5BG and ZS3AB on phone. **B.R.S.20317** (Bromley) picked up a good assortment, listening only between 18.00-21.00, except at weekends. He mentions CE3RE, CE7AK, CM2PX, CP5EP, CR4AL, EA0AC, ET3GB, FY7YC, HK1TH, M1C, UA9, UH8, VE6NZ, VK2, 3, 4, YN1PM, ZD2GNX and ZP5AC on the key, with CR4AM, FM7WF, KR6KS, VK7AZ and VP2DN on phone. The current score is 151 countries. **P. M. Crawford** (Darlington) found most of his DX between 18.00-21.00, when phone signals were heard from ZL1RE, ZD9AC, KH6, KR6, KA, KL7 and VK. Other times produced XE1OT, VE8ME and C3US, with an American accent, announcing his QTH as Formosa. **Bob Crocker** (Plymouth) has reached the conclusion that some European phone operators must live on a diet of bird seed, judging by the time they spend in whistling! DX heard by him includes CM9AA,

As recorded in our last issue Bob Ford (AC3SS, AC4RF) was recently entertained in London by representatives of the Society. In this picture Mr. Ford (second from right) is describing his experiences in China to G2MI and G6CL. CE3AG (ex-CE0AA) extreme left, was also present. *(Photo by courtesy of the Daily Mail)*

**Roker House, St. George's Terrace, Roker, Sunderland.*

HE1OP, W5, 6, 7, VE7ZM, YS1MS, FY7YE, FM7WM, FL5CM (could be SL5CM ?), VP5DX, VP9BN, OA5G, VK7AZ, 7RX (long path), CE6BS, KG4AX, HH2W, AP2BP (s.s.b.), MP4QAI, MP4KK, OA4CL (also using s.s.b.), VS6CW and VS4CT. **B.R.S.20106** (Petts Wood) dug through the phone QRM for XE1OS, VEs 4RO, 5EH, 8MA and 8MD, ST2DB and HK6GQ. On c.w., he had MP4JO, VS6CG, 6GO, XE1MJ (06.30) XW8AB (18.30), ZD3A, DU1FC, JA0BL and JA0WAC. Norman heard a W6 calling AZ1TO and remarks that J. L. Hall heard FC7GE! **G3ATU** heard somebody calling FO3HT on c.w., but would lay a shade of odds that YO3HT was somewhere around! LB1CF was found to be in Lillehammer and DL0ST turned out to be the call-sign of the Stuttgart Radio Club. Several VKs were worked around 23.30, including that eighty metres stalwart, VK5KO, who is willing to arrange skeds on that band on Friday or Saturday (U.K. time) around 21.00 G.M.T.

Fifteen Metres

The band has been full of short-skip for much of the time, as is to be expected at this time of the year, but satisfying openings have occurred for real DX. **G8DR** (London, N.W.2) found some of these and worked ZD6RM and an OA on c.w., then changed to phone for VP7NK, VP9BP, YI3WW, HC1, VP1GG, HR1LW, CR6AI, HE1OP, FY7YE, CE3DY, ZD4, MP4BBV, VQ2, TI, HK, ZP and VS1BO. **G3AAE** (Barnet) put in a short time on phone and worked FQ8AK, OA, ZP, CN2, YI, HC1, and MP4BBL, etc. **A1291** heard Asians VU2CQ, VS6CL and VS6BE, with W2ZXM/MM (in the Indian Ocean). **B.R.S.20135** lists VQs 2DT, 3ES, 4AQ and 5FS, 4X4BL, SU1CN, KZ5MB, W1, 2, 4, 8, KV4WM/KV4 and VP6FR. **B.R.S.18017** logged FF8AJ and a 4X4 on the key and FQ8AK, CX, YI3 and ZD1SW on A3. Interesting phone was heard by **P. M. Crawford,** who picks out YK1AC, KL7ZG, ZD9AC and ZLs 1RE and 2BE. **B.R.S.20106** heard ZA1AB attracting attention on phone, but presumably he's just another one of "those." **R. J. R. Crocker** heard masses of the more usual run of DX and mentions also PZ1RM (21.30), OD5AJ, HH7RW, VS1FK, 4X4 and DL3BJ (running 3 watts to a mobile rig). Maritime mobiles heard were W2MWF (750 miles e.n.e. of Puerto Rico), W5OZA (05°N-105°E), W5AXI (off Ecuador), W4KEJ (10°N-45°W), W3MCJ (300 miles s.w. Azores) and W5OZA (now in the Malacca Straits). **G3ATU** worked ZD2DCP (18.20) on the c.w. end.

Ten Metres

Very little of interest is happening just yet, although the band is often full of European short-skip. **G3AAE** thinks little DX will come through until September/October, when South Africa and South America may be workable for short periods. **G2FQR** (Walsall) is back on the band and worked CT1, DJ, DL and EA3, hearing ZB1JRK and an I1. **P. M. Crawford** picked up LUs 3DH, 4DJT and 8AJ. **B.R.S.20135** succeeded in logging VQs 4AQ, 4EU, PY and ZB1AJX, while Bob Crocker actually heard W1MK working a W4 at 20.12 on 28.7 Mc/s. From Captain Eddie Clarke (G8AO) comes the welcome news that at last he has permission to operate maritime mobile on the band. On board the *m.v. Mitcham,* he will use the call-sign **G8AO/MM** while at sea and G8AO/MA while in port. The gear, all home-built, comprises a crystal-controlled transmitter with a 2E26 p.a. delivering some 30 watts to a dipole. The receiver is interesting, being a double superhet with intermediate frequencies of 7.4 and 1.6 Mc/s. The front end uses a 6AK5 and has plug-in coils. Results are already promising.

Forty and Eighty Metres

These two noise-infested areas bring but a single comment and that from **B.R.S.20106** who looked them over before taking a holiday in the EA3 part of Spain. Norman found forty populated by VP5BM, LB8YB (Greenland), PY, LU, KP4, HK, HH3DL, VQ4DE, W5s

Frequency Predictions for August, 1955

PREPARED BY J. DOUGLAS KAY (G3AAE)

BAND	NORTH AMERICA	CENTRAL AMERICA	SOUTH AMERICA	SOUTH AFRICA	NEAR EAST	MIDDLE EAST	FAR EAST	AUSTRALIA
28 Mc/s	2200	2200	1930—2030	1600	2000	0800	0800	0830
21 Mc/s	2200	2100—2230	1700—2200	1130—2000	1530—2000	0800	0800	0830
14 Mc/s	1030—0000	1000—0000	0930—0000	0900—2100	0530—2300	0700—2000	0800—1800	0900—1700 2000—0000
7 Mc/s	0000—0800	0000—0700	0000—0600	0300—0400	2300—0300	2200—0200	2100—0200	1700—2200
3.5 Mc/s	0600	0500	0400	0400	0200	0200	0100	2000

These predictions are based on information provided by the Engineer-in-Chief of the Post Office. All times are G.M.T.

It should be noted that between May and September propagation by sporadic E may result in short skip contacts on the 14, 21 and 28 Mc/s bands. The incidence of sporadic E is unpredictable but is most pronounced around midday and dusk.

MET and CXJ and ZL1MG on c.w. On eighty, the same mode unearthed W4s BBR, BAN and KNs 2JTW and 4CHJ.

Top Band

GC2CNC and **GC2FMV** put GC3DVC/P on the radio map from Sark, between June 9-20, making 44 contacts with 29 different stations, G3FKF being the first. The transmitter had an input of 0.81 watt when the batteries were new; the receiver was an 0-V-1 (1T4-1T4). A dipole 25 ft high was used and GM3EHI, GM3EST and an OK2 were heard. Frequencies in use were 1830 and 1848 kc/s. Apart from QRN and some competition from GNI, things went smoothly except for the behaviour of one G station who sat on 1830 kc/s night after night, calling "CQ G-DX." The two GCs are particularly grateful to G5JU, who did much to assure the expedition's success. **B.R.S.20410** (Garswood) heard a new country for him when he heard the Dutch emergency network testing. Signal strengths ranged from 449 to 569 and PA0s GN, PN, PA1BRD, PA3LR and PA3RVD were logged, with some interference from G stations trying to contact them.

Flash ! **ZD3BFC** told G2MI that he will start operations on 1827.5 kc/s as soon as the necessary crystal arrives—he should have it by now—and will be hunting for Gs with the aid of three 807s and 1025 ft of wire. Results could be interesting, although static at the Gambia end is liable to prove troublesome.

Overseas and Miscellaneous Items

G3AAE had a long chat with Bob, of **YU1GM,** who said he is trying to get permission to operate from just inside the Albanian border, sometime during September. If all goes well, he will probably take a Yugoslavian along and they will use all or most bands, c.w. and phone for a ten-day period, starting and finishing with a week-end. John was told by SV0WO that he would like it known that, although he periodically goes to Rhodes, he has never operated there, nor does he intend to do so. SV0WU is on the island permanently and is said to be active from 05.00-07.30, between 14300 and 14350 kc/s on *c.w.* SV2RI, alleged to be there last summer, was in fact a pirate and there is no station operating legally from Crete. The First Class Operators' Club's *Circular Letter* has an interesting snippet regarding Albania. HB9OP (HE1OP/HE) tells G2DPY that he hopes to accompany YU1GM to ZA—probably during the first and second week of September. YU1GM needs letters from DX enthusiasts *and* DX Clubs to substantiate his appeal for a ZA "ticket." **ZB2L (G3GFM)** says G3DBT has left Gibraltar and that he (ZB2L) is due for leave at the end of August. The two of them operated ZB2A between November, 1953, and August, 1955, and anyone short of a QSL between the above dates should contact G3GFM, who is taking the log home with him. They emphasise that outside these dates they know nothing of ZB2A activity. Further, the ZB2A heard recently on 3.5 Mc/s is a pirate. The real one left the band in September, 1954. **W4ITA** was formerly ZC6UNJ and writes that the station will not be active again until a licensed amateur is assigned to the U.N. Truce Supervision Organisation. This is because the people who operated ZC6UNJ after W4ITA's departure neither kept logs nor answered QSLs. Unfortunately, '4ITA doesn't indicate when he left Palestine, so there is doubt as to when the trouble started. **E. G. Riggle** (Massillon, Ohio) writes that VK9OK (Len King), who will be on Norfolk Is. for a year, cannot understand why he can work no Gs! He is a loud signal in Ohio from 12.00 to 01.00 E.S.T. (presumably on phone). ZL1HY (Dave Brown) is now at Hazard Street, Waihi, N.Z., and with newly erected beams is also very strong. *The DX'ER*, go-ahead organ of the Northern California DX Club, Inc., says that FK8AO (ex-FQ8AE), FK8AJ and FK8AC are active on 14 Mc/s. All can be QSL'd via Box 104, Noumea. According to a letter from A.R.R.L. to W0AIW, YN0YN has as much chance as a snowball in Guam to count as anything but Nicaragua! According to W8GZ (via W.G.D.X.C.), French and Dutch St. Martin Is. will be put on the air during September by amateurs from Franklin County, Ohio. W6GPB worked, among others, KC6AJ (W. Carolines), VK9WP (New Britain) and CR10AN—all on 14 c.w.

* * *

And so a summery *M.O.T.A.* comes to an end. May the next be equally good, but should anyone be on the air, their reports would be welcomed, especially if arriving on or before August 20. Good luck and good hunting, 73.

Dutch QRP Contest

V.E.R.O.N., the Netherlands I.A.R.U. National Society, is organizing an international QRP contest on 3.5 Mc/s c.w. only. The contest will commence at 14.00 G.M.T. on August 20 and end at 17.00 G.M.T. on August 21. The maximum permissible input is 7.5 watts.

Netherlands stations will follow their call-signs with the letters QRP, i.e. PA0LB/QRP. Foreign stations should call "CQ PA/QRP de . . . " Stations may be worked twice during the contest, but the contacts must not take place within 10 hours of one another. Four points may be claimed for each 100 per cent QSO. Where it is not possible to exchange the full information required, two points may be claimed. If both contacts allowed by the rules are incomplete, 1 point may be claimed for each. The total score will be the number of points claimed multiplied by the number of PA/QRP stations worked. An award will be made to the station making the highest score in each country.

Logs, showing the date, time (G.M.T.), stations worked, reports, etc., exchanged and points claimed, should be posted not later than September 20, 1955, to P.v.d. Berg (PA0UB), Keizerstraat 54, Gouda, Netherlands.

W.A.A. Award

THE Brazilian National Society, Liga de Amadores Brasileiros de Radio Emissao, has announced that contacts with stations on Navassa Island (KC4) since November 15, 1945, can now be counted for the "Worked All America" Award.

Contests Diary

1955

August 21	-	D/F Qualifying (Salisbury)†
September 3–4	-	European Two Metre Contest*
September 4	-	Low Power Field Day*
September 10–11		420 Mc/s Contest (No. 2)*
September 11	-	D/F National Final*
September 24–25		420 Mc/s Contest (No. 2)*
October 1–2	-	Low Power
November 12–13		Top Band (No. 2)

†*For details, see page 36, July, 1955.*
**For details, see page 81.*

Tests and Contests

D/F National Final, 1955

MEMBERS qualified to participate in the National Final to be held on September 11 will be supplied individually with full details by post as soon as possible.

Low Power Field Day, 1955

THE rules for the Low Power Field Day to be held on September 4, 1955, will be the same as those published on page 570 of the June, 1954, issue with the exception that all times must be shown in G.M.T. The contest will, therefore, commence at 10.00 G.M.T. and finish at 17.00 G.M.T. on September 4.

Entries, addressed to the Hon. Secretary, Contests Committee, R.S.G.B., New Ruskin House, Little Russell Street, London, W.C.1, must bear a postmark not later than Monday, September 12, 1955.

Second 420 Mc/s Contest, 1955

THE rules for the Second 420 Mc/s Contest to be held during September will be the same as those published on page 37 of the July, 1954, issue of the BULLETIN with the exception that Rule 6 has been amended to read:

"The contest will take place between 19.00 and 23.59 G.M.T. on each Saturday and from 09.00 until 19.00 G.M.T. on each Sunday during the week-ends of September 10-11 and September 24-25."

Entries must be addressed to the Hon. Secretary, Contests Committee, R.S.G.B., New Ruskin House, Little Russell Street, London, W.C.1, and must bear a postmark not later than October 10, 1955.

Results of the First 420 Mc/s Contest, 1955, will be published in the September issue.

VK/ZL Contest, 1955

THE New Zealand Association of Radio Transmitters and the Wireless Institute of Australia invite worldwide participation in the 1955 VK/ZL DX Contest. The rules are the same as in previous years. All amateur bands may be used but cross-band contacts will not be permitted.

The two transmitting sections will take place on the following dates:

Telephony: 10.00 G.M.T. October 1 to 10.00 G.M.T. October 2.

Telegraphy: 10.00 G.M.T. October 8 to 10.00 G.M.T. October 9.

In the Receiving section, stations may be logged only once on each band during each weekend.

Overseas stations will score one point for each contact on a specific band with stations in each VK/ZL district. Final scores will be arrived at by multiplying the total number of contacts on each band by the total number of VK/ZL districts worked on all bands. These districts are as follows:—VK1, 2, 3, 4, 5, 6, 7, 9 and ZL1, 2, 3, 4. Serial numbers of 5 or 6 figures will be made up of the RS or RST report plus 3 figures commencing with any number between 001 and 100 for the first contact and increasing by one for each successive contact.

All entries must be postmarked not later than October 31, 1955, and should be addressed to the Federal Contest Committee, Box 1234K, G.P.O., Adelaide, South Australia, from whom a copy of the rules may be obtained.

European Two Metre Contest, 1955

THE 1955 European Two Metre Contest organized by the Austrian Society O.V.S.V., will commence at 14.00 G.M.T. on September 3, and end at 14.00 G.M.T. on September 4, 1955. The rules are substantially the same as those for last year's event published on page 86 of the August, 1954, issue.

The number of points for contacts will be as follows:—under 10 km—nil; 10–50 km—1 point; 50–100 km—2 points; 100–200 km—4 points; 200–300 km—8 points; 300–400 km—12 points; 400–500 km—16 points; 500–600 km—20 points; 600–700 km—24 points; 700–800 km—28 points; 800–900 km—32 points; 900–1000km—36 points; 1000–1100 km—40 points; 1100–1200 km—50 points. For each additional 100 km add 10 points (1 km —0.621 mile; 1 mile—1.609 km). In addition, a multiplier related to the number of stations worked (only the first contact with each station may be counted) will be used to arrive at the final score: 1–19 stations, multiply by 1; 20–29, multiply by 2; 30–39, multiply by 3; 40–49, multiply by 4, and so on.

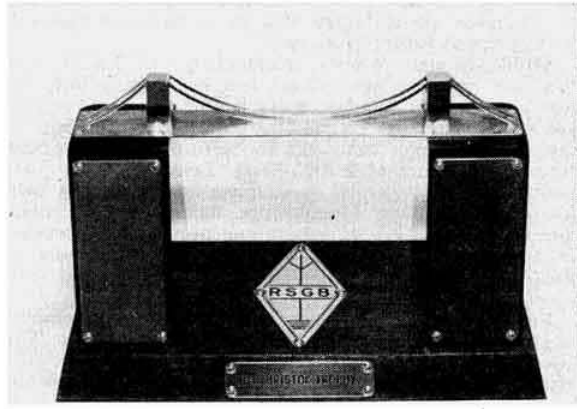
Entries must be posted not later than October 15, 1955, to Otto Juricek, OE1-458, V.H.F. T.M., O.V.S.V., Jedleseerstrasse 66–94, 23/19a, Vienna 21, Austria.

Bristol C.W. Contest

BRISTOL Group is arranging a c.w. contest for both local transmitting and receiving members. The event will take place on October 23, 1955, and operation will be permitted on all bands from 1.8 to 28 Mc/s inclusive. A copy of the rules may be obtained from the Bristol C.R., Mr. Roy Poeton (G3CTN), 37 West Broadway, Henleaze, Bristol.

Bristol Trophy

THIS is the unique Bristol Trophy, donated to the Society recently by the Bristol Group. The trophy is to be "presented annually to the R.S.G.B. Town or Area Group which, having entered only one station for



N.F.D. in accordance with the rules, and not amalgamating with any other Town or Area for the purpose of scoring, shall succeed in obtaining the highest number of points in comparison with the scores obtained by other groups entering on a similar basis."

Radio Amateur Emergency Network

By C. L. FENTON (G3ABB)*

WITH the approach of the peak holiday season, activity throughout the country has shown a not unexpected decline. However, it is anticipated that during the next few months local exercises will start up in preparation for the forthcoming winter.

It is hoped that the first R.A.E.N. Rally scheduled for September 18 will be well supported. Full details are published elsewhere in this issue.

Unfortunately, the response to the proposal for an R.A.E.N. Dinner to be held during the period of the R.S.G.B. Exhibition in November, was very small, and the proposal has therefore been dropped. The Hon. Secretary will be in attendance throughout the Exhibition, except for the opening day and the Saturday evening, and informal discussion groups will be arranged on the spot, as necessary.

News from the Groups

Northampton. A new Group has been formed and all interested amateurs, whether licensed transmitting members or listeners, are invited to contact G3JBU whose address is given below. **Sidcup.** Efforts are still being made to arrange a meeting of R.A.E.N. members in North-west Kent. Interested members should contact Alan Swindon (G3ANK), 135 Station Road, Sidcup.

Wirral, Cheshire. The recent "Exercise Porter," held in conjunction with the South Staffs. Group, created a considerable amount of interest; it is hoped to organize further exercises in the near future. In the Wirral area, G2AMV, assisted by G3FLL and G3IIH, acted as Net Control; G3CSG, G3EGX, G3FRT, G3GZX, G8PG, G3ERB and G3FXC participated, whilst G3GYV acted as Top Band link between the mobiles in Crewe and the stations in the Wirral. The general impression gained as a result of this exercise was that Top Band 'phone was better than 3.5 Mc/s c.w. for the purpose of the exercise, but considerably more practice is required in control operation in order to reach the required standard of efficiency. It is hoped that these shortcomings will be rectified in future exercises.

Middlesbrough. With a recent change of E.C.O., and the fact that the new officer has been away both on business and on holiday, news is rather scarce. Efforts are being made to get mobile/portable stations out in the field for exercises, and to recruit more members. Interest continues at a high level. **Leicester.** Efforts are being made to organize an exercise in conjunction with Rutland and West Lincolnshire members. **Lichfield.** Since "Exercise Porter" there has been some reduction in activity, due to the holiday season. The results of the exercise are still being analysed and discussed with co-operating Groups.

East Yorkshire. On June 18, East Riding members organized a mobile demonstration for civic leaders. The guests who witnessed this demonstration included the Hon. Richard Wood, M.P., and Mrs. Wood; the Mayor and Mayoress of Bridlington; the Deputy Mayor of Bridlington and his lady; the District Officer, H.M. Coastguards; the Secretary, Cox and Engineer, Flamboro' Lifeboat. Whilst at the home of G3DQ, the County Controller outlined the functions of R.A.E.N. Afterwards G3DQ called fixed stations in Scarborough, Spurn, Hull and Driffield, to demonstrate what could be done from fixed stations taking power from the mains. The guests were then shown an emergency control centre set up in a 12-seater Bedford vehicle. This vehicle (which is owned by Mr. D. Armstrong and is part of the Beverley link) carries a crew of six, G2CP's rig, two 40 ft masts and a motor generator. Six motor cars equipped for mobile operation were sent out, accompanied by the guests, and worked back to control whilst on the road. G2ABR also demonstrated his Top Band battery-operated briefcase rig. Six reporters and three press photographers covered the demonstration, which was also featured by the B.B.C. in the *News from the North*. Grateful thanks are due to Cliff Metcalfe (G3DQ) and his wife for their hospitality. Stations taking part in this exercise included the Beverley Portable Control Unit, with Don Armstrong, Eric Smith, G2CPS, G3JHD and G3JHD Junr., mobiles G3DQ, G5GX, G3GAW, G3HTB, G2ABR, G2ACD, and fixed stations G3DQ, G2CNX, G3JOH, G2DPA and G3FVW.

On July 3, the County Controller, the E.C.O.s and their ladies were invited to a private midnight matinee showing of the "Dam Busters" at the Regal Cinema, Bridlington. (It may be of interest to note that Wing Commander W. E. Dunn, O.B.E. (G2LR), was the Signals Officer depicted in the film, and the Morse signals heard were actually sent by him during the filming.)

At the time of writing it has not been ascertained whether R.A.E.N. was able to offer any assistance during the recent disaster in Weymouth; reports from the area are awaited with interest.

New Appointments

County Controller.

Mr. E. Arnold Matthews (G3FZW), 1 Shortbutts Lane, Lichfield, Staffordshire, has been appointed County Controller for Staffordshire, but temporarily retains the post of E.C.O. for Lichfield. A new E.C.O. will be appointed shortly.

Emergency Communications Officers.

G. B. Woffinden (G3COV), 14 Grove Road, Egremont, Cumberland.

J. E. Whittle (G3EKP), 2 Church Terrace, Darwen, Lancs.

G. H. Brown (G3FVW), Hill Rise, Mill Lane, Cayton Bay, near Scarborough, Yorkshire.

B. Hayes (G3JBU), 7 West End Terrace, Northampton.

P. W. Pinfold (G3ATI), Station Road, Upper Poppleton, York.

Hon. Secretary's Skeds

Following a suggestion by an E.C.O., G3ABB will operate most Friday and Saturday nights at 23.00 B.S.T., on approximately 3700 kc/s 'phone, shifting slightly to avoid QRM as necessary. Calls from E.C.O.s and members will be welcomed. If the response is worthwhile, further consideration will be given to the setting-up of a regular net.

* * *

Reports for inclusion in the next R.A.E.N. feature, which will appear in the October issue of the BULLETIN, should reach the writer not later than September 20, 1955.

*Hon. Secretary, R.A.E.N. Committee, "Niarbyl," Gay Bowers Road, Gay Bowers, Danbury, Chelmsford, Essex.

First R.A.E.N. Rally

ALL R.A.E.N. members are invited to take part in a nation-wide R.A.E.N. Operating Rally to be held on September 18, 1955. Besides providing individuals and groups with an opportunity to show their skill, the Rally should prove an excellent test of the whole emergency organisation. During the Rally non-members of R.A.E.N. are invited to work participating stations.

Rules

1. The Rally is open to all R.A.E.N. members who will be divided into three groups:—

(i) Outstations (R.A.E.N. members operating mobile or portable).
(ii) Fixed stations (R.A.E.N. members operating from their homes).
(iii) Receiving stations (R.A.E.N. members entering the receiving section only, either from home or as outstations).

2. The Rally will be of 12 hours duration commencing at 07.00 G.M.T. on Sunday, September 18, 1955, and terminating at 19.00 G.M.T.

Telephony only *will be used and operation will be restricted to the following bands: 1.8-2 Mc/s; 3.6-3.8 Mc/s; 28-30 Mc/s and 144-146 Mc/s.*

Licensed power must not be exceeded. Bonus points will be given for low power operation.

Outstation equipment may be operated from any building not used for habitation, e.g., from vehicles (mobile or stationary), tents or other temporary structures provided they are more than one mile from the participant's home address. Participants must obtain the owner's permission where necessary.

3. Outstation equipment must not be connected to the public electricity supply mains.

4. Points will be scored for contacts as follows:—
Outstation to outstation—10 points.
Outstation to fixed station—5 points.
Outstation to non-R.A.E.N. station—2 points.
Fixed station to outstation—5 points.
Fixed station to fixed station—2 points.
Fixed station to non-R.A.E.N. station—1 point.

Bonus points will be awarded as follows:—
Contacts on 28 Mc/s—multiply claimed score by 2.
Contacts on 144 Mc/s—multiply claimed score by 5.

For low power operation the following multipliers will be used:—
Multiply total score by 20 if under 1 watt
Multiply total score by 10 if under 5 watts.
Multiply total score by 5 if under 10 watts.
Multiply total score by 2 if under 15 watts.

No station may be worked twice on the same band.

5. Each participant will, on application to his E.C.O., or the Hon. Secretary, R.A.E.N. Committee, receive a test phrase. This phrase will be passed to the first station contacted, and the phrase received from that station passed on to the next station contacted. QSOs with non-R.A.E.N. stations will not necessitate exchanging test phrases.

6. Stations will call "CQ RAEN" and sign with their call-signs prefixed by the words "RAEN Station," e.g., "CQ RAEN from RAEN Station G3XXX."

A typical QSO will be as follows:—
"G3XXX from G3YYY/M. You are 5 and 8. Outstation Hull. My test phrase is 'heater current 16' . . . etc."
"G3YYY/M from G3XXX. You are 5 and 6. Fixed station Lincoln. My test phrase is 'plate load 49' . . . etc."
The test phrase in addition to the time, call sign, RS, location, etc., must appear in the log in order to claim points.

7. Logs with a brief description of the equipment used and suggestions for future rallies must be posted to reach the Hon. Secretary, R.A.E.N. Committee, "Niarbyl," Gay Bowers Road, Gay Bowers, Danbury, Essex, not later than October 3, 1955.

Log sheets should be made out in the following form:—

Name..... Call-sign.....
Home Address..... Claimed Score.....
Site of Station (if different from above).....
Receiver..... Aerial system.....
Transmitter..... Power input.....watts

Time G.M.T.	Call-sign of station worked	My report on his signals	His report on my signals	QTH	Test phrase sent	Test phrase received	Band	Points
1705	*G3——*	*57*	*56*	—	—	—		
1710	*G2——*	*55*	*45*	—	—	—		
1718	*GM2——*	*56*	*54*	—	—	—		
			Multipliers (see rule 4)					
			Claimed score.....					

Declaration: I declare that my station was operated strictly in accordance with the rules and spirit of the rally, and I agree that the ruling of the Council of the R.S.G.B. shall be final in all cases of dispute.

Signed .....

8. Awards will be made to the participants who obtain the highest aggregate number of points in the two transmitting groups.

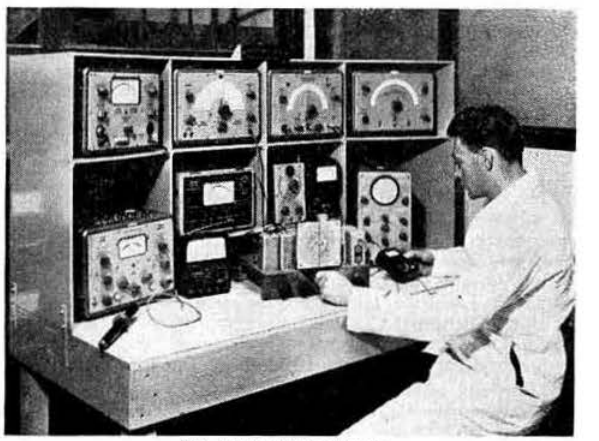
9. An award will also be made to the receiving member who correctly logs the largest number of inter-R.A.E.N. contacts, giving in each instance: Time, band, station call-sign, test phrase sent. (It is not necessary to copy both sides of a contact. List each station separately and count one point for each test phrase received if at home and two points if operating portable. Double these points for receiving on 28 Mc/s and 144 Mc/s.).

R.A.E.N. RALLY

If you wish to participate in the First R.A.E.N. Rally please notify your E.C.O. immediately. If no E.C.O. has been appointed for your area, please write to the Hon. Secretary, R.A.E.N. Committee, who will allocate you a test phrase. The Hon. Secretary will allocate *all* test phrases, either singly to Members or in batches to E.C.Os.

Taylor Service Bench

ORDINARY service benches are frequently so cluttered up with small tools and instruments that there is scarcely space for the equipment under repair. Taylor Electrical Instruments, Ltd., have tackled the problem in practical fashion with the result that in their Service Bench illustrated all the necessary test gear is arranged at approximately eye level with plenty of space for the work in progress. The bench is, in fact, "Taylor-made" for convenient servicing.



The Taylor Service Bench.

The Taylor instruments shown in the photograph are, from left to right (top row), the Electronic Test Meter Model 171A, Signal Generator type 67A, TV Sweep Generator type 92A, Wide Range R.C. Oscillator Model 191A; (lower) Valve Tester Model 45C (with television tube adaptor), Multirange Universal Meter type 88A, Universal Meter Model 77A, R.C. Bridge Model 110C, Insulation Tester Model 130A and Oscilloscope Model 31A. The engineer is using a Junior Multirange Meter Model 120A.

Trade Winds

PANDA Radio Co., Ltd., 58 School Lane, Rochdale, Lancs., has made available a well-produced brochure giving details of the Panda PR-120-V and Panda "Cub" Table Toppers, the Panda A.T.U.150 aerial tuning unit and Panda low pass filter. A copy of the brochure may be obtained from the Company upon request.

Society News

Radio Amateurs' Examination

THE City and Guilds of London Institute has notified the Society that classes of instruction in preparation for the Radio Amateurs' Examination are being offered at the undermentioned centres.

Belfast: College of Technology
Blackburn: Municipal Technical College and School of Art
Brentford Evening Institute
Brighton: Preston Technical Institute (Engineering Department)
Cannock Chase Mining and Technical College
Clacton County Youth and Day Release Centre
Cork: Crawford Municipal Technical Institute
Derby Technical College
Dudley and Staffordshire Technical College
Dumfermline: London Technical College
Glasgow: Allan Glen's Further Education Centre
Hamilton: School of Engineering, Burnbank
Harrogate: Army Apprentices' School
Hastings Technical Institute
Huddersfield Technical College
Ilford Literary Institute (at the County High School for Girls)
Ilkeston College of Further Education
Kingston upon Hull Municipal Technical College
Leicester College of Technology and Commerce
Limavady Technical School
London: L.C.C. South East London Technical College
London: Northampton Polytechnic
London: Islington Men's Evening Institute, Robert Blair L.C.C. School
Londonderry Municipal Technical College
Loughborough College of Further Education
Luton and South Bedfordshire College of Further Education
Lytham St. Annes: College of Further Education
Middlesbrough Constantine Technical College
Newport: Isle of Wight Technical College
Salford: Royal Technical College
South Shields Marine and Technical College
Swansea Technical College
Walsall Technical College
Wembley Evening Institute
Windsor: East Berkshire College of Further Education

Members having knowledge of additional centres are asked to notify Headquarters.

* * *

COURSES of instruction have been arranged at the colleges and evening institutes listed below for the benefit of those who wish to study for the Radio Amateurs' Examination.

Brentford Evening Institute. Three courses of interest to the radio enthusiast will be held during the coming session. *Radio Servicing I.* This course covers the theory of all circuits commonly met in commercial radio receivers. Some practical work is included. No previous knowledge is assumed. *Radio Servicing II.* Television is the main subject of this course. Practical work is included. *Radio Amateurs' Examination.* No previous knowledge is assumed for this course which is intended to prepare candidates for the examination to be held in May, 1956. The course will continue for some weeks after that date. The classes will be held on Mondays, Tuesdays and Wednesdays respectively from 7 to 9 p.m. Enrolment will take place during the evenings of September 12 to 16 inclusive. The fees are 10/- for a single course, or 15/- for two.

Huddersfield Technical College. Mr. C. W. Oakley (G3IPD) will be the lecturer for the R.A.E. Course commencing in September. Details may be obtained from the Department of Electrical Engineering.

Ilford Literary Institute (High School for Girls), Cranbrook Road, Ilford. (Adjacent to Gants Hill station. Central Line.) Enrolment for the Radio Amateurs' Examination and Morse classes will take place from 7 to 8.30 p.m. on September 5 to 8. The fee for either course is 10/-, or 17/6 for both, for those living in the Essex County Council area. Students from other areas will be admitted as out County Students provided the Local Authority is informed. Those who intend to enrol are advised to send their names to C. H. L. Edwards, A.M.I.E.E. (G8TL), 28 Morgan Crescent, Theydon Bois, Essex, at once so that a place may be assured.

Islington L.C.C. Men's Evening Institutes, Grafton School, Eburne Road, Holloway, London, N.7. A course of instruction, including Morse and Practical Work, for those who wish to take the Radio Amateurs' Examination, will be given on Monday (Radio Theory and Morse) and Wednesday (Practical Work and Morse) evenings from 7 to 10 p.m., commencing September 26. The instructors will be A. Perry (G3DKX) and L. Barber. Enrolment will take place from September 19 to 23 but applications should be made in the first instance to A. W. H. Wennell (G2CJN), Hon. Secretary, Grafton Radio Society, 145 Uxenden Hill, Wembley Park, Middlesex. The fee will be 10/- for the complete course.

Wembley Hill Evening Institute, Copland School, Wembley (next to Wembley Hill Cinema). Instruction in preparation for the Radio Amateurs' Examination and Morse Test will be given at the following times on Monday evenings, commencing September 19. *Morse*: 7 to 8 p.m.; *Theory*: 8 to 10 p.m. Enrolment will take place in the evenings from September 12 to 15. Alan Bayliss (G8PD) will be the instructor.

Details of classes at other centres were given on page 16 of the July, 1955, issue.

Autumn Radio Amateurs' Examination

THE G.P.O. announces that a Radio Amateurs' Examination will be held on Saturday, October 1, 1955, from 2.30 to 5.30 p.m., at Armour House, St. Martin's-le-Grand, London, E.C.1. If there is sufficient response the examination will also be held in Edinburgh and Cardiff.

The examination fee (25/-) should be remitted by cheque, money order or postal order, made payable to the Postmaster-General and should accompany the candidate's application with a note stating the centre at which he wishes to sit for the examination. Such applications, *which must arrive before September 3, 1955,* should be addressed to Wireless Telegraphy Section, Radio and Accommodation Dept., Union House, St. Martin's-le-Grand, London, E.C.1.

Science Museum Station

GB2SM is the call-sign allocated by the Post Office to the Amateur Radio station to be established at the Science Museum, South Kensington. It is expected that GB2SM will be operational, on a limited basis, very shortly.

—/M,—/A,—/P.

MEMBERS who operate from a vehicle are asked to note that the suffix /M should be used whether the vehicle is moving or stationary. If the equipment is removed from the vehicle and set up out of doors the suffix /P should be used. The suffix /A should be used when the normal home station is operated from an alternative address.

The G.P.O. make no extra charge for alternative address or portable facilities but an extra charge of £1 per annum is made in respect to mobile facilities.

Government Stations

IN response to a request from Headquarters the Radio and Accommodation Department of the G.P.O. have furnished the following definition of a Government station:—

"A Government station is one operated by any Government Department and this includes all Service stations as well as those of units of N.A.T.O. Forces operating in this country. In giving instructions to amateurs such a station would state that it is a Government or Service station. If in doubt an amateur should obey the instructions and then report the incident to this Department with as much detail as possible; all such reports will be investigated."

Members who are called by an alleged Government station should report the facts to Society Headquarters as well as to the Radio and Accommodation Department of the G.P.O.

First 28 Mc/s /MM Licence Issued

OUT of the blue comes the interesting news that Capt. E. Clarke (G8AO) has been granted permission by the P.M.G. to operate Mobile Marine on 28 Mc/s, using input powers up to 150 watts. Capt. Clarke's new licence places no restrictions on whom he may contact. When on the High Seas he will sign G8AO/MM and when in dock G8AO/MA.

It is understood that Capt. Clarke's application was considered on its merits by the Post Office and other interested parties, none of whom raised any objection to his request for 28 Mc/s facilities.

It is of interest to record that Capt. Clarke's application for permission to operate on 28 Mc/s whilst at sea has succeeded after long years of negotiation between the Society and the Post Office and follows protracted correspondence between Capt. Clarke himself and the Radio and Accommodation Department of the G.P.O. The Society has been striving for years to persuade the Post Office to issue a more liberal Mobile Marine licence than the one which has recently been in force.

Members interested in obtaining Mobile Marine facilities covering the 28 Mc/s band, should write to the G.P.O. giving full details of the experiments they wish to conduct.

Resignation of Mr. R. L. Varney from the Council

THE Council has accepted with regret the resignation from the Governing Body of Mr. R. Louis Varney, A.M.I.E.E. (G5RV).

Mr. Varney has been appointed Technical and Commercial Regional Representative for Marconi's Wireless Telegraph Co., Ltd., in the Central American and Caribbean area. Mr. Varney's Headquarters will be at Caracas, Venezuela, from where he hopes to operate an amateur station. If this is not possible, due to Government restrictions, he will apply for a licence to operate from Trinidad, which island he expects to visit on business and on local leave.

Right up to the time of sailing Mr. Varney was receiving letters asking for advice on the subject of TVI. Members will appreciate that he will no longer be able to devote the time to answering this correspondence.

Mr. Varney asks that his thanks be conveyed to all members who have shown interest in the various articles which it has been his privilege to contribute to the BULLETIN in recent years.

In offering his resignation, Mr. Varney stated that it had been an honour to serve on the Governing Body of the Society.

We wish him well.

Amateur Radio Constructors' 1955 Award

AMATEUR Radio Exhibition Manager Phil. Thorogood (G4KD) is offering a silver plaque to the member submitting, in the opinion of the judges, the best piece of home-constructed amateur equipment for display in a competition at the forthcoming R.S.G.B. Amateur Radio Exhibition. Known as the Amateur Radio Constructors' 1955 Award, the plaque is to the won outright and will remain the permanent possession of the winner.

Entry forms for the competition will be available shortly (on receipt of a stamped addressed envelope) from Headquarters.

Amateur Radio Exhibition

THE Exhibition (Home Constructors' Section) Committee will be pleased to receive offers from Provincial members willing to loan equipment for display at the R.S.G.B. Amateur Radio Exhibition to be held in London during November. The theme of the Exhibition will be "Communications Receivers." Those who loan equipment should be prepared, if necessary, to make their own arrangements for its delivery to the Royal Hotel, Woburn Place, London, W.C.1, on Tuesday, November 22, and for its collection after the exhibition closes at 9 p.m. on Saturday, November 26.

Offers in the first instance should be addressed to Mr. E. Yeomanson (G3IIR), 9 Trewsbury Road, Sydenham, London, S.E.26, to arrive not later than September 30, 1955. Owners of equipment selected for display will be notified shortly after that date.

Silent Keys

The death occurred on July 9 last of Mr. L. F. A. Fogarty, J.P., M.I.E.E., F.R.S.A., of Ruislip, Middlesex. Mr. Fogarty was a Founder Member of the Society and Honorary Treasurer from 1913 to 1923.

He was in the deputation which went to the P.M.G. in 1921 to ask for half-hour broadcasts from Writtle.

Mr. Fogarty contributed a special message to the *T. & R. Bulletin* on the occasion of the Coming-of-Age of the Society in June, 1934. In that message he wrote of his personal association with many of the pioneers of wireless.

Mr. Fogarty was Managing Director of Zenith Electric Co., Ltd., a member of the Ruislip-Northwood U.D.C. for 17 years and Chairman of the Council for three years from 1935-1937.

The sympathies of all members are offered to Mrs. Fogarty and to her family in their bereavement.

J. C.

The death occurred on July 14, 1955, of Mr. John Matthews, G3GXR, of Ashton-in-Makerfield, Lancashire. Mr. Matthews had been a member since 1950 and had been licensed for about the same number of years. His main interests were Top Band and lately 2 metres. His passing will be mourned by his many friends in the Society and by those amateurs abroad who knew him over the air.

Our sympathies are extended to Mrs. Matthews and to her son who holds the call G3HUX.

Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, June 14, 1955, at 6 p.m.

Present.—The Immediate Past President (Mr. A. O. Milne in the Chair), Messrs. W. H. Allen, L. Cooper, C. H. L. Edwards, D. A. Findlay, J. H. Hum, F. Hicks-Arnold, W. H. Matthews, W. R. Metcalfe, H. W. Mitchell, W. A. Scarr, and John Clarricoats (General Secretary). Mr. R. L. Varney arrived at the end of the Meeting.

Apologies for Absence

Apologies for absence were received from the President (Mr. H. A. Bartlett), Messrs. R. H. Hammans, R. G. Lane and L. E. Newnham.

* * *

Membership

(a) *Resolved* (i) to elect 29 Corporate Members and 7 Associates; (ii) to grant Corporate Membership to 10 Associates who had applied for transfer; (iii) to grant Life Membership to Mr. G. B. Whitfield (G3ETQ).

(b) The Secretary reported that of the 701 members whose subscription became due on March 1, 1955, 172 became overdue on May 31, 1955. Of this number 29 were London, 111 were Country and 23 were Overseas Corporate Members and 9 were Associates. Of those overdue 12 London, 50 Country and 20 Overseas members held call-signs.

The Secretary submitted details of the 10 members (including 1 Associate) who had written to resign during the three weeks ended June 11, 1955. Of this number 1 had resigned on financial grounds, 5 gave no reasons and 4 stated they had lost interest.

(c) The Secretary reported that the figure for the number of members whose subscription had been only partly paid by Bankers' Order was now 633 compared with the original figure of 911 and 697 as at May 1, 1955.

Amateur Radio Exhibition

Resolved to organize a Complimentary Luncheon following the opening ceremony on similar lines to previous years.

National Radio Show

Resolved to invite Mr. F. Ruth (G2BRH) to act as Manager of the Society's stand at the National Radio Show, Earl's Court.

I.A.R.U. Region 1 Conference

It was reported that the Italian Society (A.R.I.) had offered to organize an I.A.R.U. Region I Conference in Como during 1956.

In a letter to the Society the Hon. Secretary, I.A.R.U. Region I Bureau Committee (Mr. A. O. Milne) enquired whether the Council is prepared to support the proposed Conference by sending a delegation. Mr. Milne also enquired whether the Council would be willing to put forward items for inclusion in the Conference Agenda.

It was reported that the International Committee (of which Messrs. Clarricoats, Hammans, and Milne are members) would meet in Amsterdam during October, 1955, to make preparations for the Como Conference and that the expenses of the members of the Committee in connection with that meeting would be borne by Region I Division funds.

Mr. Milne explained to the Council that he would be attending the Como Conference in his capacity as Honorary Secretary, Region I Bureau Committee, and that his expenses would be a charge against Region I Division funds.

After the General Secretary had given a brief account of the work done at the Paris and Lausanne Conferences held during 1950 and 1953 respectively it was

Resolved (i) to authorize the Secretary to inform the Hon. Secretary, Region I Bureau Committee, that the Council of the R.S.G.B. supports the proposal to hold an I.A.R.U. Conference in Europe during 1956.

(ii) That the R.S.G.B. delegation shall consist of two persons specially selected for their experience of administrative matters and two persons specially selected for their experience of technical matters, should it be decided by the I.A.R.U. Region I International Committee to organize the 1956 Conference on similar lines to the Lausanne Conference.

(iii) To appoint the General Secretary, together with Messrs. W. H. Allen, H. A. Bartlett, H. A. M. Clark, R. H. Hammans and W. A. Scarr to serve on an *ad hoc* Committee for the purpose of drawing up a list of Conference Agenda items for submission to the I.A.R.U. Region I International Committee.

(iv) To inform the *ad hoc* Committee that it is the wish of the Council that they shall recommend to the Council the names of four persons to attend the 1956 I.A.R.U. Conference.

Regional Meetings

It was reported (a) that the I.R.T.S. were planning to hold a meeting in Dublin during the same weekend as a Region 15 meeting in Belfast; (b) the London R.R. had written to suggest that the proposal to hold a meeting in the London Region be deferred until the spring of 1956.

R.A.E.N. Committee

After consideration had been given to correspondence from Messrs. Ridley and Fenton it was

Resolved to request the R.A.E.N. Committee to give further consideration to the question of providing clerical assistance for the Honorary Secretary.

Retirement Dates for Members of the Council

The Secretary reported that he and Mr. Scarr had, on the instructions of the Council, given consideration to the requirements of Article 28, which provides that one third of the Council for the time being (exclusive of the President and Immediate Past President) shall retire annually. Their proposals were set out in the Secretary's Report to the Council.

Resolved to accept and adopt the proposals.

Retirement dates are as follows:—

December 31, 1955. Messrs. Cooper, Newnham, Hicks-Arnold, Allen and Metcalfe.

December 31, 1956. Messrs. Milne, Scarr, Hum, Edwards, Mitchell and A. N. Other (Zonal Representative if elected).

December 31, 1957. Messrs. Bartlett, Findlay, Varney, Lane and Matthews.

December 31, 1958. Mr. Hammans (provided he is President in 1956).

The retirement dates of the four Zonal Representatives at present serving on the Council were decided by lot at the meeting.

It was explained that the retirement dates of the Ordinary Members of Council had been based on the number of votes they polled at the Election held in December, 1954.

It was pointed out that there are at present two vacancies in the office of Zonal Representative. If both are filled as from January 1, 1956, one of the new Zonal Representatives will serve for 3 years and one for 1 year before seeking re-election.

R.A.E.N. Rally

Resolved to approve the Rules for the proposed R.A.E.N. Rally as submitted by Mr. W. J. Ridley, provided inconsequential phrases are used.

Resignation of Mr. W. J. Ridley

The Secretary submitted a letter dated June 9, 1955, from Mr. W. J. Ridley in which he advised the President and Council that owing to business commitments involving him being abroad for some considerable time, he would be unable to continue in office as Region 5 Representative or as Chairman of the R.A.E.N. Committee.

Resolved to place on record the best thanks of the Council to Mr. Ridley for his past services to the Society.

Cash Account

Resolved to accept and adopt the Cash Account for May, 1955, as prepared by the General Secretary.

REPORTS OF COMMITTEES

Exhibition (Home Constructors' Section)

Resolved to accept as a Report the Minutes of a Meeting of the Committee held on June 13, 1955, and to adopt the recommendations and proposals contained therein. (The recommendations and proposals dealt with arrangements for the National Radio Show and the Amateur Radio Exhibition.)

Contests Committee

Mr. Matthews again drew attention to the difficulty of finding suitable persons to serve on the Contests Committee.

The meeting terminated at 7.50 p.m.

Mobile Rally

OXFORD and District Amateur Radio Society is arranging an informal "get-together" at "The Perch Inn," Binsey, Oxford, for all interested in mobile operation, on October 9 commencing at 2.30 p.m.

The following stations will be on the air from the rendezvous during the morning and from 2 p.m. onwards:—

Top Band—G3GJX/P and /M (1900 kc/s)
3.5 Mc/s—G3GCS/P (3700 kc/s)
144 Mc/s—G8PX/P (145.350 Mc/s)

A tour of Oxford colleges is being arranged and afternoon tea will be available at "The Perch Inn" at moderate cost. Intending visitors are asked to write immediately (accommodation is limited) to the Organizer, E. B. Grist (G3GJX), 51 Home Close, Wootton, near Abingdon, Berks., stating the number in their party requiring tea and the number wishing to tour the colleges. A map showing the location of the rendezvous may be obtained from the Organizer by sending a stamped addressed envelope.

P.T.F.E. Valveholders

MR. F. J. Crisp (G3GZJ) states that p.t.f.e. B7G and B9A valveholders may be obtained, price 1/6 each, from Messrs. Telemex, 109 Humber Road, Blackheath, London, S.E.3.

National Radio Show
Earls Court
London

The Society will again be exhibiting at the National Radio Show, Earls Court, London—

WEDNESDAY, AUGUST 24
to
SATURDAY, SEPTEMBER 3

Open daily (*except Sunday, August* 28) from 11 a.m. to 10 p.m.

Admission 2/6 *Children* 1/-

. . . . See you on Stand 310

in the gallery opposite R.I.C. control room

Can You Help?

● R. J. B. Aske (B.R.S.20369), Mill Pond House, Hayle, Cornwall, who urgently requires a circuit diagram of the transmitter type T.1403 showing the connections to the pins on the back?

● R. I. Cannon (4S7IC), 28 Collingwood Place, Colombo, Ceylon, who wishes to obtain the service manual and/or circuit diagram for the AR77E receiver?

● H. W. Darvill (B.R.S.3856), 26 Merton Gardens, Petts Wood, Kent, who requires information concerning the U.S. receiver type R4/ARR2 and its conversion to work on 144 Mc/s?

● J. Eaton (G3EZZ), 74a Station Road, Langley Mill, Nottingham, who requires information concerning the BC929A indicator unit ("Rebecca" equipment) and Naval receiver type B36?

● H. Edge (G6GD), Stamford Cottage, Church Street, Malpas, Cheshire, who wishes to borrow the manual for the CR100 receiver?

● G. R. Phillips (G3FYE), 7 Germans Buildings, Buxton Road, Stockport, who wishes to borrow the manual for the DST100 receiver?

● B. C. Smith (A.1260), 9 St. Margarets Road, Westgate-on-Sea, Kent, who requires information on the use of the T.1154 transmitter on 14 Mc/s and building a converter for Top Band for the R.1155?

LONDON MEETINGS

The following programme of meetings at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2, has been arranged.

October 28, 1955: "AMATEUR RADIO IN THE ANTARCTIC —a review of VK Activity 1947–1955." By **Roth Jones (VK3BG).** (The paper will be read by Arthur O. Milne, G2MI and will be illustrated by films and slides.)

November 11, 1955: "COMPRESSED BEAMS" by **G. A. Bird (G4ZU).**

December 16, 1955: **Annual General Meeting and Presentation of Trophies.**

January 27, 1956: **Presidential Address.**

February 24, 1956: **420 Mc/s Evening arranged by members of the London U.H.F. Group.**

March 23, 1956: **Subject to be announced later.**

Letters to the Editor . . .

TVI in Reverse

DEAR SIR,—I would like to offer some observations on certain statements made in two letters that appear in the June issue of the BULLETIN.

Mr. Rayner, I fear, either lacks certain essential knowledge or chooses to disregard it, otherwise I am sure he would not have made such sweeping remarks. I think he is confusing a law with a licence condition—two quite different things. Laws are not broken if a radio receiver or a television set cause interference, consequently it is irrelevant to talk about imposing fines on the perpetrators. On the other hand, to operate such apparatus in a manner which causes interference constitutes an infringement of a licence condition, for which the licence could be revoked if necessary. Does Mr. Rayner regard this as a fine?

Electrical apparatus, other than that mentioned above, is not subject to licence conditions, nor is there, so far as my knowledge goes, a law which says it must not cause interference. Perhaps Mr. Rayner could enlighten us on the source of his information on this point.

Perhaps he has overlooked the fact that there is certain legislation concerning interference suppression of ignition systems of internal combustion engines, and that there is soon to be similar legislation relating to small electric motors and refrigerators. If this does not tackle the problem from all angles, it goes a fair way towards doing so.

Turning to Mr. Rayner's comment on improving the aerial/earth systems of radio receivers affected by (presumably) line time-base oscillator interference from television sets, it is true that complainants are often advised to put their own house in order first. One cannot expect interference-free reception with a poorly-installed receiver (and there is a surprisingly large number of them), though it must be conceded that circumstances sometimes preclude the erection of a decent outdoor aerial. Nevertheless there is no doubt that a better aerial/earth system can overcome a fair number of line time-base interference complaints. If an improvement in reception is not achieved by doing this, efforts are made to have the radiation reduced at source, despite Mr. Rayner's assertion that the authorities will not do so.

Of course, there is an aspect of this problem that was not mentioned. If circumstances are such that the complainant could reasonably act upon the advice proffered to him, but will not do so, the Post Office would seem to be entitled to withhold their services until he did. One would imagine that Mr. Rayner finds himself irritated by being in a position of this sort, judging by his acid comments, but I may be wrong!

With regard to Mr. Whitehill's thrust at television detector vans, the point he raises has escaped only Mr. Whitehill. He misleads himself by thinking that the detector vans' D.F. apparatus " homes " on the 20th harmonic of the line time-base oscillator frequency, since this can cause interference by heterodyning the 200 kc/s B.B.C. transmission. The D.F. apparatus does not need to sample this high-order harmonic in order to locate an unlicensed television receiver, so for this purpose it makes no difference whether or not the television receiver causes interference. And that, incidentally, is what bothers the licence-dodgers so much!

Yours faithfully,

W. E. THOMPSON (B.R.S. 19773)

St. Leonards-on-Sea, Sussex. T.R., Hastings

DEAR SIR,—It would be interesting to know how Mr. Rayner (June BULLETIN) came by his facts concerning the attitude adopted by the Radio Interference Branch of the Post Office towards cases where the offending equipment proves to be a television set, i.e., line time-base radiation.

Certainly I admit that the complainant may be asked to effect some improvement to his aerial and earth system if the investigating officer considers this might improve reception to his advantage, but such a request is by no means peculiar to line time-base cases.

After all, it is hardly fair to expect even the best radio to produce a good output from a few microvolts of signal staggering out of a poor aerial system and several millivolts of line time-base interference arriving hot-foot via the mains wiring.

In conclusion I would refer Mr. Rayner to the May issue of *Wireless World*, p. 207, where it states that in 1954 the Post Office dealt with 6,805 cases of radio interference arising from line time-base radiation.

The more publicity the better, I agree, in the hope that the manufacturers of TV sets will take the necessary steps somewhere along their assembly line.

Yours faithfully,

Dundee. D. T. WALKER (GM3CKN)

No Novice Licence, Please!

DEAR SIR,—I must strongly disagree with William Duncan's suggestion for institution of a Novice Licence.

The R.A.E. is as reasonably simple as it possibly can be, the syllabus is very elementary compared with those of the professional radio examinations, and there is no reason why anyone of normal intelligence, who is sufficiently keen, should be unable to pass it.

I fail to see how operating can improve one's knowledge of wireless theory, any more than regular driving of a vehicle will turn the driver (with no trouble on his part, presumably) into a motor engineer.

The dangers of allowing the handling of high-voltage apparatus by persons devoid of any knowledge of it should be obvious, and c.w. can be learned more easily without a licence than with one.

The general idea of the suggestion seems to be to get hold of a licence without any personal effort at all. Something for nothing is far too common a desire of the present time.

In any case what will become of the novices who fail to make the grade? Will they gracefully retire from the air or, far more likely, turn into a large body of disgruntled pirates?

Yours faithfully,

T. S. CARTWRIGHT (G3JYZ).

Bilston, Staffs.

DEAR SIR,—Once again a request has been made for an arrangement whereby " novices " can get on the air without first passing a Morse test. At the same time the implied suggestion is made that the " regular " amateur's cry of " Let them do it the hard way " is unworthy. I beg leave to suggest that this attitude is, on the contrary, a very sensible one. Everything worth having is worth making some effort to obtain, and I very much doubt whether the paraphernalia involved in the introduction of " novice " licences would be really worth it. Indeed, there would seem to be some change of heart in the U.S.A. where this system has been in operation for some time.

I sympathise with Mr. Duncan, but 12 w.p.m. is not really so hard!

Yours faithfully,

Bexleyheath, Kent. DAVID W. WOODERSON (G3HKX)

V.H.F.s and N.G.R.s

DEAR SIR,—As a v.h.f. " old-timer " I am surprised and a little concerned at the recent ruling of the Contests Committee which requires those stations entering the next 2-metre Field-day contest from " open " sites to transmit N.G.R. figures of their locations in place of mileage references to nearest towns.

The purpose of this, states the Committee, is to secure greater accuracy in the calculation of distances between competing stations. One questions whether the desired result will in fact be attained. In the first place, portable stations must work out the N.G.R.s of their sites. This involves a risk of error at least comparable with the plotting on a map of, say, " 7 miles n.w. of Oxford ". Then mistakes in transmission or copying of any digit in the 6-figure N.G.R. can easily occur and the errors would not readily be discovered and rectified. Lastly, the numerous mathematical calculations to be performed by participants (involving the extraction of square roots of large numbers) will inevitably produce a crop of errors.

It is difficult to believe that the present system which simply involves the careful measurement of distances with a ruler on a map between marked points is liable to anything like the same margin of error.

Regrettably certain competitors ever since the early days of v.h.f. contests have purposely " stretched " the lines of their contacts—these " deliberate mistakes " will not be eliminated by a change of system. Checking of competitors' estimates of distance under the new system would also, one imagines, add considerably to the headaches of an already over-worked Contests Committee.

There is a second general consideration which demands attention. V.h.f. and u.h.f. contests succeed largely according to the number of participants in them. Recently it is noticeable that many stations active during contests do not bother to send in entries. This is undoubtedly due in some measure to the laborious task of preparing the entry form, copying logs, calculating distances, etc. The new Committee rule enforcing the use by a proportion of the competing stations of N.G.R.s is certain to add enormously to the amount of hard work required to complete an entry and so to result in a further reduction in the number of active stations actually forwarding entries.

Is the use of N.G.R.s the best solution to the existing problem? Would it not be simpler and much more effective if a return were made to scoring zones? In this way only the occasional border-line case (e.g. contacts between 98 and 102 miles) need be calculated or checked with accuracy, or give rise to any doubt concerning the points earned.

For 144 Mc/s I would suggest a zonal scoring system on the following lines:—

Up to 50 miles	1 point
50 to 100 miles	3 points
100 to 150 miles	5 points
150 to 200 miles	8 points
200 to 300 miles	12 points
Over 300 miles	20 points

Smaller zones could appropriately be used for 420 Mc/s contests.

Your faithfully,

Tadworth, Surrey. W. A. SCARR (G2WS).

A New S-Code?

DEAR SIR,—Referring to Mr. Simmond's letter (July BULLETIN) I would agree to a new S-Code whole-heartedly, but let us not stray too far in the opposite direction. May I suggest that we adopt the same as in the International Q Code, as, after all, we amateurs use this Code each day (although some have a slightly different meaning), and therefore use QSA 1-5, thus conforming as nearly as possible to this International Code.

Another point I would like to make at this stage (and I must admit it refers in the main to the Maritime Service), is that of excessive calling. We must all have listened at one time or another to someone calling either CQ or a specific station for long periods without sending their own call-sign. To these offenders I would draw their attention to Articles 616-618 of Radio Regulations which state:—

" The call is made as follows:
" call sign of the station called *Not* more than *Three*
" times;
" the word DE;
" call sign of the calling station, *Not* more than *Three* times.
" However, in the bands of frequencies between 4,000 and
" 23,000 kc/s, when the conditions of establishing contact
" are difficult, the call signs may be transmitted more than
" three times, but *Not* more than *Eight* times."

If this procedure were to be introduced it would do two things:

1. Lessen the ever-increasing QRM on our bands,

2. Improve the operating and *receiving* standard of all amateurs.

Yours faithfully,

Ampfield, near Romsey, Hants. M. LILLINGTON (G3JFY)

DEAR SIR,—I have read with interest the letter from G8VN in the June issue regarding signal reports, using the S-point system.

I suggest that apart from being out-dated, the system is, indeed, quite useless to anyone but the receiving station, and even then one has to assume a constant " goodness " of the receiver. The system tells us nothing of any practical use, due mainly to differing types of receiving antennas in use.

Before the heavens descend on me, I would agree that hearing a " G " at S6 one week, and at S9+ the next gives an indication of conditions, which after all is what a lot of us are interested in.

However, when one considers the considerable amount of work involved in measuring field strength on standard aerials with accurately calibrated and linear receivers, one begins to wonder exactly what " S7 fb OM " really means.

The only possible use that I can find in the present system, is for " skeds " between two stations over a period of time, where the transmitters and aerials, and receivers and aerials remain untouched. Only then does the system mean anything at all.

This criticism is purely destructive, much to my regret, but for the life of me I fail to see, for the above reasons, how the 10 S-point system is going to mean anything more than a comparative report, as does the present system.

Yours faithfully,

M. W. J. OLIVER (VQ4EG, ex-MI3TM).

Westlands, Nairobi, Kenya.

Home-Built Receivers

DEAR SIR,—May I be permitted to add to the comments of the writers whose letters on the subject of home-built receivers appeared in the May and July issues of the BULLETIN?

As in Mr. Manley's case, I built my first superhet while on active service in North Africa in 1943, and later in Italy built or rebuilt seven others. All were solely for broadcast reception and usually of the simple 4 valve type, i.e., f.c., i.f., det./l.f., and output. One general short-wave band was used, except when suitable coils came to hand to include the medium waveband. (I never attempted to wind medium wave-band coils.) All had metal chassis and wooden cabinets. No signal generator was ever available, lining up being carried out by finding a signal, peaking it, and then juggling with the tuning circuits until satisfactory tracking ensued. Frequency coverage and calibration was judged by spotting the various short-wave broadcast bands or known stations until (later) a Class D wavemeter became available.

Since that time, three other superhets have been built, one of which is the present station receiver. This was built in 1950, and was my idea of, and first real attempt at, what can be described as a general coverage communication type receiver. It originally consisted of 2 r.f, 3 i.f. (465 kc/s) stages, b.f.o., noise limiter, S-meter, etc., with self contained power supply. Later modifications have included crystal and audio filters, muting, change of valves to improve the front end, etc. It covers approximately 500 kc/s to 30 Mc/s in four switched bands, employs the Maxi-Q range of coils and has an HRO type dial with in-line gearbox. The home-built metal cabinet measures 18 in. wide, 10 in. high, and 12 in. deep. The set has a total of twelve valves including rectifier and stabilizer. Alignment was carried out by using a home-built signal generator (never calibrated!), checked against its internal 100/1000 kc/s crystal and 10 kc/s multivibrator. This instrument has since been stripped, the crystal finding its way into a home-built frequency meter. Most of the components for the receiver had been acquired over the previous year, and the construction, planning, layout, alignment, etc., took approximately four months.

This receiver has given noble service, but being general coverage, is not as good as it might be if built solely for amateur band use, and to this end I am contemplating the building of the " last word in ham band receivers " ! !

Like Mr. Bruce, I am not a professional radio engineer, and my tool kit is about the same as his, with the addition of a 3 in. vice, B.A. size taps, and two or three files.

I note that in the footnote to Mr. Powell's letter in the May issue, the Society is planning to describe a receiver. Let us hope that this will prove a worthy companion to Mr. Varney's " Elizabethan " transmitter. The construction of such a receiver is an achievement of which anyone can be proud and is fully in keeping with the best Amateur Radio tradition.

Yours faithfully,

Thorpe-next-Norwich, Norfolk. O. F. SIMKIN (G3HYJ)

Regional & Club News

Aberdeen.—Members and prospective members are cordially invited to attend a meeting of the Group at "Cameron's Inn," Little Belmont Street, on Friday, August 26, at 8 p.m.

Bournville Radio Society.—The Society, in conjunction with the South Birmingham R.S.G.B. Group, is staging an Amateur Radio demonstration at the Bournville Allotment Association's Annual Flower and Vegetable Show on August 20. The Society's station (call-sign G6BV) will be active on Top Band, 3.5, 7 and 14 Mc/s when contacts, particularly with amateurs in the London area, will be appreciated. Old-time and modern radio equipment will be exhibited. A new brick-built shack for G6BV is nearly ready for use; meanwhile, meetings are held on Tuesday evenings in No. 4 Committee Room, Cadbury Bros., Bournville. Visitors are cordially invited to attend. *Hon. Secretary:* W. V. Shepard (B.R.S.19176), c/o Council Office, Cadbury Bros. Ltd., Bournville, Birmingham.

British Amateur Television Club.—The first Amateur Television Convention to be held in the U.K. will take place at the Bedford Corner Hotel, Bayley Street (off Tottenham Court Road), London, W.C.1, from 10 a.m. to 6 p.m. on October 1. Equipment loaned by members of the club will be displayed and demonstrated; there will also be a film show. Tickets (price 10/6 for members, including lunch and 5/- for non-members) may be obtained from D. S. Reid, 4 Bishop Road, Chelmsford, Essex.

Grafton Radio Society.—The Society will re-open after the Summer Recess on September 9. The A.G.M. is arranged for September 16. *Hon. Secretary:* A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middlesex.

Lothians Radio Society.—At the A.G.M. the following office bearers were elected:—*President:* Rev. Walter M. Ferrier (GM3BDA); *Vice-President:* Ian Mackenzie (GM3FGJ); *Hon. Secretary and Treasurer:* John Good (GM3EWL), 24 Mansionhouse Road, Edinburgh 9; *Committee Members:* A. C. Grainger (GM3BQO) and H. E. Stanway (GM3JOA). Meetings will be held at 25 Charlotte Square, Edinburgh 2, at 7.30 p.m. on September 8, September 22 and October 6 ("Bring and Buy" Sale). Visitors and prospective members will be welcomed.

Medway Amateur Receiving and Transmitting Society.—More than 300 people attended the Medway Hamfest at Gillingham, Kent, on July 24, when prizes to the value of £150 were distributed in the raffles. Entertainment was provided by a magician and a ventriloquist. Refreshments were free. The Society expresses its thanks to all who supported the event, which was organised by W. E. Nutton (G6NU).

QRP Society.—The Society is now represented in ten countries. It is hoped to arrange an informal meeting to coincide with the R.S.G.B. Amateur Radio Exhibition in November. Low power enthusiasts are invited to contact the *Hon. Secretary:* John Whitehead, 92 Rydens Avenue, Walton-on-Thames, Surrey.

Scarborough Amateur Radio Society.—Recent visitors have included G3HCX, and also G3HPM who will shortly be operating as ZD9AD with the Gough Island Expedition. G3HKO is off to Malta where he will operate as ZB1HKO. *Hon. Secretary:* P. Briscombe (G8KU), 31 St. John's Avenue, Scarborough.

Shefford and District Amateur Radio Society.—The Society meets on Friday evenings at Digswell House when the club station is active under the call-sign G3FJE. Meetings during August are arranged for the 19th ("Electro-chemistry" by G3IXG) and the 26th ("Fundamentals of Electronic Computers" by G2FFG). *Hon. Secretary:* G. R. Cobb (G3IXG), 7 Mitchin Road, Shefford.

Slade Radio Society.—Meetings will be held at the Church House, Erdington, on August 19 ("Design of Transformers," N. B. Simmonds), September 2 ("High Fidelity Sound Equipment," C. H. Young, G2AK). On September 16 there will be a demonstration of the Osram "912" Amplifier by G.E.C. at Aston Technical College, Ettington Road, Birmingham 6. Admission will be *by ticket only*, obtainable from the Hon. Secretary. The fourth of the season's Harcourt Trophy D/F Tests will be held on August 28. *Hon. Secretary:* C. N. Smart, 110 Woolmore Road, Erdington, Birmingham 23.

Stockport Radio Society.—Recent talks have included "Amateur Radio in South Africa" by ZS5MM, "Communication Efficiency" by G3AOO and a description of his station by G3IVR. The Society will be taking part in Region 1 Field Day.

Swindon.—A meeting will be held at the Connaught Café, 34 Cromwell Street, Swindon, at 7.30 p.m. on August 31 to discuss the formation of a local radio club. Transmitting amateurs, short wave listeners and all interested in radio are invited to attend. The meeting is being organised by R. Reynolds (G3IDW), 136 Beech Avenue, Swindon, who will be pleased to give further details.

Torbay Amateur Radio Society.—The Society will meet on August 20 at the Y.M.C.A., Castle Road, Torquay, at 7.30 p.m. Visitors will be welcome. R.S.G.B. Recorded Lectures have been booked for the winter season, commencing at the meeting at the Y.M.C.A. on September 17. The title of the first lecture is "V.H.F." by Sir Noel Ashbridge.

Representation

THE following are amendments to the list of Town Representatives published in the December, 1953, issue:—

Region 7—London South

Croydon
C. K. Lawson (G3JCL), 23 Abington Grove, Wallington, Surrey.

Region 9—Torquay

Now reads:—
Torbay Group comprising Paignton, Brixham, Dartmouth, Totnes and Newton Abbot.

* * *

The following is an addition to the list of County Representatives published in the December, 1954, issue:—

Region 12—Northern Counties
J. MacIntosh (GM3IAA), "Broompark," Cradlehall, Inverness.

* * *

Vacancies

Mr. J. D. Heys (G3BDQ) has resigned as representative for the county of Sussex and Mr. A. L. Milnthorpe (G2FMO) as representative for the town of Leicester.

Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by not later than September 30, 1955.

(Note. New T.Rs. on election, will hold office only until December 31, 1955.)

Affiliated Societies

THE following is an addition to the list of Affiliated Societies published in the August, 1954, issue of the BULLETIN:—

Stoke Heath Amateur Radio Club (G3ITZ), c/o Sgt. A. Reid, Sgt.'s Mess, No. 291 M.U., R.A.F. Stoke Heath, near Market Drayton, Shropshire.

London Lecture Meeting

Friday, October 28, 1955

"AMATEUR RADIO IN THE ANTARCTIC—
a Review of VK Activity 1947–1955"

by

ROTH JONES (VK3BG)

at the

Institution of Electrical Engineers,
Savoy Place, Victoria Embankment

Buffet Tea 5.30 p.m. **Lecture 6.30 p.m.**

The paper will be read by Arthur O. Milne, G2MI (Past President) and will be illustrated by films and slides.

Forthcoming Events

REGION 1

Blackpool (B. & F.A.R.S.).—August 23, 7.30 p.m., 33 Clarence Avenue, Cleveleys.
Bury.—September 8, 7.30 p.m., 52 The Drive, Seedfield, Bury.
Chester (C. & D.A.R.S.).—Tuesdays, 7.30 p.m., Tarran Hut, Y.M.C.A., Chester.
Crosby.—Tuesdays, 8 p.m., over Gordon's Sweetshop, St. John's Road, Waterloo.
Isle of Man (I.o.M.A.R.S.).—August 17, September 7, 21, Manor Guest House, Victoria Road, Douglas.
Lancaster (L. & D.A.R.S.).—September 7, 7.30 p.m., George Hotel, Torrisholme.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., St. Barnabas Hall, Penny Lane, Liverpool, 15. **(M.R.S.).**—August 24, September 14, 8 p.m., Larkhill Mansion House, Queens Drive, Liverpool, 13.
Manchester (M. & D.R.S.).—September 5, 7.30 p.m., Brunswick Hotel, Piccadilly, Manchester. **(S.M.R.C.).**—Fridays, 7.45 p.m., Ladybarn House, Mauldeth Road, Manchester, 14.
Preston.—August 26, September 9, 7.45 p.m., St. Saviour's Parish Hall, Manchester Road, Preston.
Rochdale (R.R.T.S.).—Fridays, 7.45 p.m., 1 Law Street, Sudden.
Southport.—Thursdays, 8 p.m., Sea Cadets Camp, Esplanade, Southport.
Stockport (S.R.S.).—August 17, September 14, 8 p.m., Blossoms Hotel, Buxton Road, Stockport.
Warrington (W. & D.R.S.).—August 18, September 1, 15, 7.30 p.m., "Kings Head Hotel," Winwick Street, Warrington.
Wirral (W.A.R.S.).—August 17, September 7, 21, 7.45 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

REGION 2

Barnsley.—September 9, 7.30 p.m., "King George Hotel," Peel Street (A.G.M.).
Bradford.—August 23, September 13, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Catterick & Richmond.—Wednesdays, 7 p.m. Loos Lines, Catterick Camp.
Darlington.—Thursdays, 7.30 p.m., 129 Woodlands Road.
Doncaster.—September 14, 7.30 p.m., Y.W.C.A., Cleveland Street
Gateshead.—Mondays, 7.30 p.m., Mechanics' Institute, 7 Whitehall Road.
Hull.—August 30, September 13, 7.30 p.m., "Rampant Horse," Paisley Street.
Middlesbrough.—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Feversham Street.
Pontefract.—August 18, September 1, 15, 8 p.m., "Fox Inn," Knottingley Road.
Rotherham.—Wednesdays, 7 p.m., "Cutlers' Arms," Westgate.
Scarborough.—Thursdays, 7.30 p.m., B.R. Rifle Club, West Parade Road.
Sheffield.—August 24, 8 p.m., "Dog and Partridge," Trippet Lane. September 14, 8 p.m., Albreda Works, Lydgate Lane.
Slaithwaite.—Fridays, 7.30 p.m., 3 Dartmouth Street.
York.—Thursdays, 7.30 p.m., Club Rooms, Y.A.R.S., Fetter Lane.

REGION 3

Birmingham (South).—September 2, 7.30 p.m., Committee Room, Messrs. Cadbury Bros., Bournville Lane. **(M.A.R.S.).**—August 16, 7 p.m., Midland Institute. **(Slade).**—August 19, September 2, 7.45 p.m., Church House, High Street, Erdington.
Coventry.—August 26, 7.30 p.m., Priory High School. **(C.A.R.S.).**—September 4, 12, 7.30 p.m., 9 Queens Road.
Kenilworth, Warwick, Leamington.—August 18, 7.30 p.m., Dalehouse Lane.
Malvern.—September 5, 8 p.m., "Foley Arms."
Redditch.—August 25, 8 p.m., 10 Woodlands Road. September 6, 8 p.m., "Scale and Compasses," Birchfield Road.
Rugby.—September 1, 7.30 p.m. B.T.H. Recreation Club, Hillmorton Road.
Solihull.—August 22, September 15, 7.30 p.m., Defence H.Q., Sutton Lodge, Blossomfield Road.
Stoke.—August 31, 8 p.m., "Lion's Head," John Street, Hanley.
Stourbridge (St.A.R.S.).—September 6, 8 p.m., King Edward VI School.
Walsall.—September 14, 8 p.m., Technical College, Bradford Place.
Wolverhampton.—August 29, September 12, 8 p.m., Stockwell End, Tettenhall.

REGION 4

Alvaston.—Tuesdays, Thursdays, 7.30 p.m., Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, nr. Derby.
Chesterfield.—Tuesdays, 7.30 p.m., Bradbury Hall, Chatsworth Road.
Derby (D. & D.A.R.S.).—Wednesdays, 7.30 p.m., Room 4, 119 Green Lane, Derby.
Ilkeston.—No August Meeting.
Leicester (L.R.S.).—No August Meeting.
Lincoln (L.S.W.C.).—No August Meeting.
Mansfield (M. & D.A.R.S.).—September 13, 7.30 p.m., "Denmans Head Hotel," Market Place, Sutton-in-Ashfield.
Newark.—September 4, 7 p.m., Northgate House, Northgate, Newark.
Northampton (N.S.W.C.).—Fridays, 7 p.m., September 2, 6 p.m., Clubroom, 8 Duke Street.
Nottingham.—No August meeting.
Peterborough.—September 7, 7.30 p.m., 21 Hankey Street.
Worksop.—September 1, 7 p.m., King Edward Hotel.

REGION 5

Chelmsford.—September 1, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.
Great Hallingbury.—September 11, 2.30 p.m., "Normandale," New Barn Lane, G6UT's Annual Ham Party. Ladies welcome.
Lowestoft & Beccles (L.&B.A.R.C.).—August 24, September 14, 7.30 p.m., Y.M.C.A., Lowestoft.

REGION 6

Cheltenham.—September 1, 8 p.m., Great Western Hotel, Clarence Street.
Gloucester (G.R.C.).—Thursdays, 7.30 p.m., The Cedars, 83 Hucclecote Road, Gloucester.
High Wycombe.—September 20, 7.30 p.m., G2FDF, 106 Liberty Lane, Addlestone, Surrey.
Jersey, C.I.—August 30, 7.45 p.m., Chamber of Commerce, Royal Square, Jersey.
Oxford (O. & D.A.R.S.).—August 24, September 14, 7.30 p.m., Club Room, "Magdalen Arms," Iffley Road, Oxford.
Portsmouth.—Tuesdays, 7.30 p.m., British Legion Club, Queen's Crescent, Southsea. (Clubroom open every evening.)
Southampton.—September 3, 7 p.m., 1 Prospect Place.
Stroud.—Wednesdays, 7.30 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—Tuesdays, 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick, W.4.
Barnes, Putney and Richmond.—September 2, 337 Upper Richmond Road, S.W.14.
Bexleyheath.—August 25, September 8, 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.
Bromley (N.W.K.A.R.S.).—September 2, 8 p.m., "Shortlands Hotel," Station Road, Shortlands, Kent.
Chingford.—August 19, September 2. Venue from G4GA (SIL 5635) or B.R.S.19765 (SIL 6055).
Croydon.—September 13, 7.30 p.m., "Blacksmith Arms," 1 South End, Croydon.
Dorking.—Tuesdays, 7.30 p.m., 5 London Road.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.
East Ham.—Next meeting October 4, 12 Leigh Road.
East Molesey (T.V.A.R.T.S.).—September 7, 8.30 p.m., "Carnarvon Castle Hotel."
Enfield.—August 21, 3 p.m., George Spicer School, Southbury Road, Enfield.
Finsbury Park.—August 16, 7.30 p.m., 16 Albion Road, Stoke Newington, N.16.
Hendon and Edgware.—Wednesdays, 8 p.m., 21 Goodwins Avenue, Mill Hill.
Hoddesdon.—September 1, 8 p.m., "Salisbury Arms."
Holloway (G.R.S.).—Next meeting September 9, Grafton School, Eburne Road, N.7.
Ilford.—Thursdays, 8 p.m., G2BRH, 579 High Road.
Kingston (K. & D.R.S.).—Alternate Wednesdays, 7.45 p.m., Penrhyn House, Penrhyn Road.
Lewisham (R.A.R.C.).—Wednesdays, 8 p.m., Durham Hill School, Downham.
London (L.M.L.C.).—August 19, September 16, 12.30 p.m., Bedford Corner Hotel, Bayley Street (off Tottenham Court Road), London, W.C.1.
London (U.H.F. Group).—September 1, 7.30 p.m., Bedford Corner Hotel, Bayley Street (off Tottenham Court Road), London, W.C.1.
Norwood.—August 20, Windermere House, Westow Street, Crystal Palace.
Southgate and Finchley.—September 8, Arnos School, Wilmer Way.
Slough.—September 6, Venue from G2HOX or G3BTP, 13 Quaves Road, Slough.
Sutton and Cheam (S. & C.R.S.).—August 16, September 20, The Harrow, Cheam Village.
Welwyn Garden City.—September 6, 8 p.m., Council Office, Welwyn Garden City, Herts.

REGION 8

Brighton (B.D.R.C.). — Tuesdays, 7.30 p.m., "Eagle Arms," Gloucester Road.
Isle of Thanet (I.o.T.R.S.).—Fridays, 7.30 p.m., Hilderstone House, Broadstairs.

REGION 9

Bristol.—August 19, September 16, 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol, 1.
Exeter.—September 2, 7 p.m., Y.M.C.A., St. David's Hill, Exeter.
Falmouth (W.C.R.C.).—August 18, September 1, "The Fifteen Balls," Penryn.
North Devon.—September 1, G2FKO, 38 Clovelly Road, Bideford.
Plymouth.—September 17, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Jude's.
Torquay.—August 20, September 17, 7.30 p.m., Y.M.C.A., Castle Road, Torquay.
Weston-super-Mare.—September 14, 7.30 p.m., R.A.F.A.R.S., R.A.F., Locking.
Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Road.

REGION 10

Cardiff.—September 12, 7.30 p.m., "The British Volunteer," The Hayes, Cardiff.
Neath and Port Talbot.—September 6, 7.30 p.m., Royal Dock Hotel, Briton Ferry.

REGION 13

Dunfermline.—Thursdays, 7.30 p.m., behind 34 Viewfield Terrace, Dunfermline.

REGION 14

Falkirk.—August 26, September 9, 7.30 p.m., The Temperance Café, High Street, Falkirk.
Glasgow.—August 26, 7.15 p.m., Christian Institute, 70 Bothwell Street, Glasgow, C.2.

In order to avoid mistakes and misunderstandings details of meetings for inclusion in this feature can be accepted only from Regional Representatives or appointed Scribes.

Town Representatives and Honorary Secretaries of clubs affiliated to the R.S.G.B. should send details to the appropriate Regional Representative (whose address is on page 53 of this issue) so that they reach him not later than the 18th of the month preceding publication.

Items for *Regional and Club News* should, of course, be sent direct to the Editor.

New Books

PRACTICAL WIRELESS SERVICE MANUAL (Tenth Edition), by F. J. Camm. 290 pages. Page size 7¾ in. by 5 in., 219 illustrations and tables. Published by George Newnes, Ltd. Price 17/6.

This edition has been fully revised and re-illustrated throughout. Much new material has been added including instructions for building a 1 Mc/s Capacity Bridge, a Condenser Analyser, an Audio Oscillator and a Comprehensive Test Unit. Although the book is primarily intended for the wireless service man it will be found of value also to the television service engineer.

The book claims to be a complete work on the testing of all types of receivers and the construction and use of test instruments. It lives up well to that claim.

AN INTRODUCTION TO COLOUR TELEVISION by G. G. Gouriet, A.M.I.E.E. 72 pages. 28 illustrations. Page size 8½ in. by 5½ in. Published for The Television Society by Norman Price (Publishers) Ltd., London, E.C.1. Price 8/6.

This Monograph contains the substance of a series of lectures delivered by the author in 1954 to The Television Society. It is fully illustrated by colour diagrams and explains the development and theory of the present American colour television system with a comment on future development in this country. The Monograph is in two parts—Part I deals with Colour Analysis and Synthesis; Part II with Colour Systems.

QUESTIONS AND ANSWERS ON RADIO AND TELEVISION (Fifth Edition), by E. Molloy. 150 pages, pocket size, numerous illustrations. Published by George Newnes, Ltd. Price 6/-.

Beginners will find a study of this book in regular sequence a very effective way of acquiring a good working knowledge of radio and television. For those who already have a fair knowledge of the subjects it will be found useful for answering difficult questions and also for clarifying their ideas on some of the more out-of-the-way aspects of the subjects.

The present edition has been enlarged to cover important recent advances in radio and television techniques. In the section on television, information is given on the new Band III frequencies and on the reception of alternative programmes on those frequencies.

The newcomer to Amateur Radio will find this little book most useful.

FREQUENCY MODULATION TUNER UNITS FOR FRINGE AND LOCAL AREA RECEPTION. 24 pages, illustrated. Page size 8½ in. by 5½ in. Published by Data Publications, Ltd. Price 2/-.

The material published in this booklet (Radio Reprint No. 2) appeared originally in *The Radio Constructor* and includes a short description of the Osram 912 High Fidelity Amplifier.

NEW A.R.R.L. PUBLICATIONS

Revised editions of two well-known A.R.R.L. publications now available from R.S.G.B. Headquarters. They are:—

Learning the Radiotelegraphic Code. (Price 4/6). Provides basic training knowledge for individual or class room instruction. This, the seventh, edition is divided into six sections: Learning the Code; Learning to Send; High-Speed Operation; Operating on the Air; Code Practice and Class Instruction. The various test exercises are set out in bold capital letters.

The A.R.R.L. Antenna Book. (Price 18/6). Contains more than 300 pages of up-to-the-minute information on all aspects of radio antenna systems. This edition is the seventh of a long line of Antenna Books offered by the A.R.R.L. It contains fifteen chapters ranging from Wave Propagation and Antenna Fundamentals to Rotary Beam Construction and Mobile Antennas. There are long sections on Transmission Lines, Multi-element Directive Arrays, Long Wire Antennas and Antennas for 160, 80, 40, 20, 15 and 10 metres. V.H.F. and U.H.F. Antenna Systems are also fully covered.

*(This new edition will be reviewed in the September issue—*ED.)

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