R S G B

DECEMBER, 1957

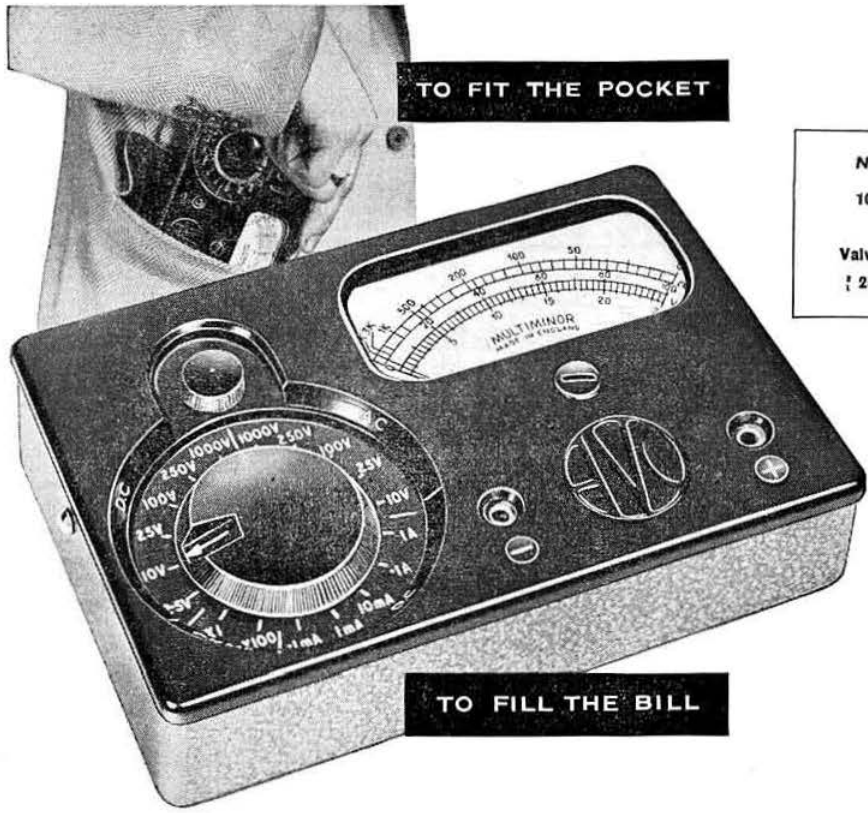
BULLETIN

2/6 Monthly

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

VOL. 33, NO. 6

DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO



Now available

10th Edition of

AVO

Valve Data Manual

25/- post free

This splendid new AVO Instrument has been developed to meet a definite demand for a sturdy pocket-size multi-range test meter at a modest price, suitable for use on modern electronic apparatus as well as for radio and television receivers, motor vehicles, and all kinds of domestic appliances and workshop equipment.

Readings are obtainable quickly and easily on a very open scale, and range selection is by means of a robust clearly marked rotary switch of the characteristic AvoMeter type. Measurements of A.C. and D.C. Voltage, D.C. Current, and Resistance are made by means of only two connection sockets.

19 Ranges

D.C. Voltage	A.C. Voltage
0 — 100mV.	0 — 10 V.
0 — 2.5 V.	0 — 25 V.
0 — 10 V.	0 — 100 V.
0 — 25 V.	0 — 250 V.
0 — 100 V.	0 — 1000 V.
0 — 250 V.	
0 — 1000 V.	

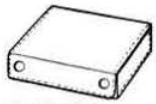
Resistance	D.C. Current
0 — 20,000Ω	0 — 100μA
0 — 2 MΩ	0 — 1mA
	0 — 10mA
	0 — 100mA
	0 — 1 A

Sensitivity:
10,000 Ω/V on D.C. voltage ranges.
1,000 „ „ A.C. „ „

Accuracy:
3% of full scale value on D.C.
4% „ „ „ „ „ A.C.

List Price: **£9/10s.**
complete with Test Leads and Clips
Size: 5⅛ x 3⅛ x 1⅞ inches
Weight: 1 lb. approx.

THE MULTIMINOR



Leather Case if required **32/6**

Designed and Manufactured by

AVO Ltd. AVOCET HOUSE · 92-96 VAUXHALL BRIDGE ROAD · LONDON · S.W.1 *VICtoria 3404 (9 lines)*

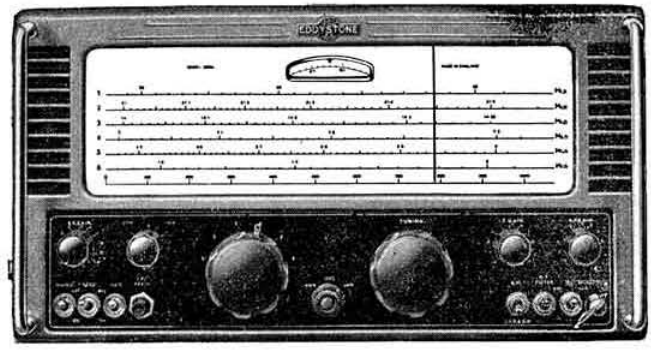
MM.2.

EDDYSTONE '888A' RECEIVER

AMATEUR BANDS ONLY; FULL BANDSPREAD

MAIN FEATURES

- Coverage of the 6 bands 1·8 Mc/s to 28 Mc/s, each spread over the full scale, 12 in. long and directly calibrated.
- Vernier scale representing 2 kc/s per division on Ten and 250 cycles on One-sixty.
- Crystal controlled calibration oscillator, giving 100 kc/s pips.
- Double superhet circuit for high selectivity (IF's 1620/85 kc/s).
- RF stage, separate Mixer and Oscillator (stabilized)—12 valves in all.
- Audio filter of advanced design, peaking at 1,000 cycles/sec., for much improved CW selectivity.
- Monitoring on stand-by and change-over, send-receive switch to control external relay circuits.
- *Plus* Noise Limiting, Aerial trim control, fitting for external S-meter, independent RF, IF and AF gain controls, variable selectivity. Rust-proofed and tropicalised finish.



ALL THE CONTROLS FOR EFFICIENT OPERATION

PERFORMANCE

SENSITIVITY better than 3μV for 20 db signal-noise ratio to give 50 mW output at 30 per cent modulation. CW sensitivity better than 0·5μV.

SELECTIVITY variable from 30db to 60db down, 5 kc/s off resonance. Audio filter attenuates 32db for signal only 250 cycles off resonance.

IMAGE RATIO better than 35db at 30 Mc/s, progressively higher on LF bands.

POWER OUTPUT exceeds 2½ watts into 2·5 ohm load.

NOTE.
Because of difficulties overseas in obtaining replacements for some valves, changes have been made and all valves are now standard International types. A mixer type of detector is provided for reception of CW and SSB, with some advantage on these types of signals. A separate switch controls AGC. The overall performance figures quoted for the "888" hold good.

Beautifully designed and constructed

LIST PRICE £110 (IN U.K.)

Booklet giving full details with user's opinions on request

EDDYSTONE '888A'

STRATTON & CO. LTD.

EDDYSTONE WORKS, ALVECHURCH ROAD, BIRMINGHAM 31

Tel: Priory 2231/4 Cables: STRATNOID BIRMINGHAM

R.S.G.B. BULLETIN

Devoted to the Science and Advancement of Amateur Radio

Vol. 33 No. 6 DECEMBER 1957

CONTENTS

Editor: JOHN CLARRICOATS, O.B.E., G6CL *Assistant Editor:* JOHN A. ROUSE, G2AHL

Advertisement Manager: HORACE FREEMAN

Editorial Office:
RADIO SOCIETY OF GREAT BRITAIN
28 LITTLE RUSSELL STREET, LONDON, W.C.1
Tel.: HOLborn 7373

Advertising Office:
NATIONAL PUBLICITY CO. LTD.
36-37 UPPER THAMES STREET, LONDON, E.C.4
Tel. 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.*

Current Comment

Sputniks and the I.G.Y.

THE release of the first Russian earth satellite imparted a stimulus to the Society's I.G.Y. programme which few could have foreseen. One of the first things that happened when Sputnik I was rocketted out to its orbit was a telephone call from The Royal Society to the R.S.G.B. asking for the co-operation of its members. The considerable amount of activity that followed was described in a topical article in the last BULLETIN by Geoff Stone (G3FZL), one of the I.G.Y. Co-ordinators. The story is carried a stage further this month.

From the Amateur Radio point of view Sputnik I will be generally regarded as the biggest thing that had happened to date during the I.G.Y. even though the suddenness of its appearance precluded much organized listening to its much-publicized " bleep." With Sputnik II there was, in the modest words of the I.G.Y. Co-ordinators, " reasonable success."

There is no need to elaborate the story on this page, for it has adequate treatment elsewhere. What does need to be put on record is an acknowledgement of the tremendous effort which has been—and is being—put into the I.G.Y. Project by the organizers and their large group of enthusiastic helpers; and secondly to remark upon the fortunate existence of Amateur Radio and Amateur Astronomical Groups all over the world capable of making worthwhile scientific observations on the satellites. Time may show that the organized activity which has been concentrated on reception of the Russian satellites will contribute materially towards the fund of knowledge of what is, in more senses than one, a voyage towards the unknown region.

QTH

IF ever there were a best seller, it is the *R.S.G.B. Amateur Radio Call Book*. The fifth edition has been out of print for many months now, and the demand for a successor has been insistent.

And now the sixth edition is out. It is without question the most up-to-date list of British Isles call-signs in existence at the present time and will remain so for many months ahead.

This is the first occasion on which the Society has been allowed access to G.P.O. records for the purpose of bringing the *Call Book* as up-to-date at the moment of printing as human endeavour can make it.

The opportunity has therefore been taken to " start from scratch " by resetting the whole of this new edition rather than attempt to make hundreds of corrections to standing type metal. Members who detect errors of any kind are requested to forward details direct to the Call Book registrar, Mr. W. J. Kempton (G8LN), to whom the thanks of the Society go for his assiduity in the work he has done on the new edition.

The President, Council and Headquarters Staff send

Christmas and New Year Greetings

to Members Everywhere

Z.R.

THERE still seems to be a surprising amount of misunderstanding — even ignorance — about the function of the Zonal Representative. It has been suggested, forsooth, that zonal representatives are in some way inferior to general Council members! Anyone seeing them in action each month around the Council table on equal terms with the ordinary elected members would soon be disabused of such an illusion.

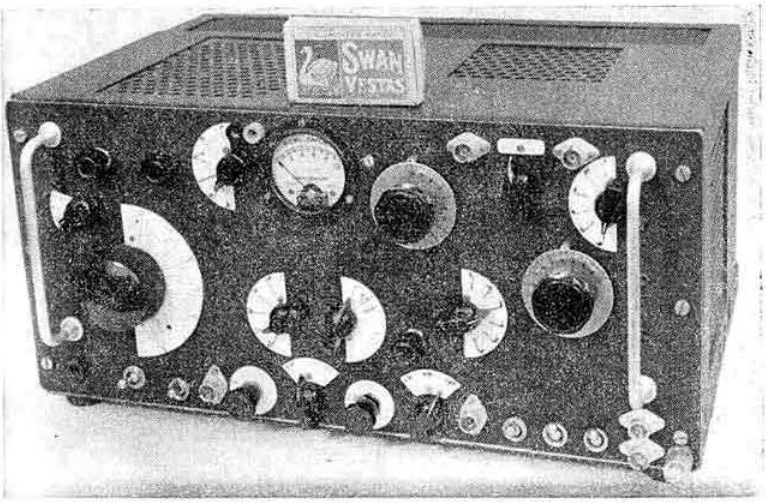
Zonal representatives are " regional men " who are returned to the Society's governing body by members residing in six large and well defined geographical areas. Their posts were created three years ago so that there would at all times be adequate provincial representation on the Council, and to dispose once and for all of the long outdated idea that the Society is governed from London.

Every zonal representative is on the same basis as the ordinary elected member in having in effect the President's chain in his knapsack, to vary a well-known metaphor. He goes to Council meetings to represent his particular slice of the membership; and the more work they give him—the more they make their voices heard through his—the better he does his job.—J.H.

Tom Thumb

A Miniature High Power Lightweight Transmitter for A.M., N.B.F.M. and C.W.

By J. M. RAILTON
(G8AB, ex-XACP, ZB1AD) *



The small size of the Tom Thumb transmitter may be judged from the box of matches standing on top of the cabinet.

THE author was originally the proud owner of a six ft. rack-mounted transmitter built like a battleship and weighing several hundred pounds. The disadvantage of such a device as far as a serviceman's life was concerned soon became apparent and plans were laid for something really small and light. A firm resolution was made not to come on the air with any temporary hook-ups and the final result has fully justified the effort expended. The transmitter is completely self contained with built-in power pack and embodies the following features:—

(*a*) Coverage—3·5 Mc/s to 28 Mc/s.
(*b*) 120 watts input on c.w. and n.b.f.m.; 60 watts on a.m.
(*c*) V.f.o. or choice of two crystals.
(*d*) TVI-proof.
(*e*) Speech clipping incorporated.
(*f*) Provision for external anode and screen modulator using the internal speech amplifier.
(*g*) Total size 16½ in. by 8 in. by 10½ in.; weight 31 lb.

It is not intended to give full layout and mechanical details since the extremely compact construction would in most cases be unnecessary. It is considered, however, that some of the features might be of interest to those intending to build "table toppers." The power supply in particular provides an answer to those seeking something small and light.

Design Considerations

The maximum size of the transmitter was arbitrarily fixed by the decision to use a surplus TU5 tuning unit aluminium case and basic "U" shaped chassis as a foundation. A new panel and top and bottom covers were made and the back of the case cut out and moved back. To facilitate construction and servicing, units were built on separate sub-chassis with a minimum of interconnection. The whole transmitter can be removed from its case complete and in a working state. It can also be operated with the front panel removed. Sub-units may be removed and operated on extension leads to allow servicing. The various units were positioned as follows:—(a) *Power Unit.* Back of main chassis; (b) *Modulator.* Bottom panel; (c) *R.F. Units.* All inside main chassis.

It soon became obvious that it was not possible to adopt conventional ideas for the power pack and modulator if the size and weight were to be kept down. It was therefore decided to dispense with transformers wherever possible. In fact they were used for heater supply only plus one small parafeed a.f. type weighing 2½ oz. in the modulator. At the same time advantage was taken of the modern compact high capacity electrolytics to cut down on smoothing chokes. Simple half wave rectification direct off the mains was used for the low voltage supply whilst the high voltage was provided by a full wave voltage doubler. To take care of a.m. a cathode follower type p.a. screen clamp circuit was adapted to provide a form of series screen modulation.

The transmitter is intended to be used with an external isolating transformer which also serves as a station voltage regulator. Such a device is highly desirable at the writer's home where the nominal 230 volts often falls to 180 volts. The transformer can of course be hidden away in any convenient corner. If necessary it is possible to operate without an isolating transformer, but the following precautions must be taken since the chassis will be directly connected to one side of the mains:—

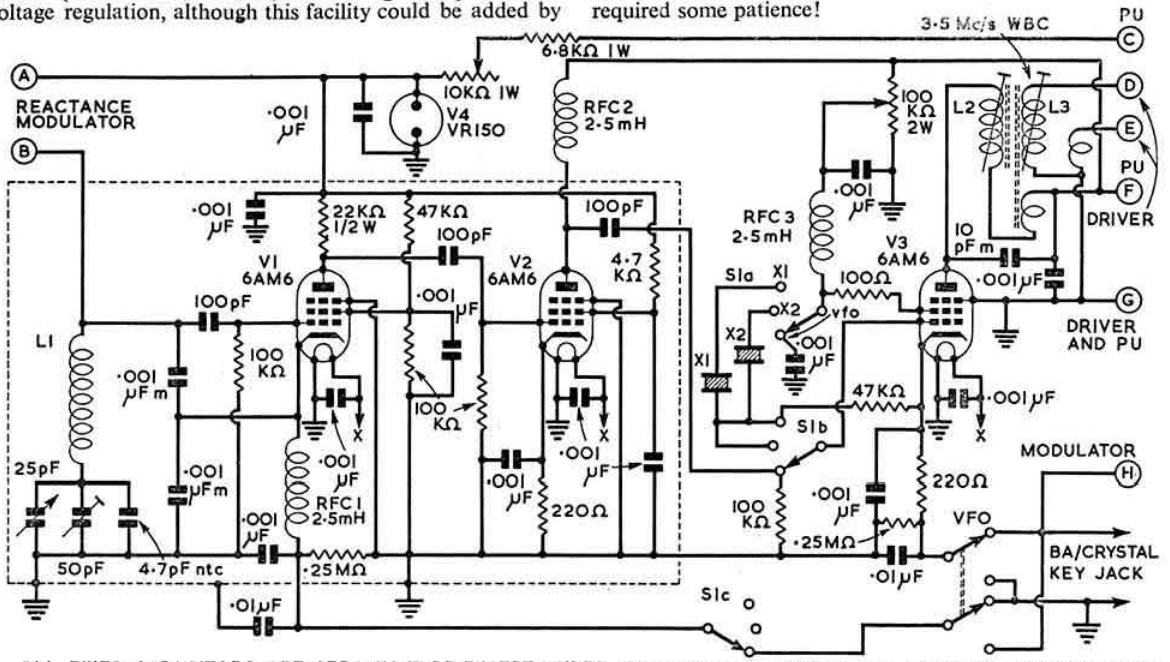
(*a*) ***The neutral (earthed) line must be connected to the chassis side of the mains input—this is essential for safety.***
(*b*) To meet the licence conditions the aerial must be isolated by the insertion of a suitable capacitor (say 0·01μF 500 volt working, non-inductive) in the inner and outer aerial co-axial connection.
(*c*) Generally the earth must be connected to the isolated side of the co-axial connection since in most areas it is forbidden to earth the neutral mains line locally.

If it is intended to operate permanently without an isolating transformer it would be better to isolate the negative 250 volt h.t. line from the chassis by returning the cathodes of the v.f.o./b.a., exciter and modulator valves to a common negative rail (preferably made of copper strip) and earth this rail at one point only in each unit through a suitable capacitor (0·01μF 500 volt non-inductive in the case of r.f. and 0·5μF 500 volt working for a.f.). A keying relay should also be used to avoid taking the live negative line outside the transmitter case. The p.a. high voltage supply negative rail is already isolated from the chassis so that if these modifications are made direct operation is permissible without resort to the precautions in (b) and (c) above. It is still desirable, however, to connect the chassis (although isolated) side of the mains input to the neutral mains line since this avoids putting the mains voltage across the isolating capacitors. However, an isolating transformer is recommended and can be constructed quite simply by stripping the secondary windings off an existing transformer and rewinding to provide a one to one ratio with additional five volt regulator taps. The turns per volt

* *Squadron Leader, R.A.F.*

can usually be determined from the existing secondary windings. About 200 watts is required to operate the transmitter, but in the author's case allowance is made for feeding an external class AB modulator and miniature receiver, which will be transformerless as far as h.t. is concerned as in the case of the transmitter. If required an isolating transformer may be purchased and a suitable (200 watt) one is made by Radiospares and can be obtained through a local retailer (this will not, however, have a range of taps to allow voltage regulation, although this facility could be added by using a small booster transformer in series with the secondary).

It was thought that some trouble would be experienced on overheating in such a compact layout. However, by arranging reasonable access for air to circulate through top and bottom panels and by placing the 829B p.a. valve right at the top of the main chassis, it was found possible to avoid hot spots. In the interests of TVI all ventilation in the main chassis was done with $\frac{1}{16}$ in. holes spaced $\frac{1}{4}$ in. apart. The drilling required some patience!



ALL FIXED CAPACITORS ARE CERAMIC TYPE EXCEPT WHERE ANNOTATED AS m MICA; ntc NEGATIVE TEMPERATURE COEFFICIENT.
ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE STATED.

Fig. 1. Circuit diagram of the v.f.o./b.a./crystal oscillator unit. Details of the wide band couplers are given in the Coil Data.

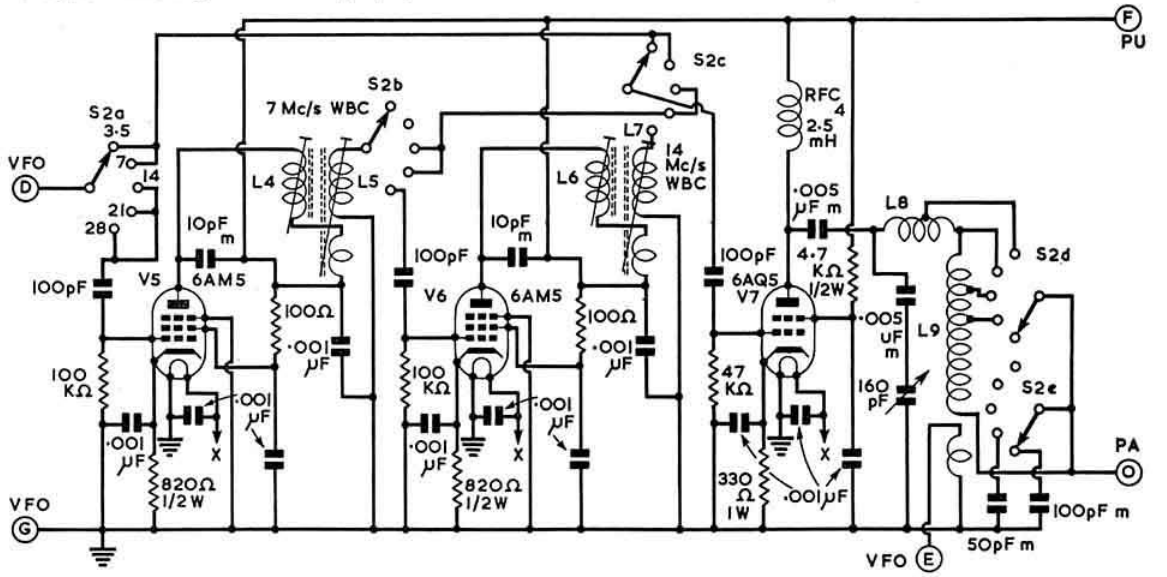


Fig. 2. The driver unit. The coils are wound as follows: L8—6 turns 18 s.w.g. tinned copper, diameter 1½ in., length 1 in., tapped at 3½ turns; L9—34 turns 24 s.w.g. enamelled close wound, diameter 1½ in., tapped at 5 and 18 turns. Winding details for L4, 5, 6 and 7 (wide band couplers) are given in the Coil Data.

V.f.o. and C.o./B.a. Unit

The v.f.o. and c.o./b.a. unit is built on a small box made of $\frac{1}{4}$ in. aluminium containing a conventional Clapp v.f.o. and isolator stage, plus a small open extension carrying a 3·5 Mc/s b.a. which can be switched in for use as a crystal oscillator. A three-position switch allows either v.f.o. or a choice of two crystals. One crystal is a band marker permanently mounted whilst the other is plugged in to allow a choice of frequency. In the original transmitter the second crystal is intended to fall in the 144 Mc/s band since the tenth harmonic can be extracted in the p.a. and used for driving a 144 Mc/s rig. A d.p.d.t. switch allows keying of either the v.f.o. or c.o./b.a. and also provides a convenient method of " spot tuning " the v.f.o. without radiating in the c.o./b.a. position. The oscillator stability is excellent and the stage may be keyed without apparent chirp up to 28 Mc/s provided an inductive keying filter is not used. If such a filter is necessary then c.o./b.a. keying gives excellent results and in most cases the v.f.o. breakthrough is insufficient to interfere with " break in " operation. Smooth drive control is provided by a potentiometer in the c.o./b.a. screen. A VR150 voltage regulator is included as an integral part of the unit. (Fig. 1).

The 3·5 Mc/s b.a. coils and the 7 Mc/s and 14 Mc/s coils in the following drive unit are copies of the G5RV wide band couplers. For convenience details of these coils are repeated here. A two turn neutralizing coil has been added to the 3·5 Mc/s coupler.

Drive Unit

The drive unit (Fig. 2) is on a small open 18 s.w.g. aluminium sub-chassis and consists of a 7 Mc/s frequency doubler, a 14 Mc/s frequency doubler and a driver stage using a 6AQ5 pi-coupled to the power amplifier. The circuitry is straightforward and requires no explanation except perhaps for the fixed capacitor in series with the pi tuning capacitor. This is an insurance against accidental shorting of the plates of the tuning capacitor since such a misfortune would put 270 volts positive on the grid of the p.a. valve whose cathode is this amount below earth. The 6AQ5 requires neutralizing on 3·5 Mc/s where it is working as a straight amplifier and this is done with a variable link neutralizing circuit. Ample drive to the p.a. is available and the tuning capacitor only requires resetting if large frequency excursions are made on 3·5 or 28 Mc/s. The pi circuit assists stability of the p.a. and provides some TVI suppression.

COIL DATA

Wide Band Couplers

The wide band couplers wound on standard Aladdin $\frac{3}{8}$ in. slug tuned formers. The primary and secondary are wound on separate formers mounted side by side. The coupling is a continuation of the primary winding wound over the earthed end of the secondary. To take advantage of stray coupling, the primary and secondary should be wound in the same sense and the link coil in the reverse sense.

Band	Wire	Pri-mary		Secon-dary	Link	Neutra-lizing
3·5 Mc/s.	38 En.	88T	10 pF.	88T	4	2
7 Mc/s.	30 En.	55T	10 pF.	55T	2	NIL
14 Mc/s.	24 En.	28T	10 pF.	28T	2	NIL

P.a. R.f. Choke

The p.a. r.f. choke is wound on a $\frac{3}{8}$ in. diameter paxolin former 3 in. long. The winding should commence $\frac{1}{4}$ in. from one end of the former, using 36 s.w.g. enamelled copper wire. A $1\frac{1}{2}$ in. winding (approximately 180 turns) is then wound on, followed by a $\frac{1}{8}$ in. space, then a $\frac{1}{4}$ in. winding (approximately 30 turns), followed by a $\frac{1}{8}$ in. space and a second $\frac{1}{4}$ in. winding (30 turns), then a space of $\frac{1}{16}$ in. followed by a $\frac{1}{32}$ in. winding (10 turns). The anode of the p.a. valve is connected to the 10 turn section, the other end of the choke being connected to h.t. positive.

Low Pass Filter Coils

The 125 m.H. filter coils may be obtained from Denco (Clacton) Ltd., 357-9 Old Road, Clacton-on-Sea, Essex.

Power Amplifier and R.f. Unit

The power amplifier plus its screen clamp valves is built as a complete sub unit on the screening panel between the drive unit and the r.f. unit. The r.f. unit is built directly on to the

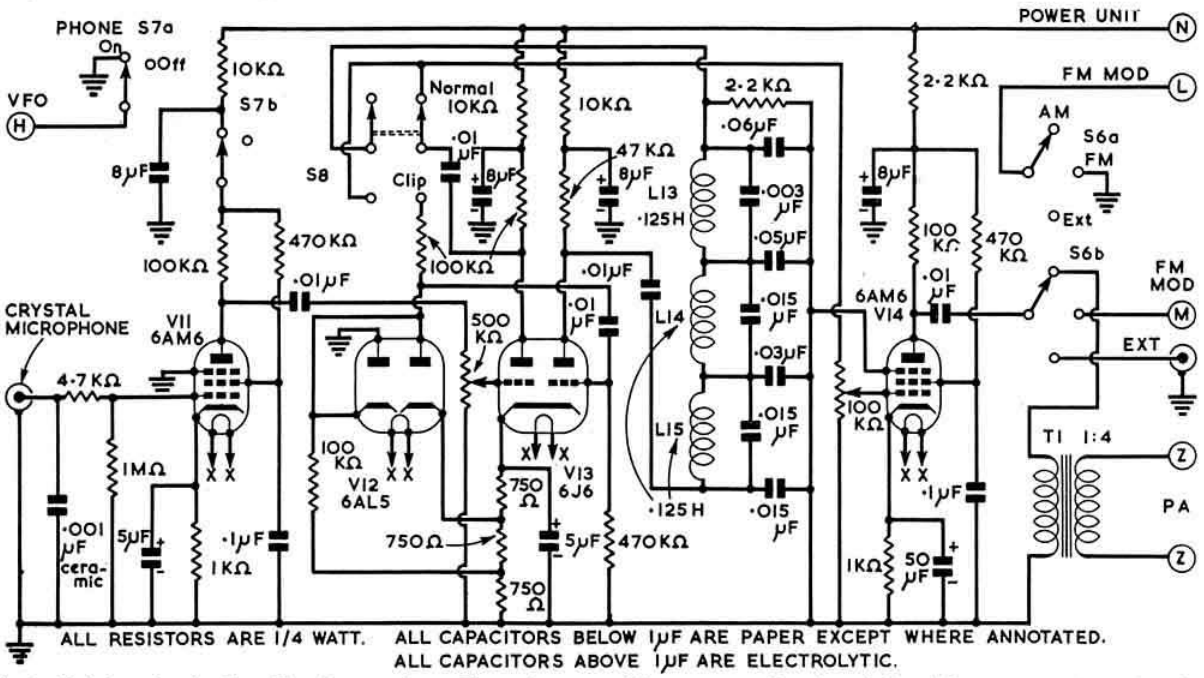


Fig. 3. Modulator for the Tom Thumb transmitter. The resistors are all $\frac{1}{4}$ watt type. Capacitors below 1μF are paper unless otherwise indicated. All capacitors above 1μF are electrolytics. The chokes used in the low pass filter are obtainable from Denco (Clacton) Ltd.

main chassis and consists of a conventional pi-tuned circuit plus an r.f. voltmeter and aerial change-over switch. An 829B parallel connected was used since it offered most power from the maximum h.t. available and was of small size. It did, however, prove somewhat difficult to "tame" particularly since the h.t. supply demanded that its cathode be put minus 270 volts below earth! It was eventually stabilized after much consumption of ale and blowing of fuses by:

(*a*) Loading the p.a. grid circuit with as much capacity as possible.

(*b*) Using a single common anode stopper (as distinct from a stopper in each anode as recommended by most authorities).

(*c*) Providing a 0·1μF (not less) paper capacitor in parallel with the normal 0·005μF mica cathode decoupling capacitor. (This cured an l.f. parasitic which could not be cleared no matter what was done to the circuit short of switching off!)

(*d*) The incorporation on 21 and 28 Mc/s of a neutralizing circuit consisting of a capacitor made of standard $\frac{1}{4}$ in. co-axial stripped of its outer braid, laid side by side for 2 in. and connected from the pi tuning capacitor back to the grid. This was switched in on 21 and 28 Mc/s only since it produced regeneration on other bands. The capacitor works in conjunction with the inductance of the anode stopper and either may be adjusted to give correct neutralizing. It is suggested that those with more space to spare may find neutralizing unnecessary. The 829B only oscillated gently before neutralization when running free of bias and with no anode loading. It is suggested that a pair of 6146's would be a better proposition for those starting from scratch.

The screen clamp circuit is a 6AQ5 cathode follower preceded by a 6C4 d.c. amplifier fed from the p.a. bias circuit. Modulating voltage is fed in series with the cathode follower grid return. With an 829B very satisfactory results are obtained and the modulation capability is around 90 per cent as checked on an oscilloscope. The potentiometer controlling the d.c. applied to the cathode follower grid provides an extremely smooth and convenient control of the screen volts. The screen clamp is not quite sufficient to reduce the input to a safe dissipation for the 829B but the additional auto bias provided by the 50 ohm cathode metering resistor does the trick nicely. The cathode follower is a device whose voltage gain is slightly less than unity but whose linearity

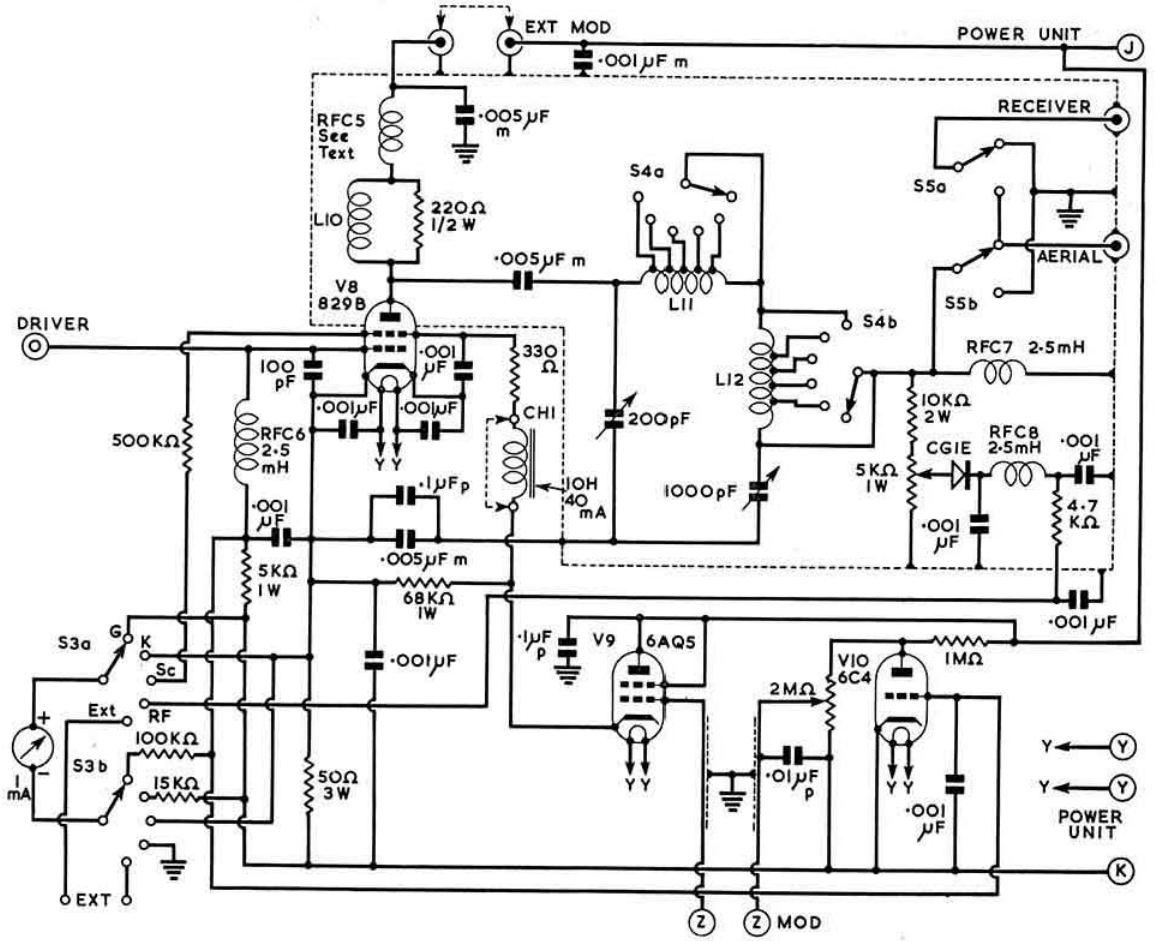


Fig. 4. The arrangement of the p.a. circuit. The coils are wound as follows: L10, 7 turns 24 s.w.g. enamelled wound on 220 ohm $\frac{1}{2}$ watt resistor; L11—5 turns 12 s.w.g. 1$\frac{1}{2}$ in. diameter, 1$\frac{1}{2}$ in. long, tapped every turn; L12, 30 turns 18 s.w.g., 12 t.p.i., 1$\frac{1}{2}$ in. diameter, tapped every 6 turns. All capacitors are shown in pF except where otherwise stated. All fixed capacitors are ceramic type except where annotated m—mica and p—paper. The resistors may all be $\frac{1}{2}$ watt type unless otherwise stated.

because of its large negative feed back, is of a high order. The voltage on the screen of the p.a. therefore closely follows the modulating voltage at the grid of the 6AQ5. A 10H 40mA choke is provided in the screen lead which is normally short circuited but which can be brought into circuit when external anode and screen modulation is used.

All metering is done in the p.a. stage and a simple system of voltage measurement is used. A 1mA full scale meter is switched in series with standard value resistors to read the grid voltage (equivalent 0-20mA), the voltage across the cathode resistor (equivalent 0-300mA) and the voltage at the screen (0-500V). In addition, the r.f. voltage across the aerial feeder can be monitored. Provision is made for using the meter externally for servicing purposes. It should be noted that the meter switch must " break " before " make " when going from " Screen Volts " to " R.F. Volts " otherwise a reverse voltage can be applied to the meter which does the movement no good. It should also be noted that the r.f. voltage potentiometer must always be turned back to zero when not in use since, when switching from band to band or making tuning adjustments, it is possible for the voltage applied to the CG1E diode to rise to a disastrous value.

The r.f. unit uses a conventional parallel fed pi-output circuit. To forestall criticism of the LC ratio on 3·5 Mc/s it is appreciated that the maximum capacitance of 200 pF is insufficient but it was the most that could be accommodated and in practice does not seem materially to affect performance. The r.f. choke is similar to that used by G5RV and details

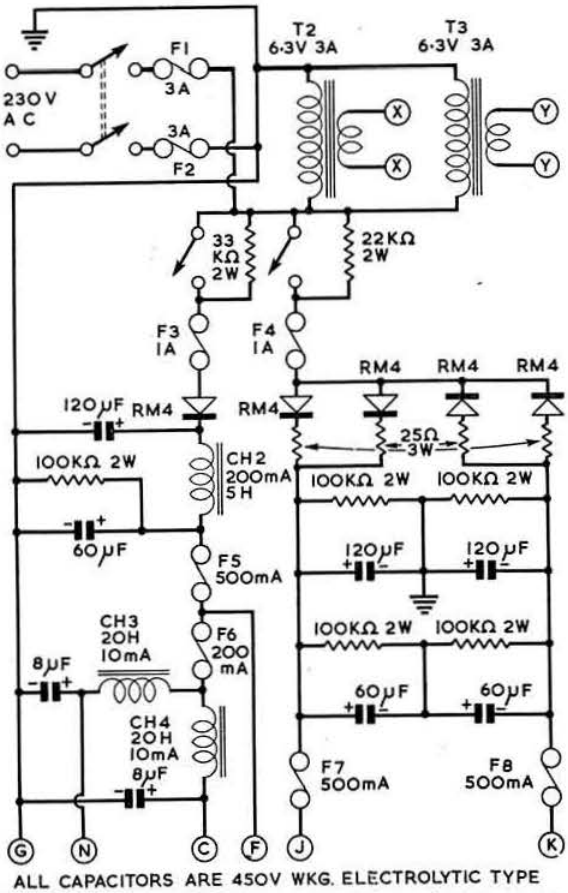


Fig. 5. The power supply. Reference should be made to the text for advice on safety precautions.

are given. In the author's case it is backed up by a standard 2·5m choke in series on the h.t. side in order to lower the natural frequency of the circuit formed by the choke and the tuning capacity to avoid l.f. parasitics which could arise.

Modulator

The modulator is straightforward and incorporates a clipper and filter described by G5RV. The filter has an excellent cut off characteristic but as might be expected has a high insertion loss. It was therefore found necessary to use a high gain output stage (Fig. 3).

The output can be switched to the a.m. modulation transformer, the reactance modulator for n.b.f.m., or to an external socket for connection to a class B modulator. The a.m. modulation transformer is a midget parafeed type which steps the a.f. voltage up to about the 250 volts peak to peak required at the grid of the p.a. cathode follower clamp valve. It should be noted that the function switch also completes the reactance modulator cathode return only on n.b.f.m. so this

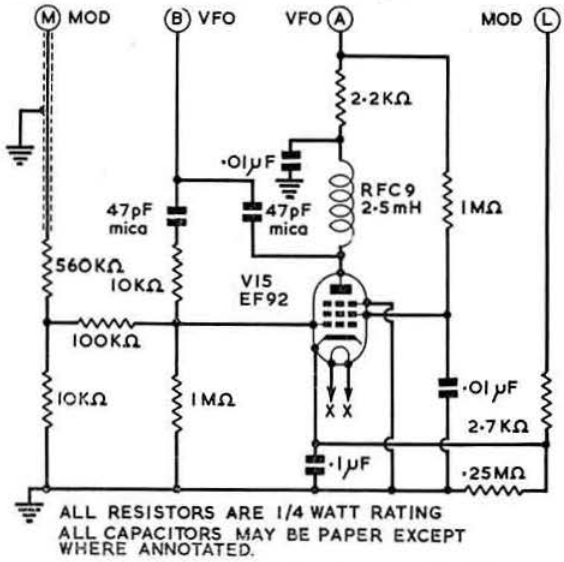


Fig. 6. The reactance modulator for narrow band f.m.

stage cannot produce unwanted frequency deviation on a.m. or c.w. An attenuator network at the a.f. input to the reactance modulator ensures that the control settings for a.m. and n.b.f.m. are not widely different. A d.p s.t. switch is used to control phone operation and this switch makes both the h.t. to the speech amplifier and the cathode return of the v.f.o. or c.o/b.a. stage. Two gain controls are provided. The first, at the output of the speech amplifier, is used as a clipping control and the second, at the grid of the output stage, is used as a modulation control.

The whole modulator unit is built on a sub chassis and mounted on the bottom panel of the main chassis. The connection from the v.f.o. to the reactance modulator is made as firm as possible by arranging for a feed-through insulator to project from the v.f.o. through the chassis directly to the reactance modulator (Fig. 6).

Power Unit

The power unit components are all mounted directly on the back of the main " U " shaped chassis. 250 volts at 125mA and 550 volts at up to 240mA is provided. Two small heater transformers are used each giving 6·3 volts at 3 amps. One feeds the p.a. and clamp valves and the other the remaining circuits. It should be noted that the p.a. heaters must not

be directly earthed since this would put them about 270 volts positive to their cathodes with consequent risk of heater/cathode breakdown.

The 250 volt line is provided by a single RM4 half wave rectifier. Because of the amount of capacity used ample smoothing is obtained with a 5H choke. Additional smoothing for the v.f.o. and modulator supplies is provided by small 20H 10mA chokes. The 550 volt line uses parallel RM4s in a full wave voltage doubler circuit. There is no smoothing choke and the regulation is surprisingly good—of the order of five per cent. As a concession to an old fashioned fear of electrolytics a fuse is provided on the input side of the filters and the h.t. switches are shunted by resistors to provide a small continuous polarizing voltage.

Operation

Lining up and tuning is conventional and is assisted by using a 110 volt 100 watt lamp as a dummy load. This lamp will light brilliantly on all bands on c.w. operation. The only controls which require special treatment are the clipping and modulation controls and these should be calibrated as follows:

(*a*) Set the clip control to a position where clipping is just starting to take place and mark " CLIP." This can be done by observation of the a.f. output on an oscilloscope or a.c. meter.

(*b*) Set the modulation control for maximum permissible modulation (about 90 per cent) and mark " A.M." Switch to n.b.f.m. and calibrate the modulation control for correct deviation on each band.

(*c*) With the modulation control set at " A.M." switch out the clipper and set the " clip " control to give the same maximum percentage of modulation as previously and mark this position " NORMAL."

It will be seen that if the above drill is carried out it will only be necessary to alter the clip control when switching the clipper in and out on a.m. or n.b.f.m. The amount of clipping may be varied to suit individual taste by advancing the clip control beyond the " CLIP " mark. No trouble was experienced in setting up the correct screen modulation conditions and although an oscilloscope was initially used the results were adequately duplicated by the following procedure:

(*a*) Tune up for normal c.w. operation using as heavy loading as possible. The screen volts should be 220 volts and the drive control should be backed off until the r.f. putput just starts to drop.

(*b*) Reduce the screen voltage to 110.

(*c*) Check the r.f. voltage to ensure there is no downward kick on the meter on modulation. The meter should remain stationary or kick slightly upwards. If it does not, the loading should be slightly increased. Be careful not to be misled by the r.f. voltage reading, however. It is possible to have the meter kicking downwards when an aerial ammeter or dummy load lamp is showing a substantial increase in average output.

It should be noted that the screen voltage for normal c.w. operation should not exceed 200 volts.

Conclusion

The results as far as actual operation is concerned have been most gratifying and so far no modifications are contemplated. Excellent reports have been received using a VS1AA aerial via a conventional aerial tuning unit on all bands using c.w., a.m. and n.b.f.m. There appears to be little difference between a.m. and n.b.f.m. as far as signal strength is concerned (remember that the power output on n.b.f.m. is four times that of the unmodulated carrier on a.m.) except in conditions of QRM when the a.m. scores heavily. The use of heavy speech clipping certainly seems to turn the 60 watts of efficiency modulated a.m. into quite a potent signal.

At present the writer is torn between enjoying the delights of operating a new toy and pressing forward with plans of a companion miniature receiver in anticipation of acquiring a new DX call! In addition a lightweight transportable aerial is under construction consisting of a ground plane switched for 28, 21 and 14 Mc/s and top loaded for 7 and 3·5 Mc/s. Mercury tilt switches are used and the whole thing packs away into a half-pint sized case.

New Method of Radio Telegraph Reception

IN telecommunications circles it is well known that errors can occur in messages transmitted by radio telegraphy. Consequently, some messages, or parts of them, have to be re-transmitted so that the errors can be eliminated before the message is delivered.

The problems of radio telegraph reception have for some time been studied intensively at the Post Office Research Station, and, as a result, a new technique has recently been developed which, it is believed, will appreciably reduce the number of errors that occur in transmission.

In this new technique, frequency-shift keying is still used, but whereas in conventional equipment used for the reception of such signals a limiter and discriminator are employed, the new method makes use of the fact that all the signalling intelligence *is impressed both on the marking and spacing frequencies*. In other words, the information in the mark-channel duplicates that in the space-channel. Consequently, if all the available intelligence is derived independently from each frequency and then combined, a double-diversity arrangement is obtained. Frequency selective fading conditions often cause trouble on radio telegraph circuits, but using the new arrangement they can be turned to advantage —if, for example, the signal on the marking frequency has faded, there is a second chance of obtaining the required information from the spacing frequency. If, in addition, double-space diversity reception is combined with the new technique, the advantages of quadruple-diversity reception are obtained.

Extended trials of this technique are being made on one of the London-Australia telegraph circuits.

New Mullard Educational Service Publications

SIMPLE Valve Measurements and *Simple Transistor Measurements* are intended for use in schools and technical classes. The former publication contains suggestions and instructions for a number of experiments for the examination of the properties and behaviour of thermionic valves. These experiments include measurements from which the characteristic curves of various types of valve can be plotted. The latter publication contains suggestions and instructions for the examination of the properties and behaviour of junction-type transistors.

Both publications are available free on application to Mullard Educational Service, Mullard House, Torrington Place, London, W.C.1.

VE3EMG

OLD friends of Ken Chapman (ex-G3AFZ), one time C.R. for Leicestershire, will be interested to hear that he is now licensed as VE3EMG. His address is 66 Mains Street, Kirkland Lake, Ontario.

Can You Help?

● J. N. Carter (B.R.S. 6174), 12 Ferry Path, Cambridge, who wishes to obtain information on the Army 10 Set and its magnetrons?

● D. K. Powell (B.R.S.20277), 67 Chandos Street, Hereford, who requires information on the following ex-Government valves: 4E27/257B, 5D 21-715B, CV22? They appear to be tetrode or pentode type transmitting valves. All letters will be answered and postage refunded.

● J. W. Swinnerton (G2YS), 29 Station Road, Filey, Yorks, who wishes to obtain the manual for the Panoramic Adaptor SA-1 (BC1031A) also known under the W.D. number TM11-446 ?

The Reception of F.M. Broadcasting

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

THERE can be no doubt that the design and adjustment of f.m. receivers is more complicated than that of a.m. receivers. Results have shown that this complication is justified. It is useful to divide the service area of a transmitter into two arbitrary types. Definitions of the areas given by P. A. T. Bevan [1] are as follows:—

First Class Service Area. Impulsive interference from 50 per cent of motor cars is imperceptible; of the remainder, occasional cars may produce interference classed as " slightly disturbing."

Second Class Service Area. The average level of interference from at least 50 per cent of motor cars is never graded as worse than " perceptible." Occasional cars give rise to interference considered as " disturbing."

The required field strengths to provide these two reception qualities are shown in Table I for f.m., for a.m. with efficient noise limiting and for a.m. without noise limiting.

Table I

System	First Class	Second Class
F.m.	1 mV/m	250 μV/m
A.m. with noise limiter	3 mV/m	1 mV/m
A.m. without noise limiter	10 mV/m	3 mV/m

These figures show clearly that f.m. provides a larger total service area for a given transmitter power. The extent of each area depends on the transmitter site and on the surrounding country. For Wrotham the first class service area lies roughly within a circle from Colchester, through Hitchin, Aylesbury, Reading, Petersfield, Eastbourne, Rye, Margate and across the North Sea back to Colchester. The second class area goes about 20 miles farther out. The field strength measurements refer to a receiving aerial height of 30 ft.

The Aerial

It must be emphasized that whatever gain is obtainable from the aerial is a saving in expense and complication on the receiver side. It is agreed that a high gain aerial for Band II is becoming rather cumbersome, but such an aerial inside the roof at 30 ft. with a feeder running inconspicuously to the ground floor can save one or two valves when comparing it with the proverbial "piece of string," and it is cheaper in price and maintenance than additional amplifier stages. Directivity with a consequent reduction of interference is a further advantage. Fig. 1 gives the dimensions of one to four element Yagi aerials. They are all cut for 91·3 Mc/s and there is not much to be gained by adjusting them for the individual channels.

The R.f. Stage

Almost universally the literature emphasizes the desirability of an r.f. stage despite the fact that the gain is small and a much higher gain could be obtained if the valve were used as an i.f. amplifier. The reasons given are (a) a better signal to noise ratio, (b) reduction of image channel and i.f. breakthrough and (c) reduction of oscillator radiation from the aerial. As to point (a) some explanation is called for, because noise, the level of which is determined by the first valve, is predominently amplitude modulated and one of the merits of f.m. reception is that it is immune to amplitude modulation. It must, however, be realized that noise occurs simultaneously over the entire bandwith of the discriminator. If the amplitude of the noise is comparable with the signal amplitude it will interfere with the proper functioning of the discriminator and a " hiss " becomes audible. For a good f.m. receiver the field strength limit below which the " hiss " is audible is about 50 μV/m. For an equally good a.m. receiver the limit is about 900 μV/m, which again proves the superiority of the f.m. principle [1]. Point (b) becomes important if the field strength of the desired signal is low. Point (c) is governed by recommendations made by the British Standards Institution and by other efforts to combat accidental radiations of all kinds. It is not only the listener, the viewer and the various other services who are troubled, but also the amateur with his sensitive receivers who suffers most from interference. Therefore, he has every reason to support such a course.

The r.f. stage used in the circuit (Fig. 2) to be described is built round a Mullard ECC85 double triode, which has been designed for f.m. reception. The valve has an internal screen between the two triodes in an effort to reduce oscillator radiation. One half works as a grounded grid r.f. amplifier and the other as an additive mixer. The conversion gain of this mixer is about 46 and with a suitable step-up between the first anode and the mixer grid a total gain of 200 to 300 is achieved from the aerial to the grid of the i.f. stage.

The I.f. Stages

The general practice to use an i.f. of 10·7 Mc/s and the higher oscillator frequency has been adopted. No contribution will be made to the dispute whether this is the right thing to do under conditions prevailing in the U.K.

The required number of i.f. stages depends on the local field strength. The receiver input voltage in millivolts from

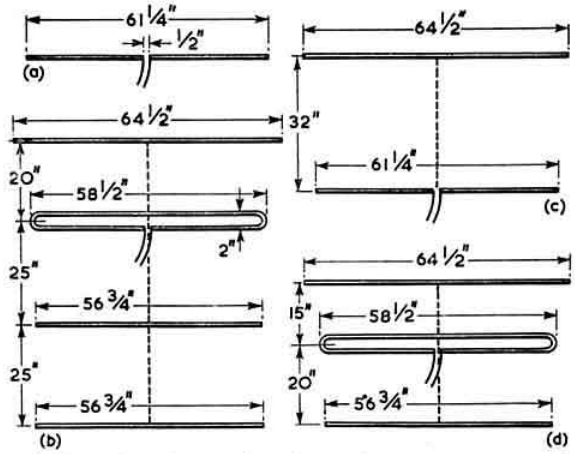


Fig. 1. Dimensions of one to four element Yagi aerials for Band II. The rods are all ¼ in. outside diameter. The feeders are the flat balanced type, of nominally 70 to 80 ohms impedance.

* *195 Woodford Avenue, Ilford, Essex.*

a plain dipole will be approximately half the field strength figure in mV/m. This approximation holds good for Band II frequencies only because the wavelength in metres happens to be almost equal to π [2]. The minimum voltage for satisfactory operation of the discriminator is 1000 mV. Hence, if the field strength is say 8 mV/m, a gain of 250 from the ECC85 should be sufficient to require no i.f. stage. If the quoted standard components are to be used, 20 mV/m or some gain from the aerial will be an advantage because the matching from the mixer to the discriminator will not be at its best. RDT in Fig. 2 would then take the place of IFT1 and C15 become C9. The resulting receiver would have only two valves, i.e. V1 and V3. The use of germanium diodes is not recommended, because they are more difficult to adjust than is usually realized.

The circuit shown in Fig. 2 has one i.f. stage and utilizes a high slope EF91 working at its maximum gain. This is sufficient for normal conditions within the first class service area. Care must be taken to earth the central screen of the valveholder to ensure stability.

In difficult cases and in the second class area two i.f. stages are necessary. In this application, two EF91s in cascade have a tendency to become unstable and 6BJ6s are more suitable. Their slope is less, but so is their grid to anode capacity. Their input impedance is higher, and on balance the gain from two such valves is better than can be obtained safely from two high slope ones. It should be remembered that the pin connections for the 6BJ6 are not the same as for the EF91. Hence they are not interchangeable in any way.

The circuit for a two stage amplifier is shown in Fig. 3. The cathode bias resistance is so small that nothing is to be gained by shunting it, hence the by-pass condensers are left out.

The Discriminator

The ratio detector type of discriminator is used almost universally because it is insensitive to a.m. without a preceding limiter over a wide range of input voltages, and it gives a high output. It can be used either as a balanced or unbalanced type. The latter is gradually gaining in popularity because it requires less components and is easier to adjust. Its working is more difficult to explain than the case of the balanced type and reference should be made to the literature [3]. Resistors R8 and R9 serve to provide an easy means for finding the middle of the diode load. They should be as near equal as possible though the absolute value is not very important.

Construction

Referring to Fig. 2 the numbers associated with V1 indicate which purpose the otherwise identical halves of the valve serve. The input circuit is screened from the rest of the components associated with V1 by a strip of tin sheet, 1 in. wide, which is soldered to pin 2, to the tubular central screen

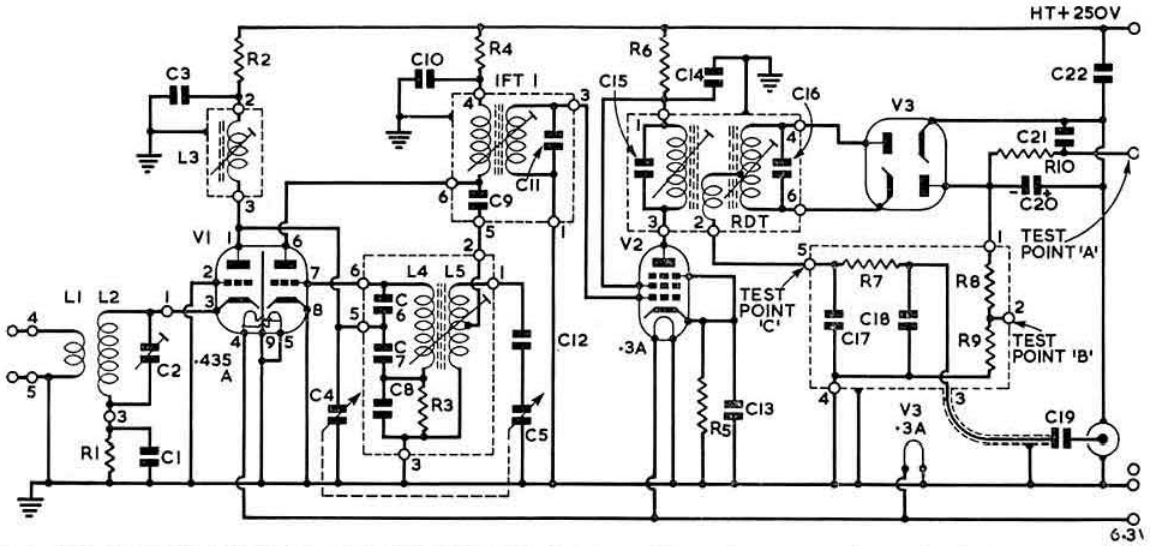


Fig. 2. The complete circuit of the f.m. tuner with one i.f. stage. The values of the various components are given in the components list.

COMPONENTS LIST

C1, 13, 23, 24, 0·002μF.
C2, 3-30pF Philips trimmer.
C3, 10, 14, 18, 0·001μF.
C4, 5, 4-27pF per section two gang variable (Jackson Bros. type U.102).
C6, 20pF silvered mica.
C7, 10pF silvered mica.
C8, 7pF silvered mica.
C9, 11, 15, 16, 50pF (parts of i.f. transformers).
C12, 50pF silvered mica.
C17, 300pF.
C19, 0·05μF.
C20, 2μF 150V wkg.
C21, 50pF feed-through type.
C22, 25, 0·01μF.
IFT1, 2, Maxi-Q type IFT11/10·7 (Denco (Clacton) Ltd.).
RDT, Maxi-Q type RDT1/10·7 (Denco (Clacton) Ltd.).
L1, 2 turns 34 s.w.g. enamelled copper, wound over L2 with a layer of paper in between.
L2, 4 turns 34 s.w.g. enamelled copper, close wound on Aladdin PP5938 former (no core).
L3, 2$\frac{1}{2}$ turns 22 s.w.g. tinned copper spaced 2 wire diameters on Aladdin PP5938 with can and dust iron core type 5940.
L4, 5, see text (wound on Aladdin former PP5938, with top plate PP5939 and dust iron core PP5940).
R1, 220 ohms $\frac{1}{2}$ watt.
R2, 6, 1000 ohms $\frac{1}{2}$ watt.
R3, 22K ohms $\frac{1}{2}$ watt.
R4, 27K ohms 1 watt.
R5, 150 ohms $\frac{1}{2}$ watt.
R7, 47K ohms $\frac{1}{2}$ watt.
R8, 9, 20K ohms $\frac{1}{2}$ watt $\pm$ 1 per cent.
R10, 10K ohms $\frac{1}{2}$ watt.
R11, 12, 68 ohms $\frac{1}{2}$ watt.
R13, 14, 33K ohms $\frac{1}{2}$ watt.
R15, 16, 2·2K ohms 1 watt.
All resistors 20 per cent. tolerance type unless otherwise specified.
V1, ECC85 (Mullard).
V2, EF91 (Mullard).
V3, EB91 (Mullard).
V4, 5, 6BJ6 (Brimar).

of the valveholder, and to pin 5, so that it forms an apex which protects pin 3. This is indicated in the general layout, Fig. 4, which shows the arrangement of the principle components on the underside of the chassis. L1, L2 lie on the upperside of the chassis and do not have to be screened.

Coil L3 has a marked effect on the gain between anode 1 and grid 7. If optimum performance is wanted, it pays to experiment with the inductance by changing the wire gauge or the spacing of the turns to get it right rather than to rely entirely on the slug. This coil must be covered by a screening can as is indicated by the broken line. The numbers associated with any of the coils refer to the eyelets of Aladdin formers.

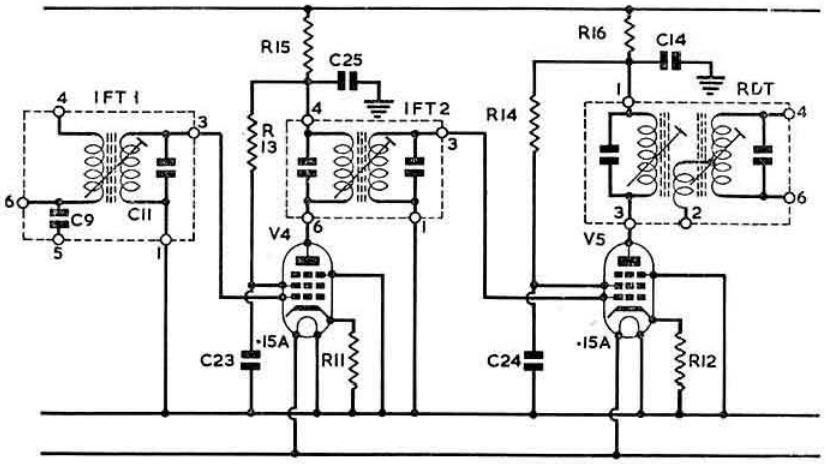


Fig. 3. Circuit diagram of the two stage i.f. amplifier employing 6BJ6 type valves. Further information is given in the components list.

To wind the oscillator coils L4, L5 prepare an Aladdin former and top panel by providing busbars of 20 s.w.g. tinned wire for eyelets 1, 2, 5 and 6. Furthermore, twist the wire ends of R3 and C8 together and mount them between the panel and eyelet 3, as shown in Fig. 5(a).

For L5, cut a 6 in. length of 26 s.w.g. double silk or double cotton covered copper wire, solder one end to bar 1 at a height of $\frac{5}{16}$ in. above the eyelet and thread through the bars to wind close turns in an anti-clockwise direction when looking at the bottom of the former. As the wire passes bar 2 for the second time scrape the insulation away, spot-solder it to the bar and carry on winding. Put one more complete turn on and as it comes round again to bar 3 cut it off, press the turns tightly together and solder the end to the eyelet side of R3C8. Fig 5 (b) shows diagrammatically the number of turns which amounts to about $3\frac{1}{2}$ effective turns.

For L4 cut a 6 in. length of 36 s.w.g., d.s.c. or d.c.c. copper wire, solder one end to the panel side of R3C8, push it through the bars, lead down right next to L5 and fix it with a tiny piece of tape. Start winding adjacent to L5, without any spacing, in the same winding sense, put three complete close turns on and as the wire approaches bar 6 for the fourth time, cut it and solder it to bar 6. The total number of effective turns will again be about $3\frac{1}{2}$. Secure the windings with narrow strips of tape (preferably not the transparent acetate tape). Solder C6 into position between bars 5 and 6, and C7 between bar five and the panel end of R3C8. The whole assembly is then put into its screening can.

The Maxi-Q i.f. transformer IFT1 is supplied with the condenser C9 soldered across the primary winding which terminates in eyelets 4 and 6. C9 has to be carefully unsoldered from bar 4 and the resulting loose end fed out through the free eyelet 5.

The de-emphasis filter C17, C18, R7 together with the diode load R8 + R9 is mounted on to an Aladdin former and put into a screening can. This is not necessary, but it is in keeping with the rest of the circuit which is built up of a

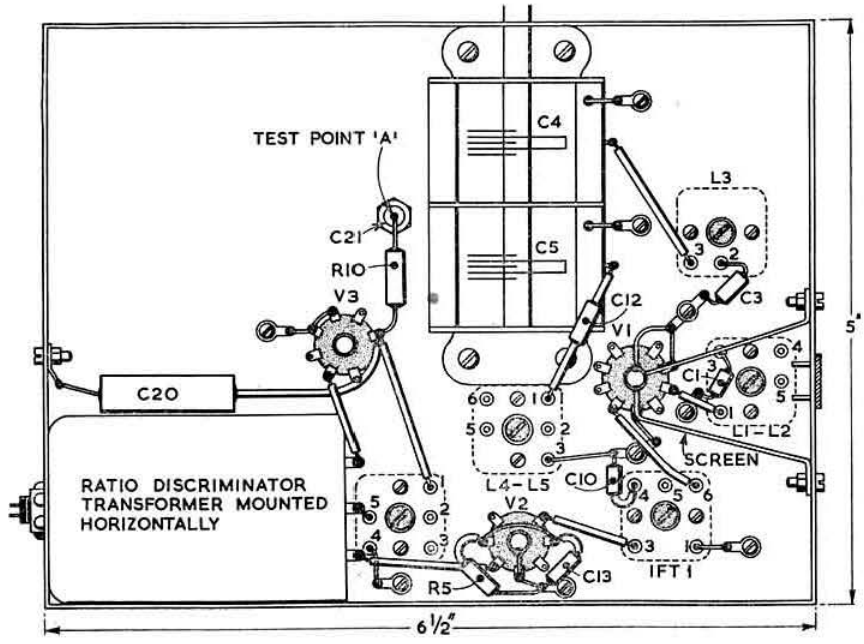


Fig. 4. Under-chassis layout of the principal components in the f.m. tuner.

number of self-contained units, leaving only wire connections to the valveholders and a few odd components on their own. This makes for easy assembly and tidy appearance.

The h.t. requirements for the tuner with one i.f. stage are 28 mA and with two stages 40 mA at 250 volts. The heater requirements in both cases are 6·3 volts at 1·035 amps.

The complete tuner with its own power supply can be built on a chassis $6\frac{1}{2} \times 5$ in.

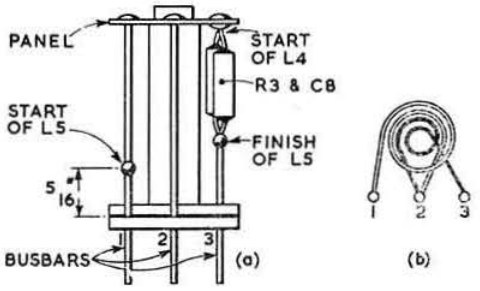


Fig. 5. Method of winding the oscillator coils.

Alignment

A voltmeter, preferably with a sensitivity of 20,000 ohms per volt, is connected from test point A to the chassis. A signal, which may be f.m. from the transmitter or c.w. from a signal generator, is applied to L1 and the slug in L5, adjusted until a reading appears on the meter. The slugs in the i.f. and the ratio detector transformers are adjusted for maximum reading. If a signal generator is available it is advantageous to adjust the i.f. circuits to 10·7 Mc/s, but this is not absolutely necessary. The meter is then transferred to read between test points B and C. The reading could be either positive or negative. The secondary of RDT is adjusted to make this reading nil. That is all there is to be done to the ratio detector and the i.f. stages.

The Third Programme signal should then be selected and the slug in L5 adjusted to bring it into the middle of the tuning scale. C2 is adjusted and then L3 trimmed as was described when dealing with the construction.

Results

At the writer's home which lies near the 20 mV/m contour, a plain dipole at 15 ft. above ground in a built-up area, working into the tuner with one i.f. stage, produces approximately 17 volts between test point A and chassis on all three programmes. A 4 element Yagi produces 65 volts. The tuner with two i.f. stages works quite well with a foot of wire.

References

[1] "Some Aspects of V.h.f. Sound Broadcasting and F.m. Broadcast Stations," P. A. T. Bevan, *Electronic Engineering*, March 1955, pp. 96-101.

[2] "Design for an F.m. Tuner, S. M. Amos and G. C. Johnstone, *Wireless World*, April 1955, pp. 159-163.

[3] "The Ratio Detector," M. R. Murray, *Wireless World* May 1955, pp. 245-246.

I.G.Y. NEWS

SPUTNIK II

By G. M. C. STONE (G3FZL)*

R.S.G.B. I.G.Y. Co-ordinator

AS announced briefly in last month's *I.G.Y. News*, the release of Sputnik II occurred before final amateur participation preparations had been made. From rumours in the newspapers and elsewhere, November 7 had been "decided" because this coincided with the 40th anniversary celebrations in Russia of the October Revolution.

Two weeks before this date a meeting was held at The Royal Society (the National I.G.Y. co-ordinating body) following a request made by the writer at a previous meeting, to decide what the amateur could do to assist the official bodies engaged on the radio aspects of earth satellites. The outcome of this meeting was two-fold. Firstly, a definite amateur programme covering *Sputnik II* was decided and secondly, contact was made with the British Astronomical Association who have an amateur group interested in radio astronomy. It was agreed that amateur participation would be useful in the following ways:

(i) To provide several Doppler tracking groups to operate for the first 36 hours after the release of *Sputnik II*.
(ii) To record field strength, fading rates and telemetering.
(iii) To listen for weak beyond-the-horizon signals.

The first working meeting with the B.A.A. was held at Norwood Technical College on October 26, when the detailed arrangements for the organising of about a dozen Doppler groups were made. These groups were to be as follows: B.A.A.—Liverpool, Halifax, Penrith, Glasgow, Buckingham, Clacton and Chelmsford; R.S.G.B.—G8FC (R.A.F. A.R.S. Locking), G3ENY (Bridgnorth), G2FNI (Wallasey), GM3EGW (Dunfermline), G3FBA (Bath), G3GDR (Watford) and G5BD (Mablethorpe).

R.S.G.B. groups would undertake the dual responsibility of Doppler tracking and handling of Doppler results from nearby B.A.A. groups. A skeleton network was planned on November 2 and an information sheet quickly posted to all likely participants. Having made these plans, a quiet weekend of final preparations was envisaged.

What Actually Happened

G3FZL was alerted at 10.30 a.m. the following day, November 3 by the organizer of the B.A.A. groups who had returned to his home at Herne Bay following the Saturday meeting. Groups who were known to be ready were also alerted.

The London centre was not ready. However, G3IIR soon got under way and contacted G8FC on 3·6 Mc/s. A joint station G2FKZ/A and G3FZL was established at the QTH of G3FZL. This became the main centre as the B.A.A. co-ordinator (John Heywood) arrived to do orbit calculations.

However, the problem of communications was very much more difficult than anticipated, but contact was maintained with G8FC and G3GDR. Relay contact to the north was made via the Wirral A.R.S. (G3CSG) and G3ERN on 1·8 Mc/s later in the evening and information regarding observations obtained.

Orbit times were collected from the various centres and, following the discovery of quite wide discrepancies, a new set of orbit times in the form of a bracket between the limits of various times was calculated and the information was compared with the B.B.C. at Tatsfield and also telephoned to Broadcasting House for transmission at the regular I.G.Y. time of 11.03 p.m.

During the Monday and Tuesday very good Doppler results were telephoned direct to Norwood Technical College

* *10 Liphook Crescent, Forest Hill, London, S.E.23*

from G3ENY, G8FC, G3GDR and a B.A.A. group at Buckingham under G3HMO (see *Short Wave Magazine*, November 1957) for onward transmission to the Mullard Radio Astronomy Laboratory, Cambridge.

G2FNI would have been ready by the Tuesday; G3FBA and GM3EGW had great difficulties because of extreme mains voltage variations whilst other Doppler groups were non-starters.

In conclusion the Co-ordinators wish to thank all those taking part for their magnificent response at very short notice.

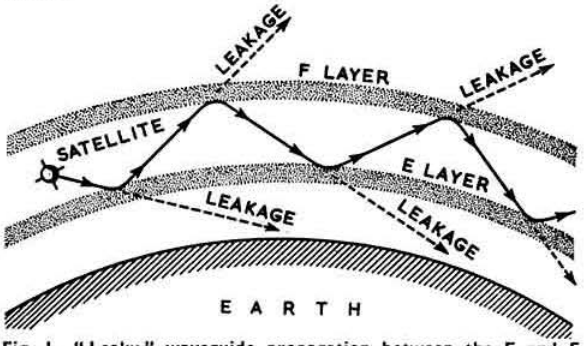


Fig. 1. "Leaky" waveguide propagation between the E and F layers of the ionosphere. The drawing is diagrammatic and not to scale.

Future Satellite Plans

It is not yet certain whether further amateur Doppler tracking will be required in future Russian satellite releases. The official bodies in this country are now very much better organized with elaborate Doppler and interferometer tracking equipment established at a number of places.

Those interested in the details of the technical aspects of satellite tracking are referred to several excellent articles which appear in the following magazines: *QST*, November 1957; *Nature*, November 2; *Short Wave Magazine*, November 1957, and the *Wireless World*, December 1957. For those who can read Russian, a number of articles covering the Soviet satellite programmes have appeared in *Radio* (Moscow). This magazine is available in the Patent Office Library in Holborn.

The operating frequencies, although stated by the Russians to be 20·005 and 40·010 Mc/s have been found to be 20·005 and 40·002 Mc/s. The latter frequencies have also been quoted in *Radio* and it is to be presumed that these will be used in future in spite of the international agreement to use 108 Mc/s for telemetering purposes. However, the choice of frequencies is extremely good for ionospheric research and it is in this that the Russian scientists are particularly interested.

Beyond-the-Horizon Propagation Theories

Last month a possible explanation of beyond-the-horizon signals from a satellite was given. Another theory has since been advanced to explain round-the-world transmission that has also been observed. In fact, there have been reports of signals from *Sputnik I* being received round the world in both directions at once with a resultant heterodyne between the two signals. This is because the differing relative velocities give rise to different Doppler shift frequencies. It has been observed for some time that round-the-world signals common on h.f. bands are very much stronger than expected. This is especially noticeable in the case of the satellite since the transmitter is of such low power.

The new theory is that propagation takes place with the *E* and *F* layers acting as the boundaries of a leaky waveguide. Such propagation, as shown in Fig. 1, would result in signals being transmitted round the world with comparatively small attenuation with signals "leaking out" all the way round. This would explain the reception of satellite signals for very long periods and in certain circumstances for the continuous reception during an orbit. The same theory could apply to signals transmitted from points on the earth as it would be possible for signals radiated in a favourable direction to be "trapped" in the leaky waveguide. The attenuation in this mode is likely to be about 10-20db and this means that long path signals may well cause severe phase distortion with short path signals and, in fact, such occurrences are quite common.

Such theories demonstrate the value that satellites carrying radio transmitters can be in ionospheric propagation research.

Sussex R.N.V.R.

MR. J. Dickson, G2HV states in a letter to the Society that the Sussex division of the Royal Naval Volunteer Reserve will welcome enquiries from men over 16 years of age who are without National Service obligations. The activities available include the traditional seamanship arts, wireless telegraphy, mechanical, electrical and radio engineering. *H.M.S. Sussex* offers the opportunity to practise and extend hobby and professional interests under adventurous conditions while playing a vital part in the defence of the country.

The R.N.V.R. includes the Wireless Reserve which was formed as a result of R.S.G.B. initiative and advice in 1932. A number of senior officers of *H.M.S. Sussex* have graduated from telegraphist R.N.V.(W).R. A telegraphist R.N.V.(W.)R. is entitled to the loan of a communication receiver and a simple transmitter for establishing a home station.

Those interested are asked to write to the Commanding Officer or to call at *H.M.S. Sussex*, Kingsway, Hove on Monday or Tuesday evenings or at Bridge Street, Newhaven on Monday or Thursday evenings.

Ham Spirit

MR. J. D. Loader (G3HVO) whose address is "The Caravan Site," Spring Hill, Balderstone, near Rochdale, Lancs., would like to hear from a needy, invalid, or bedridden amateur to whom a six band TVI-proof table top transmitter will bring some hours of happiness. Mr. Loader is willing to instal the set should the owner be unable to do so. G3HVO is changing over to s.s.b.

B.B.C. Test Tones

MEMBERS in the Home Counties may find the B.B.C. test transmissions from the Wrotham f.m. station on 91·3 Mc/s (the Third Programme frequency) of interest. From 16.46 to 17.10 (clock time) on Thursdays, the transmission is modulated with tones of various frequencies.

ZB1 Contacts

TO help those who need a contact with Malta for a new country worked, the Malta Amateur Radio Society is to hold an Activity Weekend during the first two days of February 1958. As many ZB1 stations as possible will be active on the various DX bands during that period.

British Double Century Award

FULL details of this new award may be obtained from GW8WJ upon receipt of a S.A.E. or I.R.C. Brief details are that one must work 200 U.K. counties, using three bands, no more, no less. A natural division of scores would be about 80 counties on 160m, 70 on 80m and 50 on 40m. European and overseas amateurs would, of course, use the higher frequency bands.

GC2CNC is responsible for the award which is sponsored by the Tops Club.

Auroral Propagation

Basic Information for the Radio Amateur

By J. F. SHEPHERD (GM3EGW)*

RADIO amateurs have always been interested in the propagation of radio waves and particularly propagation which provides unusual characteristics. It is therefore to be expected that during the I.G.Y., when warnings of solar flares are readily available, more interest than usual is concentrated on auroral propagation. The present article has been prepared by scrutinizing various papers written by experts in auroral research. The author does not claim that the result of his reading is either new or authoritative but hopes that the following notes may help readers to understand one of the most fascinating aspects of Amateur Radio.

> "*The cauld blae North was streaming forth,*
> *Her lights, wi' hissing eerie din.*"

So wrote Robert Burns. It is presumed that Burns had never heard 2m signals "bouncing off the aurora" but it gives quite a good description of what amateurs can hear if they beam on to the Northern Lights.

Early Research

It was Gassendi, a French physicist, who first gave the name to the aurora borealis in his book *Physics* in 1621. Before that it had often created not only interest but fear and foreboding in the minds of the people of Central Europe. In Scandinavia where auroral displays are much more frequent, the lights held no such terror and as far back as the middle 13th century Norwegian chroniclers had recorded the thoughts of men as to the origin of the lights. By the start of the 18th century the connection between the displays and the magnetic field of the earth had been established.

In 1784 Henry Cavendish established by calculation the height of the aurora to lie between 52 and 71 miles. Biot, in 1817, ascertained that the light was unpolarized and therefore not reflected. Kristian Birkeland under laboratory conditions attempted to demonstrate how aurora was formed by exposing a magnetised sphere, coated with a fluorescent substance and simulating the earth, to a stream of cathode rays. Carl Störmer who had just been appointed Professor of Pure Mathematics at Oslo was so interested in the results that he has dedicated his life to research on aurora. He devised a network of observing stations which took simultaneous photographs of the heavens so that by mathematical computation the height and position of the various aspects of aurora could be determined. So far, more than 10,000 usable sets of photographs have been made.

Similar work has been done over the last ten years by a team operating in Scotland under the leadership of James Paton of the University of Edinburgh. Extensive research has also been carried out in North America where radar techniques are being employed to determine the area from which radio reflections take place.

Location

In two zones which girdle the earth about 23° from the north and south magnetic poles there is an almost continuous area of weak aurora (Fig. 1). During periods of sunspot maximum the area of luminescence may however spread for several hours far from its usual area and may be seen almost to the magnetic equator. When the aurora is weak it appears as a grey white light but when its luminosity increases above the threshold of colour perception the observer may see flaming streaks and arcs in many colours.

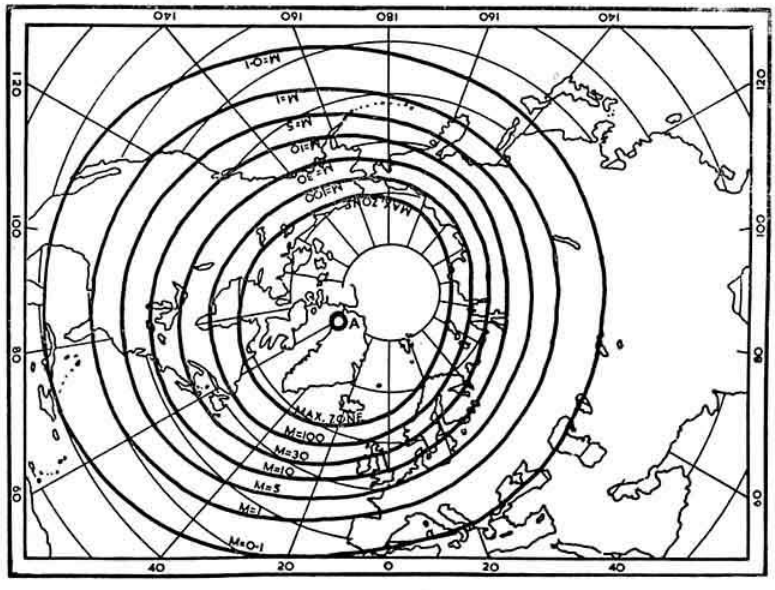
Types of Aurora

When a solar flare occurs ultra-violet light is emitted in great quantity. This ultra-violet on reaching the earth causes a fade-out of short wave radio signals and at the same time a sudden disturbance of the earth's field. This occurs on the sunlit side of the earth about eight minutes after the flare commences. After about 24 hours there starts arriving at the earth a corpuscular stream consisting of ions and electrons in more or less equal numbers. Obviously if the stream were comprised of, say, only electrons their mutual repulsion would scatter the stream. It is probable that the electrons and ions are those of hydrogen, helium and magnesium though some sources mention the elements sodium or calcium. These particles approach the earth at the comparatively slow speed of 1500km per second.

The emission of auroral light is thought to result from the excitation and ionization of atmospheric atoms and molecules directly by the primary particles in the solar stream or by secondary electrons ejected during their passage through the atmosphere. It is now generally agreed that every great aurora has its origin in a solar flare.

There is however another type of aurora in which no great "flaming"

*8 Garnock Hill, Dunfermline, Fife.



The geographical distribution of auroral frequency in the Northern Hemisphere (after Fritz). The heavy lines connect places having the same auroral frequency in nights per year (M). A is the magnetic axis point. *(Reproduced from "The Sun and Its Influence" by permission of Routledge and Kegan Paul Ltd.)*

is observed; instead there is only a diffused arc. This tends to occur when there are sunspots near the central meridian but when there is no apparent " solar flare." It is thought that in this case an area of the sun which Bartels calls " magnetically active " emits over a long period a particle stream. This area, since it must be near the meridian, produces magnetic storms and aurora during each revolution of the Sun—approximately 27 days.

It therefore appears that there are two types of aurora

(1) The great aurora associated with intense solar flares which produce " nascent " streams of particles.
(2) A quieter type of aurora associated with " magnetically active " areas producing a " mature " stream of particles.

The first type causes a sudden magnetic storm of great intensity, the second, with a 27-day cycle, produces magnetic storms which are neither as intense nor so rapid in their onset.

During the periods of maximum sunspot activity, such as we are now experiencing, great aurora appears quite often and has been observed to within 10° of the magnetic equator. Scientists investigating this type are particularly anxious to have details of the sightings of aurora in low magnetic latitudes. However during years of minimum sunspot activity there is an unexpectedly high incidence of aurorae of the second type as far south as geomagnetic latitude 58° and even 55°. The maximum of aurorae of this type seems to occur one or two years after sunspot maximum.

Height

As mentioned earlier, Cavendish calculated the height of the aurora to lie between 52 and 71 miles above the earth. The work of Störmer in Scandinavia, Paton in Scotland and others in North America has confirmed that in fact the auroral curtain only occasionally drops as low as 50 miles. Paton found that some red patches in the great aurora of January 25, 1949, were at a height of over 700km over Germany. Störmer noted a diurnal variation in the height of the lower limit—a maximum occurring just before midnight and a minimum some two to three hours later. Usually the lower limit lies at about 100km and it is interesting to note the discovery by a rocket ascent of a discontinuity of the geo-magnetic field at this height.

Aurora and the Radio Amateur

For several years past radio amateurs have found that by beaming in a northerly direction signals in the frequency range 28-230 Mc/s can be " bounced off the aurora." Lower frequency signals appear to be absorbed and the upper frequency limit has not yet been ascertained. The writer is not aware of any auroral contacts in the 420 Mc/s band in Europe.

Signals " bounced off the aurora " have a most distinctive characteristic. At 28 Mc/s the signal appears to burble, but the higher the frequency employed the more like a hiss the note becomes. Phone is unreadable as the fading component may have a frequency up to 2000 c/s. Slow Morse is more successful.

As far as radio amateurs are concerned the results of radar soundings off the aurora are of most importance. It is noted that for distances up to 800 miles better results appear to be between stations which are lying on an east-west path, though the beams of the station will be pointing in a northern direction. Reflections of 144 Mc/s signals seem better than those on 50 Mc/s which in turn are better than those on 28 Mc/s. Auroral reflections usually are more evident in the months August, September and October and March, April and May with a minimum during December and January. The best times of day seems to lie between 18.00 and 21.00 and from shortly after midnight till 03.00. There is a pronounced reduction in observed reflections about midnight and virtually no reflections have been observed by amateurs during the two hours before and after noon—this may to some extent be due to lack of activity at these times.

Up to now the expression " bounced off the aurora " has been used parenthetically. Radar soundings not only in this country but in North America seem to show that reflection of radio waves occurs not from the visible aurora but from an area behind the aurora. In fact the area from which signals may be returned need not even be luminescent. It has been observed that where an arc of aurora extended from east to west and practically overhead no reflection could be obtained from the luminous part.

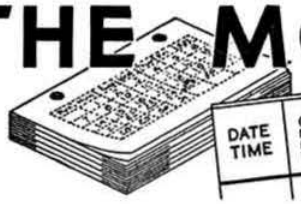
During a great aurora the " flaming " arcs will, if conditions are suitable, form a " corona " practically, but not quite, overhead. From this phenomenon it can be observed that in fact the arcs follow the lines of force of the magnetic field of the earth. (A compass needle recording the vertical component of the earth's field would be parallel to the auroral arcs.) Now if one imagines the arcs to be columns of ionized gases one sees that as the columns approach the magnetic pole their declination will increase. In actual fact the " feet " of the columns would reach earth—if they could —not at the magnetic pole but instead in a circle round the pole as the effective north or south poles are well inside the earth. It has been found that to obtain reasonable reflection with high frequencies the angle of the wave front to the reflecting surface must approach the perpendicular. This seems to apply to auroral reflections and it is found, by radar soundings, that reflections are obtained from areas at quite considerable distances beyond the areas which appear luminescent. Following from the above, it is obvious that to get the largest reflections the angle of the transmitted wave must be kept very low in order to strike the ionized region as nearly perpendicular as possible. It is therefore advisable to use if possible stacked aerial systems which will satisfy these requirements. This also explains the reason for the lack of " echoes " from an arc passing overhead when the beam is pointed east or west. This " perpendicular " theory would also suggest that under suitable meteorological conditions of inversions even more extensive ranges for auroral reflection are possible as in effect the inversions would act as a large wave-guide keeping the radiated signal at a low angle well beyond the horizon and then " squirting " them at the aurora. For example, the aurora of September 5, 1957, which did not appear to be a great aurora, produced signals from Sweden and Germany at good strength at the writer's station. Supposing a good meteorological situation had existed say for 400 miles south of Sweden then it might have proved possible to contact stations in Poland or Czechoslovakia.

V.h.f. Work During the I.G.Y.

During the I.G.Y. it is hoped that many amateurs will be operating schedules on the v.h.f. bands and that this regular operation will give a chance to keep a lookout for auroral conditions. North/south paths will be the easier to use for auroral reflection checks as all that needs to be done is for the southern station to radiate a steady signal towards the north during which period the northern station swings his beam north to the auroral zone. The northern station can then check if there is any hissing on the frequency of the other station. The distance between the two stations should be sufficiently close that contact over the normal tropospheric path can always be maintained and yet at such a distance that the signal coming in from the back of the northern station's beam is sufficiently weak so that any reflection will not be masked by the direct signal. A nightly schedule for this purpose is run at 23.00 clock time between G2NY (Preston) and GM3EGW in Dunfermline. It would be very useful if other stations could run similar tests at other hours.

(Continued on page 279)

THE MONTH ON THE AIR



By S. A. HERBERT (G3ATU) *

THE various bands have been behaving in a typical and on the whole a very satisfactory way and there is little need for preliminary comment on them, so straight away we make a start by looking at what is going on in various distant corners of the world.

News from Far and Wide

Eric Trebilcock, **B.E.R.S. 195** (Thornbury, Victoria) sends another comprehensive account of Australian happenings in this, his thirty-first year of Amateur Radio. So far during 1957, Eric has mailed 1,172 reports and has received 484 QSLs from 115 countries in 38 zones—his best return in all these years of patient effort—and his present total of 245/235 is an obvious tribute to the usefulness of every report he sends. During the c.w. section of the VK/ZL Contest he stayed on 7 Mc/s and logged 45 stations in eight hours, with G5DQ and G6CJ as the only U.K. stations heard, while " Down Under," the only really active ones appeared to be VK2GW, '2QL, '3YD and ZL1MQ, '1AV and '3CO. Recent non-contest loggings on 7 Mc/s c.w. were G5RI, '3JUL, GM3LUC, SM, YO, UA, DL, YU, UB, UA0, ZE, ZS, ZD6, the " usual " Pacific ones, with KR6AK outstanding, DU7SV (14.00 G.M.T.) and FX8UA, who says he is in a French " Colonie." After 14.00 G.M.T., 7 Mc/s goes almost dead except for Europeans and Africans. Occasionally, Eric hears a VK or ZL, but he emphasizes that 99·9 per cent. of the VK/ZL population give the band a rest after 12.00 G.M.T. and they stay off altogether until about 21.00. And that, undoubtedly, explains why we in Europe, who could work VK almost every evening ten years ago from as early as 15.00 G.M.T., now hear precious little from that direction. As to 14 Mc/s c.w., Eric hears ZK2AD daily from 18.00 G.M.T. and he has a QSL already. VS5BS was heard at 10.00 and VK5UM (Alice Springs) was logged. VK5TL, who is the Postmaster at Alice is active most days and the two VKs count as Northern Territories as does Darwin, though nothing has been heard for months of the dozen or so stations up there. VK5WC is active on c.w. from the Woomera Rocket Range.

The Kranji Amateur Radio Club is forging ahead under the aegis of founder **VS1HU.** Mike needed 26 months to make DXCC from G3JFF, whereas from VS1HU, 30 watts and a 300 ft. wire have done the trick in a mere 95 days. Among the latest DX worked on 14 Mc/s is KC4USA, ZP5CF, ZD2NWW, VP9DB, VP8CI, CR8AC (who QSL'd direct), FK8AT, VR4CW, KM6AX, HL9KT and KC6KG, while 7 Mc/s produced QSOs with ZC5RF, 4S7WP, JA6MF, DU7SV, VK and K6. The bands are *different* out there! Visiting amateurs are welcome at VS1HU and a telephone call to Kranji Wireless Station (GYL/GYS) will do the trick. Recent visitors have been VS2FK, GW3ITD and G3HEH/OD5AF/MP4QAJ, who is active as OD5AF/AM while on a regular airline service between London and Australia. VS1HU requests listener's reports on his 7 Mc/s signals, especially from Europe and South America, but he stresses the fact that VS1HU is *not* yet on 21 Mc/s, despite the fact that QSLs are arriving for QSOs on that band.

Frank Johnstone **(G3IDC)** is now happily settled near Singapore as **VS1FJ** and *his* 100 countries were worked in 30 days—this with 25 watts, though a Vee Beam with " only 209 ft. per leg " probably helped a bit! Frank uses 7 to 28 Mc/s and says he may be on 3·5 this Winter. Meanwhile, he would like to hear a GC on 14, 21 or 28 Mc/s.

News of the " Gan " **(Maldive Is.)** project is that activity may occur after Christmas, when power should be available for private radio equipment. At present, the contractors cannot allow additional drain on their generator, but shortly, if the Shiek will permit foreigners to operate—all will be well.

Lee Grant (ex-**ET2NG, ST2NG, VS9AG)** has been transferred to Bathurst, Gambia, so that a new ZD3 may be expected on the air from December. Lee wants to clear up what he describes as " the unhappy ST2NG QSL situation." Briefly, after returning from leave late in 1956, he mailed some 450 cards to the Bureau. Unfortunately, somewhere along the line, the packet vanished—a fact which became obvious when rude remarks began to be made both postally and over the air, so Lee sat down and promptly re-issued the lot and now, as far as he knows, he is right up-to-date with ST2NG/VS9AG pasteboards. He will take spare cards to ZD3 and if anyone is short, a line to I.A.L., P.O. Box 285, Bathurst, will suffice. Eager customers may note that it may take a year by sea mail before an exchange is completed from some of the quaint, barren, sandy wastes to which Lee seems to be doomed, so that a little patience wouldn't come amiss! Finally, he says, he would be far happier if everyone would QSL via the R.S.G.B. Bureau. He has never yet lost a packet from G2MI, but the stamps on the covers *he* sends are so attractive that the obvious happens. If stamps are wanted, send a registered letter and I.R.C.s. Never send unregistered mail direct. And that, friends, applies to countless rare DX locations, so be warned.

Eric Hall (ex-**G3JJD),** established on Vancouver Is., B.C. has been issued with the call-sign **VE7BV** and is looking for his old friends in order to give them the VE7 QSO which he was never able to make himself from G3JJD. The local authorities did not recognize his G licence, so he had to start again from scratch, but all went well and he is now

"Ed" KL7PIV and Sheila KL7BHE operate on the DX Bands from Alaska

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

permitted c.w. on all bands, together with phone on 28 Mc/s after six months and on the rest after a year. An RME4350 receiver and a Viking Ranger transmitter are used with dipoles for each band. Eric says that the QRM from the Ws has to be heard to be believed! A novel touch is to listen to the nightly traffic net on 3755 kc/s. Twenty or more stations controlled by VE7AUF—an XYL operator of vast experience—pass messages to widely-separated parts of the Dominion smoothly and very efficiently.

G6XN (Petersfield) passes more news—via VE7ZM—of **KS6AF**, active on phone, as recorded last month. She is on 21400 kc/s (02.00-08.00) and on 14200-'250 (08.00-12.00 G.M.T.) using a.m. and s.s.b. and is expected to close down on December 15.

Fred Pilkington **(G3IAG)**, who is Radio Officer on the *M.V. Georgina V. Everard*, was recently in Poland, where he enjoyed great hospitality from SP1JN and all the other amateurs he met. '1JN is an operator at a Polish coast radio station and he first worked Fred on the shipping band and asked him if he was an amateur. Visits were made to SP1KAA and SP1KBT—both club stations and '3IAG operated the latter, causing raised eyebrows among the Gs he worked! SP1KBT, incidentally, sports a BC342 and a BC610, which runs at 200 watts on 14 Mc/s.

B.E.R.S. 216 (McKenzie, Br. Guiana) spent a month in the jungle, up-country, setting up radio equipment for an expedition. While there, he heard VP2GC and some W phones and he plans to return soon, when, if conditions are better, he may log some Europeans from a spot never before visited by a radio amateur.

G3EMD (99 Shenstone Valley Road, Quinton, Birmingham, 32) holds some 250 QSLs for **VP8AJ/G3AXN,** whose present address is unknown to him, so that news of his whereabouts would be welcome to the above QTH. **G8KS** (Petts Wood) is in weekly contact with **VP8CC** (Deception Is.) and learns that some 350 QSL cards will leave by the first boat and should arrive in the U.K. next February. VP8CC will be on Deception for another year and will be active as far as his regular schedules with other Bases and with two sledge parties allows. G8KS notes the reappearance of VP8BK, back on South Georgia for the whaling season and putting out his usual excellent c.w. signal on 14 Mc/s.

G3AAE is planning a multi-operator expedition to Alderney next year, when **GC3AAE** should be QRV 24 hours a day for two weeks. Full details later.

DX Television Predictions for January 1958

Prepared by J. Douglas Kay (G3AAE)

Barbados	1200/1500	Baghdad	0900/1300
Bermuda	1400/1500	Bahrein	0800/0900
Trinidad	1145/1430	Teheran	0900/1300
Lima	1300/1500	Accra	0900/1200
Cyprus	1000/1400	Dakar	1000/1400

These predictions are based on the B.B.C. Channel I sound transmission on 41·5 Mc/s. The vision frequency is 45 Mc/s.

Emmet G. Riggle (Massillon, Ohio) is anxious to track down the ZS2MI active in November 1955! He suggests checking 14105 kc/s for FU8AD and 14198 kc/s for KA0IJ, both S9 on phone (07.30 E.S.T.).

Twenty Metres

Discriminating DX chasers continue to show preference for twenty, which regularly provides a selection of rare ones, even if they are mixed vexatiously with local rock-crushers for much of the time. **G6XL** (Leeds) heard JT1AA (13.30, '062), but he was weak and almost impossible to copy through the calling multitude—as usual—but QSOs were made with FK8AH (18.35, '050), ZK2AD (17.50, '045), YK1AT and VP5AB (South Caicos, 05.35, '070).

G3AAE (Barnet) finds his garden too small for a large beam, but the trusty Zepp gave him c.w. QSOs with XE1VW (08.30), KW6CA (09.30), KC4USA (15.00), UA0KAR and ZK2AD, so he shouldn't be unduly worried, even though ZM6AS (10.00), FB8XX, JT1 and CR8 eluded him! John also heard many Ws vocally calling HV1CN. **G3FPQ** (London, E.10), has added six new ones in two zones and sits at a comfortable 110/37. He connected with HP1BR (00.00, '002), KV4BO, LA2JE/P (on Spitzbergen until next July), UA0KAR and UL7AB, all c.w.; he called CE9AE, ET2US (very busy with Ws), FB8BF, HH2Y, KC4USH, VQ8AS, XZ2TH and other sought-after items. **G3ATU** finally burst through the barrier round CR8AC. The LG300 has been cooling off ever since! **G3KAY** (R.A.F. Gaydon, Warks.) uses 150 watts with dipoles for each band, stretched between a water tower and a hut and has amassed some 60C in 26Z in his three months at Gaydon. His total though is

Frequency Predictions for January, 1958

PREPARED BY J. DOUGLAS KAY (G3AAE)

BAND	NORTH AMERICA East Coast	NORTH AMERICA West Coast	CENTRAL AMERICA	SOUTH AMERICA	SOUTH AFRICA	NEAR EAST	MIDDLE EAST	FAR EAST	AUSTRALIA	ANT-ARCTICA
M.U.F.	40Mc/s 1500	26·5 Mc/s 1800	42 Mc/s 1300	37 Mc/s 1800	35 Mc/s 1200	40 Mc/s 1200	37 Mc/s 0800	37 Mc/s 1000	29 Mc/s 0800 SP	22 Mc/s 0830
28 Mc/s	1200/1800	1800	1100/2100	1030/2030	0900/1800	0800/1730	0700/1300	0730/1600	0730/0900 SP	0830
21 Mc/s	1100/2200	1630/1900	1000/2300	0800/1200 1800/2300	0700/0900 1330/2100	0630/1900	0630/1700	0700/1700	0700/1700 SP 0930/1200 LP 2100/2215 LP	0730/1200 1800/2000
14 Mc/s	1000/2400	0000/0300 0830/1100 1430/2000	1800/0600	2100/0900	1600/0300	0530/0130	1330/2000	1430/1830	1100/1900 SP 0730/1030 LP	2000/0930
7 Mc/s	2000/0900	0600/0800	0000/0830	2300/0830	1800/0100	1530/1100	1730/0130	1900/2030	1600/1900 SP	2200/0400
3.5 Mc/s	2300/0600	0730	0100/0700	0000/0600	2000	2100/0500	2000/0200	2000	1700 SP	0000

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

over 100C and some of the recent DX worked on the key includes KA2SH, XW8AE, CE4AD, CR6AI, VS9AC (Aden), VP8BK, '8AO (Shackleton), FG7XC, DU1RTI and Russia's only " non-U " U—RAEM!

B.R.S. 21279 (Oldbury) used the *CQ* World-wide DX Contest, phone section, to log a very creditable 100 countries. New ones on twenty were VP2AB and KS6AF. 3A1W was heard—a strange one, this, Martin says **G3AAM** worked **HV1CN** for a new one. The HV speaks only Italian and is active around 19.00—21.00 on weekdays. On c.w., new ones were FP8AP and FB8CD (17.30) of Comoro fame. (The FB8 *does* QSL. *S.A.H.*) **B.R.S. 20317** (Bromley) found things not as good as last year, but he managed VQ8AS (Rodriguez Is. 18.00/20.00, '012) for a good new one and also heard FM7WT, FY7YF, JA1AG, ZD5CM, VU2AJ, ZK1BG (11.15), JT1AA, DU, FG, KG6 and UA0 on c.w., mostly from 17.00 onwards. Bill now possesses two very superior QSLs—from FW8AA and FB8CD, no less.

B.R.S. 20106 (Petts Wood) reports a quiet month producing HH2NM (02.00) and KC4USH (s.s.b., 08.30) on phone and VS9AC, '9AD, ZL5AA (18.50) and more usual ZLs, around 18.30, plus VQ8AS (19.22) on the key. **B.R.S. 2292** (Hounslow) mentions W4FCB/KS4, YK1AT and 3A2BT—the last two on the same frequency! On phone, Charles logged VS1JR and LX1AI. **A.1491** (London, N.13) sends his first report, of particular interest because he uses a five valve straight BC receiver with a 24 ft. wire strung round the room and the phone heard on this—VQ4AQ, KH6BSK, ZD6GT, VE3AHU/SU, ZS3B, VP2AB, HH, HK, CE2, VE7 and VE8 would do credit to much more elaborate equipment.

Fifteen Metres

Fifteen is as lively as usual, although still subject to sudden changes and periods of near silence. **B.R.S. 20135** (Newport, I. o. W.) logged KH6AVX, KR6DR (13.00), BV1US, ZD6RM, VS6CL and KL7RZ on A3, while among the 100C at **B.R.S. 21279** were VP1AG, HB1RF/FL and VP8s 'CC, 'CH and 'AO. **B.R.S. 20317** heard HH2Z on A3 and logged EL1K, UD6KAB, UA0s and KW6CA (13.00, '015) on c.w. **B.R.S. 20106** mentions W4FCB/KS4 (2143), OY1R, VP4LR and TG9AD on A3 and JA6RR on A1. **B.R.S. 2292** dug up VK7WA, DU7SV, VQ3GC, VP5CM and ZL—phone—and PJ5CA, FQ8AU, CR6AI, VR2AS and OQ5GU c.w. At **A.1491,** the BC set pulled in HE9LAC, VP3SY, PZ1AG, MP4KAM, EL1G, BV1US, KL7, ZL *and* FB8CD (18.30), who was called by practically everybody!

On the transmitting side, **G3BHJ** (Norwich) likes times when the band seems dead. Often one signal pops up and is worked, MP4KAC being an instance. During normal openings, CE3JE, EA9BK, OQ5HP, VK3AZY (naturally!), VP8CC and W7MXD, '7YOA (Montana) fell to his phone. **G6XL** advanced to 205/164 with a choice new one—KX6AF (09.30, '250) and the QSL has arrived. Two interesting phone contacts were with ZS1DO and ZS2DY around 06.30. Both ends of the QSO were beaming over their respective Poles and reports were RS58 over the 18,700 mile path. When both beams were turned " inwards over the short (6,125 miles) path, signals went down to S1/0.

G3AAE raised rare ones—KP6AL (08.00), FK8AC, W0GXA/KG6—and Zone 19 UA0s on c.w. and QSO'd CR4AD, VR2AZ and VP8AO on phone, missing KM6AX and VP8BY (South Orkneys, 00.15). **G3KAY** worked FK8AC, UA0CI (Khabarovsk), VK and JA on c.w., while **G3FPK** QSO'd EL1P, VE8PB, VP8AX (11.50, '070), XE1PJ and JA.

Ten Metres

This band is now in full swing and **G3BHJ** used phone to work KA2JO, TF2WCD, SV0WQ (Crete), VQ6ST, VQ5GF, ZD6RM, etc. **G3AAE** raised OQ0DZ (08.30), CR5SP (11.00), HI8I3E, VQ3ES, '3GC, W0LV/KG6, FB8BV, KR6BH (13.00) and KR6CJ (10.45). **G3KAY** contacted UA0LA (Vladivostock) on c.w. while **G3ATU** draws attention to AP5C (14.00), CR9AK, ZD2FNX and VP1OLY.

B.R.S. 20135 heard VP1OLY, plus VP9G and OY1R on A3, while **B.R.S. 21279** heard CR7BN. On the key, **B.R.S. 20317** logged FY7YC (13.00, '030), UO5PK and GD4VH, with HH2HH, PZ1AE, ZD1PW and ZD8SC on phone—all new ones for him. **B.R.S. 20106** was there to hear VP5BL, FQ8AX, KR6RB and W1MKM (Vermont) on A3; he logged JA3AB (07.40), UA0KUV and ZD2DCP on A1. **B.R.S. 2292** had VP5BL, ZS3AG, ZD3BFC and lots of VE7 phones, plus Ws in all areas.

The Other Bands

Still a collective item, which is to be expected with the h.f. bands so lively. **G3KAY** QSO'd KZ5RF on forty c.w. and **G3FPK** was pleased with PJ2CK (02.30) who was pounced upon before anyone else had heard him! Prospects on Top Band seem grim to **B.R.S. 20106,** due to work on the Kent Coast Main Line widening and electrification scheme which, he thinks, must be responsible for hash and noise centred about 1550 kc/s but affecting even eighty metres. The work extends from Beckenham to Swanley, at least, and it would be interesting to know how badly others in the area are finding the interference.

The Finnish society, S.R.A.L., is holding its annual N.R.A.U. Contest on 3.5 and 7 Mc/s from 14.00 to 16.00 G.M.T. and 22.00 to 24.00 G.M.T. on January 11, and from 06.00 to 08.00 G.M.T. and 14.00 to 16.00 G.M.T. on January 12. Phone or c.w. may be used but cross-band contacts will not be permitted.

* * *

And that finishes another month, except that your commentator would like to wish all of you the merriest of Christmases. Reports are fewer this month as the BULLETIN appears to have been held up in the post, so that readers may like to note that future deadlines are the 18th of the month preceding publication. Good hunting, and renewed 73.

London Meeting
Friday, January 24, 1958

Presidential Address
by L. E. Newnham, B.Sc. (G6NZ)
followed by a lecture on
"The Human Machine as a Radio Operator"
by F. J. H. Charman, B.E.M. (G6CJ)

at the
Institution of Electrical Engineers
Savoy Place, Victoria Embankment

Buffet Tea 6 p.m. **Lecture 6.30 p.m.**

Auroral Propagation **Continued from page 276**

Acknowledgments

Thanks are due to Mr. James Paton of the Balfour Stewart Auroral Laboratory (University of Edinburgh) for furnishing much of the information used in this article. The assistance of Mr. G. M. C. Stone (G3FZL) is also acknowledged as being invaluable in suggesting further sources of information. Finally, CU on aurora—the original " steam " (sounding) radio!

Bibliography

The Polar Aurora, Carl Störmer.
The Sun and its Influence, Routledge and Kegan Paul Ltd.
Guide to I.G.Y., Methuen & Co. Ltd.

FOUR METRES AND DOWN

By F. G. LAMBETH (G2AIW)*

THE entries for the European V.H.F. Contest are now being judged by the Contests Committee, but it may be stated here and now that the Czech contingent lead the various sections with special reference to Section 4 in which their efforts were outstanding. In Sections 1 and 3 use was made of the 70cm band in some cases, with excellent scoring. German results were also very good, whilst F8MX/A valiantly stood for France; G2XV made a brave show under what were obviously adverse conditions. Some of the Continental successes were obviously due to the more central position of the participants, allowing good all round coverage, but none the less, the sustained efforts of some of these operators deserve the highest praise. The full results will be published shortly.

More Contest Views

G3GHI (Kenley) says he dislikes the period of the European V.H.F. Contest—he objects to a contest going on through the night and suggests that the Saturday operating be cut out and the contest confined to the Sunday. Then, if conditions are only average the contest is hardly European, when perhaps only few continentals are heard. But that's the luck of the game, as we cannot organize conditions to order. As G3GHI further opines, it appears that the Continental stations have the advantage over Gs in respect of DX contacts. G3GHI enjoyed the R.S.G.B. Open Contest in the early summer and found the easy method of scoring preferable to the kilometre/miles system, which takes much longer to work out.

V.H.F. Review

The 2m band does not seem to have been at all lively recently, and the old bogey of low activity has been raised again by some correspondents. There was however an aurora, visible in Scotland on the night of November 6/7, but with no great results. All in all a not very satisfactory month for 2m. The picture is quite different on 6m however; the first QSOs with California have been reported, —it is a pity that we cannot have this band at least for the I.G.Y., as there is still much to be learned about that part of the spectrum.

Band Plan

Apropos the remarks on the Band Plan last month, **B.R.S. 19162** says that if everybody had G5YV three miles away on 144·25 they would be glad to go to 145/6!

Two Metre News

B.R.S. 16075 (Shirley, Southampton) found activity very low—only two or three of the local stations are regularly active, which makes things a bit grim sometimes. During the bad gales recently an unusual occurrence was noticed: good signals were received from stations around 100 miles in spite of an extremely low pressure system. G3ION is temporarily QRT through aerial damage due to these gales.

B.R.S. 19162 (Dewsbury), although a fairly active listener since October 2, found conditions and activity poor with the exception of November 12 when London stations were coming in quite well around 2200. PE1PL has been logged a couple of times at midday. The single slot has been replaced by a 6-over-6 slot-fed beam; all the usual stations have gone up by 1 to 1½ S points and fading is much less on the Liverpool and Manchester stations. **B.R.S. 20133** (Melton Mowbray) has also erected a 6-over-6 slot at 30 ft. At first, nothing new or spectacular was heard, conditions being so extremely poor, but on November 12, G3FAN (I.o.W.), was received for the first time. Stations generally were coming through at better strength in spite of bad weather. PE1PL has been heard for the first Continental. The new aerial is certainly bringing results! The county score is now 25 in 3 countries. **B.R.S. 20162** (Selsdon) heard 134 stations in 23 counties during the period, which shows most conclusively that the activity is not quite so bad. Poor conditions seem to close down on some areas while others appear little affected. '20162 calls activity "reasonable to poor." It is pleasing to note a few new calls on 2m each month.

G2HDR (Bristol 9) heard no signals from above 50 miles distance and precious little within that radius. **G5BM** (Highnam) was only on twice and found things quite good on both occasions, especially the night of November 14. London and Home Counties stations were the majority of those worked and heard.

G3JR (Barnes) had one bright period just after midnight on November 13, when he had a phone contact with G3ENY (Shropshire) for the first time. Soon after, G3JZG (Staffs) was raised also for the first time. On November 15 signals from G3IRA (Swindon), who was using *one watt*, were received at RS45. **G3GOZ** (Enfield) was able to work both Midlands stations and also G3GSO and G3KQF in Derby on November 12. During a further opening on November 14 G3LHA (Coventry), who was running four watts, was worked at RS58. G3LHA, with the same input, worked several stations in S.E. England on November 12. The 2m aerial at **G8SK** was blown down during the gale of November 4 and at the moment a temporary one (a cubical quad) is in use. Although the quad has to fire through the house, G3GSO and G3KQF have already been worked on it. **G3KHA** (Bristol) and G5DW (Somerset) have also been raised.

G8VZ (Princes Risborough) kept a sked three times a day with G3JWQ (Ripley, Derby) and found on average that the morning sessions at 0900 were best, although conditions were poor all the week (October 21/27) when these tests were made. From November 12 barometric pressure began to rise, with a consequent improvement in conditions. During November 14 stations from the north and north-west were worked at good steady strength.

G5DW (Bridgwater) found November 14 a bright spot in an otherwise featureless period. At 15.00 G.M.T. the path was open to the east, with steady signals, accompanied sometimes by a sudden dip to almost zero of extremely short duration. From 21.00-21.30, G3KEQ was S9 + 30db and quite constant, the needle steady on the S meter. From 21.30 the London I.T.A. (Channel 9) station was a solid signal right through the rest of the evening, although the picture was spoiled at times by QRM from the Lancashire station on the same frequency! G5DW has a pair of 35T running at 150 watts for c.w. only. Input has to be reduced to around 75

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

watts for phone. As they have run for many years on 14 Mc/s G5DW hasn't the heart to be too cruel to them on 144!

G5CP/A—a new station—is located five miles south of Chesterfield in North Derbyshire, 800 ft. a.s.l., and is operated several evenings weekly and at weekends. Tests indicate that the location is really good for 2m transmissions. During initial tests GM stations were worked—one by aurora. Reports are particularly wanted from the south west as there are hills in that path. The transmitter runs 80 watts to an 829B with a 4-over-4 Yagi. The receiver is CV53 r.f. stage and crystal controlled cascode converter into an AR88.

G2HCJ (Warrington) recently finished a rotator and indicator for a 12 ft. 10-element Yagi, and the beam was tried out in the presence of G3IWJ and G3HII (both of Liverpool). QSOs were had with GM3EGW, GM3HLH/A, GI3GXP and EI6A. Quite an evening! G2HCJ and G3IWJ have found that the currently available 10 Mc/s crystals are very active particularly those with the fixing screws at the same end as the pins. At least one of this type showed high activity at the thirteenth overtone. All of the plated and unplated ones tested were good up to the seventh. If anyone has not received QSLs from G2HCJ will they please send him a reminder?

G3HBW (Bushey Heath), **G5BD** (Mablethorpe) and **G5YV** (Leeds) have all been working plenty of DX on 2m in spite of bad conditions and poor activity. **G2NR** (Welwyn Garden City) asks for more informative news regarding 2m band conditions. As most of us are aware, it is very difficult and sometimes impossible to prophesy on 2m. The band can change with bewildering rapidity; for better or worse. If anyone can suggest a means of accurately foretelling band conditions, we shall be very glad to hear about it.

Scottish Two Metre News

GM2FHH (Aberdeen) has made tape recordings of all the aurora openings. GM3EGW was worked on November 6 at a time of visual aurora at RST 584 both ways. **GM6WL** says that this same aurora was seen by a listener (Mr. McWalter) at Wemyss Bay. On November 14 there was a tropospheric opening and G2NY, a very strong signal in the Glasgow district, worked GM3NG, GM3DIQ and GM3INK as well as GM3EGW. On October 26 **GI5AJ** (Bangor) returned to the band and contacted GM3DDE, GM3EGW and GM6WL. Further contacts were made on November 2 and 9.

Two Metre Activity in Southern Europe

G3GOZ (Enfield) has culled some interesting news about Mediterranean activity on 2m. **IIKDB** (Naples) on 144·138 Mc/s has worked 3V8AB (Tunisia) on 144·165 Mc/s many times. ZB1AJ has been trying to raise them, but so far none of the three Maltese stations have had an overseas QSO. The three stations are ZB1AJ (15 watts), ZB1BJ (10 watts) and ZB1E (60 watts), all on 144·1 Mc/s. They have a round-table QSO each Sunday commencing at 08.00 G.M.T. for about an hour.

Seventy Centimetres

B.R.S. 16075 (Shirley, Southampton) reports that G3IBI is nearly ready to go on the air. Both transmitter and receiver will be low power at first, but the aerial is a 16-element stack at approximately 40 ft. The main idea is to transmit Amateur TV but sound QSOs will be appreciated as well.

G8AL (Chingford) found November 12 and 14 red-letter days on this band when G3JZG (Willenhall, Staffs.) was worked on both occasions. G3HAZ (Birmingham) was a welcome QSO on the 12th. G8AL's report shows that 70cm contains a fair population for anyone interested to have a go.

G5KG (Danbury) had QSOs with G5DT, G5UM, G2WJ, G2CIW and G5BD during the month. The most interesting event was the reception of good TV pictures from G2WJ/T.

G5KG thinks it may be of interest to those who are worried about standing waves on their feeders to note a couple of expressions which are easy to manipulate.

$$\text{Power Loss} = \left(\frac{v-1}{v+1}\right)^2 \text{ where } v = \text{V.S.W.R.}$$

$$\text{Power Radiated} = \frac{4v}{(v+1)^2}$$

e.g. if V.S.W.R. is 2 : 1

$$\text{then Power Loss} = \left(\frac{2-1}{2+1}\right)^2 = \left(\frac{1}{3}\right)^2 = \frac{1}{9} \text{ or 11 per cent}$$

$$\text{Power Radiated} = \frac{4 \times 2}{(2+1)^2} = \frac{8}{9} = 89 \text{ per cent}$$

The power loss is therefore 0·5db approximately. Although this does not include cable attenuation losses or take into account r.f. resistance losses, it is near enough for all practical purposes.

G2XV (Cambridge) has been driven to 10m for some "relaxation" owing to poor activity and conditions on both 70cm and 2m, but is still willing to arrange 70cm skeds with any operator in the counties of Derby, Gloucester, Cheshire, Lancashire, Hereford and Dorset or any other, for that matter! G2XV is suffering from short life in 6BQ7A valves, and wonders if anyone else has the same trouble. What is the answer or is the valve notorious for short life?

Suitable Feeders for V.H.F.

Five minutes after finishing a QSO with G3HBW, devoted almost entirely to a discussion on suitable feeders for the 70cm band, **G5UM** spotted the request in the last BULLETIN from B.R.S. 16075 (Southampton) for information on the best feeder for this band; G5UM passes on G3HBW's comments on this point: An excellent feeder is Transradio C1T which consists of a single fairly thin conductor supported within the co-axial sheath by means of polystyrene beads. Its impedance is around 150 ohms and its loss 8db per 100 ft. From the same source a cable called A1T is available with an impedance of 70 ohms, a much heavier central conductor and a loss of 4db per 100 ft. It will carry a good deal more r.f. power than the first named.

There are several types of feeder used for Band III television which give a good performance at 435 Mc/s, and it is well worth while writing to such firms as Telcon or B.I.C.C. for technical literature about them.

Saturday Night on Seventy

The announcement last month that several stations are active between 19.00 and 20.00 on Saturday evenings has already increased the occupancy of the band at that time. On November 16 several stations in the London area made as many as five contacts each.

All u.h.f. operators in the south-east are urged to make their presence heard on Saturday evenings so that sustained activity may be kept going on the band.

Stations active in Scotland include GM6WL, '6KH (who now has a rotatable 6-over-6 slot for this band), '3GAB, '3NG, '3GUO and '3DDE. GM6XV (Larbert) is almost ready, having just finished a G3BKQ-type converter. GM6WL's frequency is 432·3 Mc/s—we should like to know the other Scottish frequencies!

Four Metres

G5MR (Hythe, Kent) reports on the Four Metre Contest. He advised F8GH who passed the news on to the other

French stations, but there did not appear to be much British co-operation. G5KW and G5MP were worked on the Saturday, but G5MR was too late home for the Frenchmen. Sunday morning was rather depressing; apart from G5KW and G5MP only two weak phone stations were heard in the British band. They would have been comfortably readable if they had used c.w.! On the French band there was the usual round table party on phone, but all stations were below normal strength. The scene brightened considerably when, shortly before 15.30 G.M.T. G5JU (Birmingham) was heard calling CQ and immediately raised (c.w. both ways): this is G5MR's best GDX so far on 4m. Soon after, the French stations came through again and five were worked before the contest closed.

Belgian amateurs are now permitted to operate on 70·3 to 70·5 Mc/s for the duration of the I.G.Y.

PA0FB Burnt Out

PA0FB has had the misfortune to lose all his radio equipment in a fire at his home and will be off the air for some time. All his QSL cards were also lost and he would therefore be grateful if British stations he has worked in the past would send him replacements.

Six Metres

EI2W had an excellent QSO with **K6GDI** (Fresno, Calif.) on November 5. On November 2 and 4 stations were worked in the following U.S.A. districts 1, 2, 8, 9 and 0, with VE1PQ and VE3ARU for good measure. The QSO with VE3ARU was the first VE/EI on 50 Mc/s. From October 27 to November 17 (inclusive) 84 stations were worked in 20 states. All U.S.A. call districts were raised at one time or another. The Pacific area was worked many times, as well as many stations in the W5 and W7 districts. Nevada and Utah were heard and called, but no QSO resulted. The most consistent station was W1HOY, with W4UCH and W8CMS always receivable when conditions were fair to good. The strongest signal during the period was W7GRA (Arizona). On November 19 around 17.00 G.M.T. he was blocking EI2W's receiver!

G3COJ (Maidenhead) worked W9DSP (Wisconsin) crossband from 10m and heard K0AKJ and K0GOG, both in Minnesota plus two unidentified W0s. November 4 produced W7RUX (Phoenix, Ariz.) at S9 phone calling CQ6 and W6NLZ on c.w. calling CQ and later G2BVN. W5VY (Texas) was a strong c.w. signal most of the afternoon. November 5 produced the first resolvable U.S.A. TV pictures on 55·25 Mc/s. The best results seem to be about the middle of the day, and it looks as if the first 50/70 Mc/s QSO will be around 13.00 G.M.T. On November 6 conditions were poorer with traces of carrier on 55·25 about 13.00. The usual Ws were on 50 Mc/s including W9DSP.

G2BVN (Romford) reports a successful QSO with W6NLZ (crossband from 10m) on November 4. G2BVN has also worked a VE1 station. W6ABN was also heard, but was unfortunately only checking 6m. W7RUX is on daily listening at the low end of 10m for calls from the U.K. Sometimes the critical frequency in the 6m band appears very localized. In tests carried out by G2BVN with W1GKJ on November 14 the American station gradually moved higher in frequency and signals which were S9 at 50·3 Mc/s were inaudible even with the b.f.o. on at 50·4 Mc/s. There were no other signals above 50·4 Mc/s. W1HOV, K2CBA and W4UCH are probably the most consistent signals on 6m and seem to be at good strength whenever the band opens. G2BVN reports that W6NLZ worked VQ2PL on November 11 and thus completed the first 6m WAC.

G3FIJ (Colchester) heard many Ws in areas 1, 2 and 8 and worked W1DEI, W8CMS and W1HDQ crossband from 10m on October 27.

G3XC (Slough) has worked 19 Ws and Ks in districts 1, 2, 3, 4, and 8, and three VE1 stations crossband 6/10. Among several stations heard were W6UXN, K6GDI and K0AKJ.

An I.G.Y. station run by the Swedish Society will soon be operating from Spitsbergen on 50·030 Mc/s. The call-sign will be SM8AQT/LA/P and it will be firing south through the auroral curtain.

* * *

A Merry Christmas and a Happy New Year to all v.h.f. enthusiasts. Please note the deadline for reports for the January issue is December 18.

Worked and Heard on V.H.F.

Two Metres

B.R.S. 16075 (Shirley, Southampton) October-November.
Heard: G2DVD, 2HCG, 2JM, 3DDM, 3IIT, 5MA, 6AG, GB2RS, 3IGY, GW8UH.
B.R.S. 19162 (Dewsbury, Yorks.). October 23-November 15.
Heard: G2AUD, 2XV, 3BA, 3GOZ, 3HBW, 3HZK, 3IWJ, 3JZG, 3KFD, 3KQF, 5MA, 6WF, 8AL, 8VZ, GB3IGY, PE1PL.
B.R.S. 20133 (Melton Mowbray). October 12-November 12.
Heard: G2BVW, 2CDB, 2CRL, 2FMO, 2FNW, 2HCG, 3ALC, 2BU, 3EKX, 3EVV, 3FAN, 3GSO, 3HBW, 3HZK, 3IOO, 3JWQ, 3JXN, 3JZN, 3KEF, 3KEQ, 3KQF, 3LHA, 3LHW, 3LKA/P, 4MK, 5CP/A, 5DS, 5MA, 5YV, 6NB, 6XM, 6YU, GB2RS.
B.R.S. 20162 (Selsdon, Surrey) October 14-November 13.
Heard: G2CIW, 2CPX, 2DD, 2DVD, 2FKZ/A, 2HCG, 2UJ, 2WJ, 2XV, 2YB, 3CGQ, 3FAN, 3FEX, 3FIH, 3FIJ, 3GGJ, 3GHO, 3GNR/P, 3HWR/A, 3HZJ, 3HZK, 3IIT, 3IRA, 3IUL, 3JWQ, 3JZG, 3JZN, 3KFX, 3KHA, 3KMT/M, 3LOK, 3LTF/A, 5BD, 5DW, 5KG, 5OX, 5UM, 5YV, 6NB, 8SC/A, GC3EBK, GW8UH, PA0FB, 0GER, 0TP.
G3BFP/A (Selsdon, Surrey). October 14-November 13.
Worked: G2XV, 3AAZ, 3BEX, 3DOR, 3EKJ, 3EYV, 3FD, 3FQS, 3IIT, 3JR, 3LOA, 4DC, 5KG, 5UM, 5YH, 6SC, 8SC, PA0FB, 0TP.
G5BM (Highnam, Glos.) November 14-November 17.
Worked: G2AHY, 3HBW, 3KEQ, 3JQN, 3LTF, 4DC, 6AG, 8VZ. *Heard:* G2XV, 3GHI, 5MA, 5YV, 6JK.
G5YV (Leeds) September 29.
Worked: DJ3KO, DL1LB, 1RX, GM2FHH, 3DIQ, GW8SU, HB9BZ, 9RG, ON4CP, OZ3A, 9AC, PA0FB. *Heard:* DJ1XX, DL1HN, 3AH, 3YBA, 6SU, EI6A, F3JN, GI3GXP, GM3EGW, 6WL, 6KH, 6XW, ON4DW, OZ2BB, 2IZ, 2KH, 5AP, 7IGY, 9EA, PA0AGJ, 0BZH, 0GER, 0GRN, 0EZ, 0RK, 0UHF, SM7BE, 7BZK.

Four Metres

G5MR (Hythe, Kent).
Worked: F8GH, 8NB, G5KW. *Heard:* F3GX, 8LO, 8MW, 9CZ, 9IW, 9ZA, FA3JR, 9VN, G6NB.

Seventy Centimetres

G5KG (Danbury).
Worked: G2CIW, 2FNW, 2HDJ, 2HCG (Crossband), 3FP, 3GDR, 3HBW, 5BD, 5DT, 5KW (Crossband), 5LL, 5UM, 8AL, 8RW. *Heard:* G2FCA.
G8AL (Chingford E.4) September 18—October 14.
Worked: G2CIW, 2FCA, 2HDJ, 2WS, 3FP, 3GTH, 3IRW, 5BD, 5DT, 5KG, 5UM, 6NF, 8RW. *Heard:* G2FNW, 3HAZ.

Contributors are requested to list only the call-signs of stations which are 50 miles or more distant.

Mobile Rallies

ARRANGEMENTS are being made for mobile rallies to be held on the following dates during 1958:

April 13. Northern Mobile Rally at Harewood House, near Harrogate, Yorkshire (organized by Spen Valley and District Radio and Television Society).

June 15. Longleat Mobile Rally at Longleat House, near Warminster, Wiltshire (organized by Bristol R.S.G.B. Group).

Further details of these rallies will appear in *Mobile Column* in due course. In order to avoid clashes of dates, organizers of rallies are asked to send details for publication as far in advance as possible.

Third European (WAE) DX Contest 1958

COPIES of the rules for this contest, organized by the D.A.R.C., can be obtained by sending a stamped addressed envelope to Headquarters.

The contest periods will be as follows:
C.w.: 18.00 G.M.T. January 3 to 24.00 G.M.T. January 5, 1958.
Phone: 18.00 G.M.T. April 4 to 24.00 G.M.T. April 6, 1958.

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 Monday, October 21, 1957, at 6 p.m.

Present: The President (Mr. D. A. Findlay in the Chair), Messrs. W. H. Allen, C. H. L. Edwards, K. E. S. Ellis, W. J. Green, F. Hicks-Arnold, J. H. Hum, E. G. Ingram, W. H. Matthews, W. R. Metcalfe, A. O. Milne, L. E. Newnham, W. A. Scarr, John Clarricoats (General Secretary) and John A. Rouse (Deputy General Secretary).

Apology: An apology for absence was submitted on behalf of Mr. H. A. Bartlett.

Absent: Messrs. R. H. Hammans and H. W. Mitchell.

* * *

Reports of Committees

The Minutes of a Meeting of the Contests Committee held on September 19, 1957, were submitted as a Report.

Resolved (i) to receive the Report and the Recommendations contained therein. (The recommendations dealt with the programme of events for 1958 and administrative matters concerning contests in general); (ii) to hold a 420 Mc/s Open Contest on May 18, 1957, in addition to contests proposed by the Contests Committee; (iii) to refer to the V.H.F. Committee the question of holding a V.H.F. National Field Day during 1958; (iv) to hold a R.A.E.N. Rally on September 28, 1958.

The Minutes of Meetings of the Exhibition Committee held on October 1 and 14, 1957 were submitted as Reports.

Resolved to receive the Reports.

A memorandum outlining resolutions adopted at a meeting of the R.A.E.N. Committee held on October 12, 1957, was submitted.

Arising therefrom it was

Resolved to accept with thanks an offer to present to the Society a copy of the R.A.E.N. sequences in a new British Red Cross Society film entitled *Humanity in Action* provided the cost to the Society for preparing titles, etc. does not exceed £5. (Subsequently increased to £12—EDITOR.)

The Minutes of Meetings of the Articles of Association *ad hoc* Committee held on September 17 and October 15, 1957, were submitted jointly as a Report.

Resolved to receive the Report and to adopt the Recommendations contained therein.

The Recommendations dealt with the interpretation of Articles 27 and 28.

Resolved to record that it is the view of the Council that only a Corporate Member resident in a particular Zone shall be eligible to fill a casual Council vacancy in that Zone.

Auditors' Report and Audited Accounts

The Auditors' Report and Audited Accounts for the year ended June 30, 1957, were submitted.

Resolved to accept the Report of the Auditors and to approve for publication, and subsequent submission to the membership at the Annual General Meeting to be held on December 13, 1957, the Audited Accounts for the year ended June 30, 1957.

Annual Report of the Council

The Annual Report of the Council, as drafted by the General Secretary, was presented.

After minor amendments had been approved it was *Resolved* that the Annual Report of the Council for the year ended June 30, 1957, be approved for publication in the Society's Journal and subsequent submission to the membership at the Annual General Meeting to be held on December 13, 1957.

Membership

(a) *Resolved* (i) to elect 76 Corporate Members and seven Associates, (ii) to grant Life Membership to Mr. N. Bennett (G3HSC) of Purley, Surrey; (iii) to grant Corporate Membership to three Associates who had applied for transfer.

(b) (c) The Secretary reported that 69 of the 597 members whose subscriptions became due on July 1, 1957, became three months overdue on September 30, 1957, and that 15 of the members concerned had written to resign.

(d) It was reported that Mr. Kay had been successful in enrolling a further 25 members during the quarter ended September 30, 1957, bringing his personal total to 105 new members in 15 months.

Application for Affiliation

Resolved to grant affiliation forthwith to the Hastings and District Amateur Radio Club.

National Convention

Mr. Metcalfe reported that the Scarborough Amateur Radio Club were not yet in a position to submit a tentative programme. He anticipated, however, that the Club would be able to organize a Convention in Bridlington during the period September 18-20, 1958.

R.S.G.B. Amateur Radio Call Book

The Secretary submitted a Report on the progress made to date in connection with the production of the 1957-58 edition of the *Call Book*.

Region 11 O.R.M.

Mr. Newnham and the Secretary outlined the various matters raised at the Region 11 Meeting.

The two most important matters discussed were (a) the possibility of the Society contributing programmes to the B.B.C. Network III, and (b) a suggestion that at some future date North Wales (Region 11) should be linked with Region 1 and South Wales (Region 10) with Region 9.

Resolved to receive the Reports submitted verbally by Mr. Newnham and the General Secretary.

The Society's Patron

Mr. Milne offered to pay for the cost of purchasing a copy of the portrait of His Royal Highness, The Prince Philip, Duke of Edinburgh, painted by Signor Annigoni, and for the cost of framing the portrait.

Resolved to accept with grateful thanks the generous offer made by Mr. Milne.

Bulletin Drawings

Resolved to pay at the rate of 7/6d. an hour for work done in connection with the preparation of drawings for the BULLETIN and other Society publications.

(For the past 5 years the Society has paid at the rate of 5/- per hour for this Service.—EDITOR.)

Headquarters Telephone Service

Proposals which would lead to the saving of about £10 per annum (based on the new G.P.O. charges) in connection with the telephone service at Headquarters were approved.

Meetings at the I.E.E.

It was reported that the Institution of Electrical Engineers had given notice that as from January 1, 1958, the cost of buffet refreshments would be increased in accordance with the following scale:—Tea and biscuits, 7d. per head; Tea and cake, 9d. per head; Tea, sandwiches and cake, 1/10d. per head.

Resolved to provide tea and cake for members attending meetings at the I.E.E.

(At present the Society provides tea, sandwiches and cakes for members who attend meetings at the I.E.E. at a cost of 1/6d. per head).

Résumés of Minutes of Meetings of the Committee

In view of the short period that elapses between the time the Résumés of Minutes of Meetings of the Council reach Regional and County Representatives and the time the particular Résumé appears in print in the BULLETIN it was

Resolved to discontinue the practice of sending copies of the Résumés to Regional and County Representatives in advance of publication in the Society's Journal.

I.G.Y. and Russian Earth Satellite

It was reported that one of the Society's I.G.Y. Co-ordinators had attended a meeting at the Royal Society to consider how radio amateurs may be able to co-operate in the taking of observations of radio signals from the Russian earth satellite (See article in November 1957 BULLETIN entitled *Sputnik I.*—EDITOR).

The meeting terminated at 9.50 p.m.

Society News

Trophies

THE following Society trophies have been awarded by the Council for the current year in addition to those listed on page 191 of the October 1957 issue of the BULLETIN:—

Somerset: Mr. I. T. Cashmore (G3BMY) winner of the First 1957 Top Band Contest.

Mitchell-Milling: Mr. N. H. Munday (G5MA), winner of the Two Metre Open Contest.

1950 Council: Mr. J. K. Finch (B.R.S. 15688), winner of the D/F National Final.

Edgware: Surrey Radio Contact Club, winners of the Affiliated Societies' Contest, 1957.

Houston Fergus: Mr. J. J. Yeend (G3CGD), winner of the Low Power Field Day.

Watts: Mr. A. L. Mynett (G3HBW) in connection with 1250 Mc/s Tests.

Braaten: Mr. F. J. U. Ritson (G5RI), leading English R.S.G.B. member station in the 1957 A.R.R.L. DX Telegraphy Contest.

Milne: Mr. J. Banner (GW3ZV), leading R.S.G.B. U.K. member station other than English in the 1957 A.R.R.L. DX Telegraphy Contest.

The Desmond, 1930 Committee, Whitworth and Metcalfe Trophies will be awarded after the entries for the Second Top Band, Low Power and Telephony Contests have been judged.

Miniature trophies have been awarded to Messrs. H. Boakes (G8SB) and Derby and District Amateur Radio Society (G3ERD) as winners of the First and Second Two Metre Field Days, and to Mr. G. A. Jeapes (G2XV) winner of the 70cm Contest.

R.S.G.B. Amateur Radio Call Book

THE 1957-58 edition of the *R.S.G.B. Amateur Radio Call Book* is now on sale.

This is the most comprehensive list of United Kingdom call-signs ever published as it includes practically every call issued up to about the middle of October 1957. The exceptions are the few amateurs who, for personal reasons, do not wish details of their call-signs to be published.

The new edition runs to 72 pages—8 more than the previous edition—and contains in addition to the call-sign material, lists of International prefixes in prefix and country order, the R.S.G.B. QSL Bureau rules, information about the R.S.G.B. and an application form for membership.

The price of the new edition is 3/6 (by post 4/-).

T.R.s and Club Secretaries will assist Headquarters and local members by placing bulk orders at the rate of 3/6 a copy, plus the cost of postage and packing (2/6 in the case of lots of one dozen).

National Convention proposed for 1958

AT the November meeting of the Council consideration was given to a proposal put forward by Mr. W. R. Metclafe (G3DQ) that the Society should hold a National Convention in Bridlington, East Yorkshire during the period September 18-20, 1958.

In order to obtain some idea of the amount of support which is likely to be given to a Convention in Bridlington, members interested in the proposal are invited to write either to Mr. Metcalfe, 12 Cliff Street, Bridlington, or to the General Secretary at R.S.G.B. Headquarters.

Christmas Arrangements

MEMBERS are asked to note that Headquarters will be closed from about 4.15 p.m. Christmas Eve until 9.15 a.m. on Monday, December 30, 1957. Orders for Society publications, diaries, ties, blazer badges, etc. required as Christmas gifts should be posted to reach Headquarters by not later than December 19, 1957.

Society Christmas Card

SUPPLIES of the Society's Christmas card are now available from Headquarters, price 10/- per dozen post free, including envelopes. The card, which is of distinctive design and printed in red, has been produced by W. R. Royle & Son Ltd., the well-known London firm of printers.

Appeals for Rare Drugs

MEMBERS are advised that the policy of the British Red Cross Society is not to accept requests for rare drugs from individual radio amateurs even when such requests are passed on to them via the police authorities. The British Red Cross Society recommend that when a United Kingdom amateur is asked by a foreign amateur to accept a message for a rare drug he should advise the sender to contact his National Red Cross Society.

Only requests from, or through, National Red Cross Societies, can be dealt with by the British Red Cross Society and any drugs obtained would be sent to the National Red Cross Society concerned.

Certificate Claims

MEMBERS who forward claims for R.S.G.B. operating certificates and awards are asked to enclose sufficient stamps or a remittance to cover the cost of the return of the cards. Cards will not be returned by registered post unless a special request has been made and sufficient stamps enclosed.

Claims should in all cases be sent direct to the R.S.G.B. Honorary Certificates' Manager (Mr. C. R. Perks), 74 Long Lane, Newton, near Walsall, Staffs, England and not to R.S.G.B. Headquarters.

Cards from overseas will be returned, after checking, as commercial papers, and will be registered only if sufficient postage has been sent with the claim.

Receipts

IN order to reduce expenditure, receipts for subscriptions paid by cheque, bankers' order or postal order will, in future, not be sent unless especially requested. Receipts will be drawn as usual and kept on file at Headquarters for at least six months.

An estimated annual saving of £60 on postage charges will be achieved if members are willing to forego receipts.

GB2RS Schedule

THE R.S.G.B. News Bulletin is now being radiated on frequencies in the 3·5, 7 and 145 Mc/s bands. The schedule is as follows:

3600 kc/s	Sundays	10 a.m.	(London)
		12 noon	(Yorkshire)
7100 kc/s	Sundays	10.30 a.m.	(London)
		12.30 p.m.	(Yorkshire)
145·55 Mc/s	Sundays	11.15 a.m.	(beaming South-East from Leeds)
		11.30 a.m.	(beaming South-West from Leeds)
		11.45 a.m.	(beaming North from Leeds)
145·5 Mc/s	Sundays	12 noon	(beaming North from Well Hill, Kent)
		12.15 p.m.	(beaming West from Well Hill)

Photographs Wanted

OFFERS of photographs of amateur stations are invited for reproduction in the new edition of *The Amateur Radio Handbook* now in preparation.

Prints should show complete working stations and the majority of the equipment should be home-constructed. Compact living-room installations and large operating consoles are equally suitable, but preferably the operator should not appear in the picture.

High contrast and sharp focusing are essential and the prints must be on glossy paper.

Please send all offers and photographs (which will be returned if not used) to the Editor of the *Handbook*—Mr. S. K. Lewer (G6LJ), 50 Chaldon Common Road, Chaldon, Caterham, Surrey.

London Lecture Meeting

ABOUT 35 members were present at the Institution of Electrical Engineers on Friday, November 29, 1957, when Mr. F. Horner, M.Sc., A.M.I.E.E., of the D.S.I.R. Radio Research Station, Slough, lectured on "Some Aspects of Atmospheric Radio Noise."

The chair was taken by the President (Mr. D. A. Findlay, D.F.C.) and a vote of thanks to the Lecturer was proposed by Mr. C. E. Newton (G2FKZ).

R.S.G.B. Amateur Radio Call Book Correction List

THE following are corrections to the 1957-58 Edition of the R.S.G.B. Amateur Radio Call Book:—

G2PU S. R. Kharbanda, "Ivett Lodge," Newton Road, Harston, Cambs.

G3KIN Kingston and District Amateur Radio Society, c/o R. S. Babbs, 5 Penryn Road, *Kingston on Thames, Surrey.*

G8DR D. R. Aston, 204 Cricklewood Lane, *London,* N.W.2.

G8TL C. H. L. Edwards, 28 Morgan Crescent, *Theydon Bois,* Essex.

1250 Mc/s Tests, 1957

ACTING on the advice of the Contests Committee, the Council has awarded the *Arthur Watts Trophy* to Mr. A. L. Mynett (G3HBW) in connection with his work on 1250 Mc/s.

The only other entry received for the 1957 Tests was from Mr. D. N. Corfield (G5CD).

Radio Amateur Emergency Network

By C. L. FENTON (G3ABB)

THERE are now a number of petrol electric generators on the market, at prices ranging between £5 17s. 6d. and £10 10s., depending on condition and spares. The various models give 6, 12 or 24 volts at up to 80 watts, from a 300 cycle generator with metal rectifier. The engines are four-strokes. These would run a ZC1 for about 24 hours on nine pints of petrol, and look a useful buy.

News from the Groups

The **Ilford** group is being reorganized under the leadership of G2BCX. Interested members are asked to establish contact with him. **Nottingham.** Activity continues to increase slowly but surely under the guiding hand of G8ON. **Taunton.** The local British Red Cross branch require an installation in their Headquarters, as a base station for exercise and emergency use. The project is proceeding slowly, and more members are required to assist in installing and manning this station. Offers of help to the County Controller, G5TN.

Ipswich. A new group is being formed, with G3DPH as Area Controller. **Yorkshire.** On September 28, about 100 officers of the British Red Cross Society attended a conference at Scarborough. The afternoon and evening sessions were devoted to R.A.E.N. R.A.E.N. Chairman, Lt. Col. A. C. Dunn (G2ACD) was formally introduced by Sir Franklin Gimson, and then spoke on the aims and history of R.A.E.N. This was followed by a demonstration exercise. Four mobile equipped cars were in the field, each accompanied by a Red Cross observer. Two stations were in operation from conference headquarters, maintaining contact with the mobiles on the West Pier and at the Burniston Road Barracks. Assisting in this exercise were G2ACD/M, G2YS/P, G3AWL/M, G3FVW/P, G3GBH/A, G3GUV, G3JBR/A, G3JOO/M, G3JYH/M and G3LXS. At the conclusion of the day's events, Lady Margaret Illingworth thanked all helpers for their efforts. Admiral Dick represented the Deputy C.-in-C. of the St. John Ambulance Brigade, whilst the Chief Constable for the North Riding of Yorkshire was represented by an Inspector as observer. Another very interested observer was Alec Scott (4S7AM).

Personnel

The following have been appointed *County Controllers:* T. Griffin (G3GUV), 22 Albert Terrace, Middlesbrough; D. F. Willies (G3HRK), The Wilderness, Grove Road, Holt, Norfolk.

The following have been appointed *Area Controllers:* E. Greebe (G3LFU), 79 Spinney Road, Thorpe, Norwich; W. E. H. Harris (G3DPH), 4 Glanville Place, Kesgrave, Ipswich, Suffolk.

A. F. Dennis, County Controller for Birmingham, now resides at 47 Hemlingford Road, Walmley, Sutton Coldfield.

New R.A.E.N. Committee Secretary

By the time this issue of the BULLETIN is published, E. A. Matthews (G3FZW), whose appointment as Deputy Honorary Secretary of the R.A.E.N. Committee was announced last month, will have taken over from the writer as Honorary Secretary of the Committee and as conductor of the R.A.E.N. news feature. All reports and correspondence should therefore be sent to Mr. Matthews.

The writer would like to take this opportunity of thanking all R.A.E.N. members for their support and encouragement during his term of office and the officials of the British Red Cross Society for their co-operation.

Tests & Contests

Affiliated Societies' Contest, 1958

APPLICATIONS to take part in the Affiliated Societies' Contest to be held on February 8 and 9, 1958, should be addressed to the Contests Committee, Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1, and must be post marked not later than **December 31, 1957.**

The rules governing the contest will be effectively the same as last year but a copy of the complete rules will be sent during January with the official list of competitors to each society taking part. Non-competitors may obtain a copy by sending a stamped addressed envelope to R.S.G.B. Headquarters.

The contest will take place between 18.00 and 23.00 G.M.T. on both February 8 and 9 and telegraphy only will be used.

Low Power Field Day, 1957

ONCE again John Yeend (G3CGD) has emerged winner of the Low Power Field Day, snatching victory by only three points from D. G. Alexander (G3KLH). Despite his score—90 points from 36 contacts—G3CGD had his troubles, both transmitter and receiver being found inoperative on the bands at the commencement of the contest, necessitating hurried re-winding of the coils. G3CWL's receiver also misbehaved, whilst a capricious breeze wafted G3HTI's kite borne aerial over the roof of a nearby house.

All but six of the contacts appearing in the logs were made on 3·5 Mc/s, although the only overseas QSO, between G3DTA and PA0DW, was on 7 Mc/s. A number of competitors felt that the high level of QRM on 7 Mc/s and the absence of portables working there to provide high scoring contacts made it a waste of time to go on the band at all. Top Band has been suggested as more appropriate for low power working. This and other points raised will be considered by the Contests Committee when framing the rules for next year's event.

Check logs from G3DXJ, G3FBA and G6AH are acknowledged with thanks.

Results Low Power Field Day September 1, 1957

Posn.	Call-sign	Contacts	Points
1	G3CGD	36	90
2	G3KLH	32	87
3	G3BZM	23	60
4	GW3GHC	25	52
5	G3CWL	19	49
	G3ISU	13	49
7	G6GH	14	46
8	G3HTI	17	45
9	G8NN	11	38
10	G3DTA	10	37
11	G3GDW	10	26

Second 144 Mc/s Field Day 1957

EXACTLY half the mobiles active during the Second 144 Mc/s Field Day sent in logs, the proportion of portables submitting entries being distinctly better. Altogether 41 entries (33 portable and eight mobile) and four check logs were received. Conditions were poor for DX working and the weather appeared to vary considerably.

Several comments were made about the lack of stations north of the Midlands, some suggesting it might be due to " district " holidays in those areas.

Normally transmitted reports and locations appear to have been passed successfully without much mutilation but in the checkable contacts errors in calculating distances were extremely high. Mobiles were wrong in 88 per cent of their calculations and portables in 84 per cent. Admittedly the distances involved were only 2 to 3 miles in most cases but some exceeded 25 miles! The errors were both for and against contestants.

N.G.R.s were requested on entries to enable the Contests Committee arithmetically to settle any distance in query, but again they were either reversed, read incorrectly or omitted entirely. Final distances for the leading stations were therefore measured on a 10 miles per inch map. All other scores are given as claimed. To check all logs would have been a task to no end.

The Portable Section was won by the Derby and District Amateur Radio Society who made 76 contacts under their call-sign G3ERD/P using a modified SCR522 transmitter running 15 watts to a 16-element stack. On the receiving side, a converter feeding into an HRO was used. The runners-up in this section were W. James (G6XM/P) and R. Palmer (G5PP/P).

In the Mobile Section, A. Smith (G3AYT/M) of Hyde, Cheshire, came first with a score of 3592 from 48 contacts. His transmitter comprised a 12AT7 overtone oscillator and doubler, two 6BW6 doublers and a QQV03-10 running 15 watts input. The modulator line-up was EF91, ECC82 and ECC83 in zero bias class B. Two aerials were used—a half-wave horizontal dipole clipped to the top of the nearside window and a home-built collapsible 4-over-4 slot fed Yagi. The mobile runners-up were J. W. Woodfield (G3HZK/M) and E. Shackleton (G6SN/M) of Birmingham.

Check logs from G2AHY, G2AUD, G3HBW and GW3GWA are gratefully acknowledged.

Results—Second 144 Mc/s Field Day, August 18, 1957

Posn.	Call-sign	Location	Contacts	Points
		Portable Section		
1	G3ERD/P	15m. N. Derby	76	7731
2	G6XM/P	8m. E. Leicester	78	7645
3	G5PP/P	6m. N.W. Coventry	77	7598
4	G8SB/P	8m. S. Buxton	74	7520
5	G3KEQ/P	4m. E. Guildford	68	7387
6	G2HCJ/P	5m. W. Mold	60	7307
7	G3GNS/P	4m. W. Wells	61	7081
8	G3BA/P	8m. S.W. Birmingham	70	7072
9	G8UQ/P	7m. S.E. Basingstoke	66	7010
10	G3JWQ/P	9m. S.E. Leek	58	6097
11	GW3BOC/P	4m. W. Wrexham	47	5363
12	G3JMA	3m. S.W. Royston	54	5335
13	G3ION/P	4m. S.E. Shaftesbury	53	5342
14	G8QY/P	5m. S. Birmingham	50	4990
15	G3FD/P	2m. S. Dunstable	63	4769
16	G3KAG/P	18m. N. Derby	61	4732
17	GW8UH/P	6m. N.W. Newport, Mon.	42	4652
18	G3LHA/P	4m. E. Coventry	53	4645
19	G3GQK/P	2m. E. Caterham	58	4549
20	G3IRA/P	4m. S.E. Swindon	47	4408
21	G3GGR/P	2m. S.E. Dudley	52	4353
22	G3JXN/P	2m. S.W. Wendover	44	3773
23	G3GNR/P	4m. N.W. Brighton	47	3478
24	G3KCE/P	5m. W. Wigan	36	3384
25	G3KSR/P	5m. W. Winchester	41	3307
26	G3BFP/P	3m. E. Guildford	43	3042
27	G2DUS/P	5m. N. Baldock	36	2891
28	G3GYV/P	5m. S. Tarporley	35	2816
29	G8LM/P	6m. N. Hertford	41	1953
30	G3ATM/P	5m. W. Huddersfield	26	1839
31	G2QY/P	2m. S.W. Wendover	25	1837
32	G4BP/P	2m. S. Scarborough	10	1394
33	G3HHY/A	3m. S. Chipping Sodbury	7	448
		Mobile Section		
1	G3AYT/M	Various	48	3592
2	G3HZK/M	2m. E. Coalville, Leics.	34	3153
3	G6SN/M	Various	32	2877
4	G2AHL/M	Various	27	2513
5	G2DSW/M	5m. S. Poole	21	1665
6	G8SC/M	Various	17	1375
7	G4IB/M	Various	20	1290
8	GW8MZ/M	2m. N.W. Llandudno	10	1111

Rules for National Field Day, 1958

THROUGHOUT the following rules for National Field Day, 1958, the word "group" means R.S.G.B. Groups and Affiliated Societies with properly appointed A.S.R.s.

1. The contest will commence at 17.00 G.M.T. on Saturday, June 7, 1958, and conclude at 17.00 G.M.T. on Sunday, June 8, 1958.
2. Only groups having official R.S.G.B. representatives may enter for the contest.
3. Operators must be fully paid-up Corporate Members of the R.S.G.B. at the time of the contest and must each hold a current British Isles (G.P.O.) Amateur (Sound) Licence.
4. Each competing group will be permitted to place two stations ("A" and "B") in operation. "A" stations must select any three of the six frequency bands in use in the contest (1·8, 3·5, 7, 14, 21 and 28 Mc/s); the other three frequency bands will be allocated to the "B" station, i.e., no group may operate two stations on any one frequency band. Both stations may operate from the same site or from different sites, provided that they are located within the agreed limits of the area covered by their Regional Representatives. It will be permissible for two groups within a single region to amalgamate for the purposes of scoring. Single-station entries will be accepted for stations operating on not more than three of the frequency bands listed above.
5. Each station must be licensed to use a different call-sign.
6. Applications to enter N.F.D. may be made only by R.S.G.B. representatives, on the form which will be circulated not later than February 28, 1958, from Headquarters. The application is necessary to enter the contest and will include details of the frequencies chosen for each station entered—the choice of frequencies may not be varied after the closing date for applications.
7. Applications, duly signed, addressed to the R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1, must be postmarked not later than **March 31, 1958.**
8. Stations must be operated from tents.
9. No apparatus may be erected on the site prior to 12.00 G.M.T. on June 7, 1958. This rule includes aerials and aerial fittings as well as tented accommodation for the stations. This does not apply to a tent to be used for storage purposes.
10. Any aerial may be used up to a maximum of four per station (including the receiving aerial), subject to the following limitations:
    (a) All aerials must be constructed from wire of total cross-sectional area not greater than that of 14 s.w.g. with the exception, however, that masts may be used as vertical radiators.
    (b) No part of the aerials shall exceed a height of 45 ft. above ground level.
11. Equipment at any "A" or "B" station must not exceed three transmitters and one receiver. Reserve equipment may be kept available, but not connected.
12. Total d.c. input to the anode circuit of the valve or valves energizing the aerial, or to any previous stage of the transmitter, shall not exceed **10 watts.**
13. Power for any part of the station shall not be derived from supply mains.
14. The contest is restricted to the use of c.w. (A1) only.
15. An exchange of reports must be made and acknowledged before points may be claimed. Contacts between competing stations must include a rising serial number commencing with 001 and increasing by one with each successive contact, **irrespective of band,** made by the station (e.g., RST 579001, etc.) and such serial numbers, both incoming and outgoing, together with signal reports, must be entered on the log sheets. Proof of contacts may be required.
16. Only one contact with a specific station, whether fixed, portable or mobile, may be made on each band during the contest.
17. Points must not be claimed for contacts made by a competing station with other stations within its own town or area or with members of its own group, whether fixed, portable or mobile.
18. Points will be scored on the following basis:

(a) Fixed, mobile and non-competing portable stations in the British Isles	1 point
(b) Fixed stations in the rest of Europe including Eire ...	2 points
(c) Fixed stations outside Europe	3 points
(d) Fixed stations in the British Commonwealth and Empire ...	6 points
(e) Competing portable stations in the British Isles	*3 points
(f) Portable stations in the rest of Europe including Eire ...	4 points
(g) Portable stations outside Europe	6 points
(h) Portable stations in the British Commonwealth and Empire	12 points

*An additional point may be claimed **on 1.8 Mc/s ONLY** for contacts with a competing portable station in any other British Isles prefix zone (e.g., GM-G, GM-GD, GW-GC, G-GI contacts on 1·8 Mc/s score four points). The six British Isles prefix zones are G, GC, GD, GI, GM and GW.

N.B.—For contacts within the British Isles the portable-to-portable scoring rates apply **ONLY** for contacts between stations listed in the official list which will be circulated with the log sheets from Headquarters. Contacts with Mobile or **UNLISTED** portable stations will score one point only.

19. An entry will be valid only if signed by the R.S.G.B. representative, who will be solely responsible for the conduct of the event in his group.
20. Contacts made by an operator whose personal signature does not appear on the covering sheet(s) of the appropriate log(s) will be disallowed.
21. Each station's entry shall consist of extracts on the official log sheets from the station log, a separate extract being submitted for each band worked, together with a cover sheet for each band, and a summary sheet. Forms for this purpose will be supplied by Headquarters. Entries must be addressed to the R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1, **postmarked not later than June 23, 1958. LOGS MUST BE KEPT AND ENTRIES SUBMITTED IN G.M.T.**
22. In addition to the *National Field Day Trophy* and miniature which will be awarded to the group obtaining the highest combined score, miniature replicas will be awarded to the groups with the highest score on each frequency band. A certificate will be awarded to each of the following: (a) the chief operator of the overseas station whose log shows that he contributed the most points to competitors; (b) the chief operator of the British Isles station whose check log shows that he contributed the most points to competitors.
23. The *Scottish N.F.D. Trophy* (together with miniature) will be awarded to the Scottish group scoring the highest number of points.
24. The *Bristol Trophy* will be awarded to the group which having entered only one station shall obtain the highest number of points in comparison with other groups entering on a similar basis.
25. The trophies will be handed to the R.S.G.B. representative of the groups concerned, who will be responsible for their safe keeping until their return is requested by Headquarters.

Contests Diary

1958

January 25-26	-	B.E.R.U. Contest[1]
February 8-9	-	Affiliated Societies' Contest[3]
March 1-2	-	First 1·8 Mc/s Contest
March 2	-	144 Mc/s Open Contest
May 4	-	D/F Qualifying Event
May 4	-	First 144 Mc/s Field Day
May 18	-	420 Mc/s Open Contest
June 1	-	D/F Qualifying Event
June 7-8	-	National Field Day[2]
June 21-22	-	First 70 Mc/s Contest
June 22	-	D/F Qualifying Event
July 6	-	Second 144 Mc/s Field Day
July 14	-	D/F Qualifying Event
September 6-7	-	European V.H.F. Contest and National V.H.F. Contest (both under Region I I.A.R.U. Rules)
September 6-7	-	420 Mc/s Contest
September 6-7	-	1,250 Mc/s Tests
September 7	-	D/F National Final
September 14	-	Low Power Field Day
September 28	-	R.A.E.N. Rally
October 4-5	-	Low Power Contest
November 8-9	-	Second 1·8 Mc/s Contest
November 15-16	-	Second 70 Mc/s Contest
November 22-23	-	21-28 Mc/s Telephony Contest

[1] See page 27, R.S.G.B. Bulletin, July 1957.
[2] See page 287 R.S.G.B. Bulletin, December 1957.
[3] See page 286 R.S.G.B. Bulletin, December 1957.

The attractive QSL card, donated to the Society by Mullard Ltd., used to confirm contacts with GB3RS/A at the recent Radio Hobbies Exhibition.

Letters to the Editor . . .

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents.

Bristol N.F.D. Trophy

DEAR SIR,—As the donors of the Bristol N.F.D. Trophy mentioned by Mr. W. Farrar (G3ESP) in his recent letter, we are sorry to learn that the Pontefract Group are grieved at the conditions governing its award.

This is perhaps an opportune moment to state that these conditions were most carefully considered by us before the trophy was offered to the Society. In Bristol we have a strong and, we are glad to say, flourishing group and thus have no difficulty in entering two stations for N.F.D. each year. It was with thoughts in mind of the less fortunate groups—those whose enthusiasm permits of their entering the contest but only in a small way due to their limited resources—that the suggestion came forth to offer a trophy to the most successful group with only one station in the field. From the comments which have come our way subsequently we are encouraged to believe that our little trophy has been warmly welcomed by the groups concerned and that it has provided them with an incentive which was formerly lacking.

The goal of all groups entering N.F.D. is, of course, to win the coveted shield but this is well-nigh impossible with only a single station. Each year a number of these nevertheless take part in the contest and now they have a trophy which can be won by such an entry. Mr. Farrar suggests that a group capable of entering two stations could concentrate on one solely to win the Bristol Trophy but he then states that Pontefract will never do this. Surely, Sir, no other similar group would either—the N.F.D. Shield is too attractive a carrot to dangle!

Mr. Farrar and his colleagues evidently feel that the need exists for a further trophy for N.F.D. If this view is generally held we in Bristol, as whole-hearted supporters of the event, would most willingly contribute something towards a fund for its provision.

Yours faithfully,
On behalf of the Bristol Group,
Bristol. F. H. CHAMBERS (G2FYT), T.R.

DEAR SIR,—As a very small group Lewisham can hardly hope to win the N.F.D. shield. The group runs a station as best it can to give the others some points and with the rather remote hope that some day it may do well enough to bring home the Bristol Trophy.

Compared with Lewisham the Pontefract group has an untold wealth of active N.F.D. operators and really it seems rather greedy of them to expect their own (or any other) two station entry to qualify both for the N.F.D. Shield and the Bristol Trophy.

Please let there be a little incentive for the gallant dozen or so groups who often really struggle to put on just the one station.

I like to think that this was what the donors of the Bristol Trophy had in mind and hope that the suggestions put forward by Pontefract will be rejected accordingly.

Yours faithfully,
Bromley, Kent. J. WILSHAW
(Scribe for Lewisham Area Group.) (B.R.S. 18936)

DEAR SIR,—We are unable to understand the outlook of G3ESP and his colleagues, who having failed to gain the premier award complain that they were not presented with a trophy awarded to stations with fewer operators and smaller resources than they themselves were fortunate enough to have. That there are such cases is evidenced by the fact that there were no less than 22 stations unable to send in more than one entry. We do do not know how many operators Pontefract consider desirable, though we note that the winners, Slough, were able to find only six for two stations. They also were fortunate. In Port Talbot we had exactly half that number and therefore entered only one station. Had we had one or two more we would have put in two stations, but unlike Pontefract would not have complained about the results.

The conditions governing the award of the Bristol Trophy were laid down by the Bristol Group and accepted by us in good faith. If Bristol wish to change those conditions, they are of course at liberty to do so, but that cannot alter the fact that Pontefract and the other stations listed in the letter were not in the category referred to in Rule 25 of the Contest conditions.

We shall be pleased to present a perpetual trophy to be competed for by Pontefract each year—all other stations to be debarred.

Yours faithfully,
G. E. EVANS (GW2AVV).
Port Talbot, Glam., S. Wales., On behalf of the Port Talbot N.F.D. Team of Operators:
R. EDWARDS (GW3BQY). C. JAY (GW3KSQ).

Licence Abuses

DEAR SIR,—I noticed on page 177 of the October BULLETIN a small paragraph headed " Take Heed." How very much needed is this warning and whoever is responsible is to be congratulated.

In listening round the various bands it is perfectly obvious that in numerous cases the person using the microphone is not the licensed operator. For a wife of one amateur to say " how do " to another operator's wife can be overlooked, but one hears women's voices absolutely monopolizing the " air " hour after hour. Even mobile is affected this way and some of the voices are not even pleasant.

Sincerely,
Essex. "SMITHY."

Amateur v. Commercial

DEAR SIR,—I have been interested in the Amateur v. Commercial controversy, having for some time held the view that a commercial company should, with superior equipment, be able to produce better transmitters than the amateur.

As a result of claims in advertisements, and having less time at my disposal than years ago, I was induced to buy a commercial all-band transmitter. After having accepted delivery of several of these sets which proved unsatisfactory, I received a final set which also broke down almost immediately. With the generous help of a well-known firm of condenser manufacturers, who sent me, gratis, several types of capacitors to replace those breaking down (which apparently were being over-run), I was able to make this set serviceable. The interest and gesture of the company concerned was certainly appreciated.

The advertisement relating to the set claimed that it puts out a T9 note (which unsolicited reports very much disproved above 3·5 Mc/s) and that it is " TVI proof " (which my neighbours and the G.P.O. are both unable to confirm).

By comparison with the operation of several amateur-built transmitters locally, tested by G.P.O. equipment under the same conditions, my faith in commercially made transmitters has been somewhat shaken.

Incidentally, requests to the company concerned for the return of several pounds deposited with them until the return of the transmitter crate, have been evaded by an excuse of carriage charges. A later request to honour this promise was completely ignored!

If this is " Commercial Amateur Radio " I suggest that we can get on well without it and the sooner members are prepared to pay an economic subscription for the Society's services, the sooner can some of the advertising matter be dispensed with. I think some of us, after all, may be excused a few nostalgic memories of our more happy Amateur Radio experiences in the late twenties and thirties.

Yours faithfully,
Uplands, Bristol. REGINALD E. GRIFFIN (G5UH).

No Support for Extra Class Licenses or Higher Power

DEAR SIR,—Since the mention of Extra Class licences in *Current Comment* last May, two correspondents have written in support of an increase of the maximum power input.

We are of the opinion that the highly efficient amateur already has his reward, i.e. he can emit a strong, clean, intelligible signal that can put him " head and shoulders " above the less efficient and less knowledgeable remainder.

Certain minorities have always been in favour of Extra Class licences and various reasons are given why these should be permitted. The real reason for the request, rarely mentioned, is that these minorities wish to use more power than the average amateur in order to assist them in their particular activities. If Extra Class licences were permitted surely they would encroach

on the facilities granted to holders and future holders of the present licence who may not be able to obtain one.

If such a licence were granted what qualifications would be required to obtain one? Not all amateurs are both highly efficient as operators and technicians although of course there are exceptions. To place too much importance on c.w. operating might exclude technicians who are making contributions to the development of s.s.b. and other new introductions to amateur communication. On the other hand to make the technical requirements high would exclude practically all those not engaged in some form of electrical engineering.

We submit, therefore, that there should be no distinction between amateurs all having the same facilities once they have the qualifications and given proof of their practical capabilities, if necessary by means of a probationary period or novice operation. One would not ask for an advantage for experience and ability in a game or sport, in fact, quite the opposite is generally the case.

Some amateurs believe that we would benefit by a general raising of the power limit as other countries seem to be doing. We believe that the lowering of power limits would benefit the average amateur everywhere and that an international limit should be imposed, say in the region of 100 watts and certainly not more than 200 watts. Worldwide communication is possible using less than 50 watts and the use of higher power means generally a higher level of interference.

The achievements of amateurs are notable not because of the use of high power but because they have made what was once considered difficult or impossible, commonplace.

Extra Class licences and/cr raising the present power limit would affect *all* amateurs and the R.S.G.B. should consult its members individually before making any approach to the authorities. We are sure they will find that the average amateur does not want a raising of power limits, and, in fact the vast majority of amateurs throughout the world would welcome an international power limit of 100-200 watts. As the R.S.G.B. should represent the majority their policy should be clear.

Yours faithfully,
T. J. BROOKE (GW3GHC).
Cardiff. T. HIGGINSON (GW3AHN).

Another Plea for a Novice Licence

DEAR SIR,—Last February, in a letter to the BULLETIN, I suggested that in order to increase (*a*) membership of the Society and (*b*) occupancy of the v.h.f. bands, the Council should negotiate for the issue of a Novice licence.

This licence was to be granted to persons who passed the technical examination and would allow them to operate for a probationary period of 12 months on the v.h.f. bands. At the end of that period if they could not pass the Morse test, then their licence would be withdrawn.

I was glad to see that the Council gave it their consideration at their March meeting but regret that no official reasons were given for rejecting the suggestion.

There has been some measure of support for my proposal both in the correspondence columns and letters sent to me. Only two persons—G3FPK and J. H. in *Current Comment* for May—have been against. Summarized, their objections are as follows:

" *Makes it too easy compared with pre-war licensing conditions.*"

Does it? Pre-war, to obtain a licence, one applied to the P.M.G. giving three reasons for desiring a licence. An A.A. licence was granted and for a minimum period of six months the licensee was allowed to construct transmitting gear and after coupling up to an Artificial Aerial was permitted to carry out tests and keep a written record of experiments. (For the benefit of post-war members an A.A. was a piece of apparatus that existed in the imagination of the Post Office.) At the end of that period, a Morse test could be taken and a licence followed. There was no question of long months of study followed by an examination set by an authorized body—fortunately for many of us!

What could have been easier than that?

" *Troubles, technical, of American novices.* "

If a Novice passes the technical examination why should he cause more trouble on technical grounds than any other licensed amateur? Does a knowledge of Morse automatically make an operator technically better?

" *Lowering of the present standard.* "

What is the present standard? How many operators does one find today who cannot read code at more than 5 w.p.m.? We all know there are dozens of operators who have never handled a key since they were licensed and there are quite a few amateurs who by reason of their wartime trades were exempted a code test even though they had never touched a key.

" *Abolition of Morse test.* "

Never been suggested.

Now, has the general position altered since last February? I have not seen any figures, but am looking forward to the publication of *home* membership figures in the Annual Report. I hope they have increased.

Has there been increased activity on the v.h.f. bands? Judging from reports in the BULLETIN I don't think so and from my personal experiences on the band from –/A and –/P sites I would say there has been even less apart from about three " openings " during the season.

Once again I think my suggested Novice licence will help both cases. In the immediate future more and more young people are being trained as technicians and scientists. We want them in the Society. Most of these youngsters will be able to take the technical examination in their stride but jib at the idea of learning Morse, thinking, rightly or wrongly, that it will take up too much of their time and/or interfere with their studies, or even consider it hard to learn. However, once they have been able to construct their own gear—or even buy it!—and experience the joys of being on the air, I haven't the slightest doubt that the majority will then get down to the business of learning the code and so preserving their licences.

I have no personal axe to grind in this matter. Ninety per cent of my contacts are on the key but I can quite understand other amateurs preferring phone. All I want, in common with most of us, is a strong Society and an active v.h.f. band and I consider a Novice licence issue would help both.

Yours faithfully,
Barnsley, Yorks. J. A. WARD (G4JJ).

Morse Is Still Used

DEAR SIR,—With reference to Mr. M. Barlow's letter in the October issue about Novice and Technician Licences, he may be interested to know that the following airlines use c.w. for passing traffic:

British: 1. B.O.A.C. 2. B.E.A. 3. Air Charter Ltd. 4. Skyways Ltd. 5. Britavia Ltd. 6. Scottish Airlines Ltd. 7. Eagle Aviation Ltd.

Foreign: 1. Olympic Airways. 2. El Al (Israel). 3. Middle East Airlines. 4. Turkish State Airlines.

I am certain there are far more than these few.

I do not seek to enter the for and against c.w. controversy, but I'm all for c.w. and the re-imposition of the 12 month and 25 watt limitation on licences.

Yours faithfully,
Scunthorpe, Lincs. G. P. LOVELOCK (G3III).

Are Operating Standards Falling?

DEAR SIR,—Much has been written—and voiced over the air—on the subject of falling standards in Amateur Radio, and I for one agree that a licence is now far too easily obtained. The BRS and the licensed amateur who listens between transmissions will bear testimony to the truth of this.

Current Comment (September issue) has much to commend it and I was particularly pleased to note the remark about c.w. operation. It is a great pity, I think, that the 12-month c.w. period has been eliminated and I trust that the 12 w.p.m. of Morse will always be a requirement for a licence.

I was rather taken aback, therefore on Sunday, September 15, when the illustrious operator of GB2RS concluded the first reading of the bulletin, apologized for the absence of the usual second operator and said that, in consequence, the Morse résumé would not be transmitted! One was tempted to draw all sorts of conclusions, but it is to be hoped that they would prove to be false.

Yours faithfully,
Hounslow, Middlesex. C. HARRINGTON (B.R.S. 2292).

The Top Band Special

DEAR SIR,—Having read with interest the article by Mr. H. S. Chadwick (G8ON) on his Top Band Special (September 1957 issue), there are two or three comments I should like to make.

Firstly, he states early in his article that a pi-network would be suitable, provided the output impedance is appreciably lower than that of the valve to which it is matched. Later, however, he contradicts himself by saying the ratio of capacitances C1 : C2 lie between 2 : 1 and 3 : 1, C1 and C2 being the inlet and outlet

capacitors respectively. This means that the output impedance s higher than the input. I presume he meant the ratio of capacitance reactances lying between 2 : 1 and 3 : 1, which would of course be correct.

Secondly he states that when shifting frequency to 1980 kc/s, the DX signal somewhat diminishes with a corresponding gain locally. May I offer my opinion on this phenomenon and a possible cure for same?

The aerial being roughly cut and loaded to resonate at 1835 kc/s brings a voltage loop at approximately point A in Figure 1 of the article. Increasing frequency to 1980 kc/s moves the voltage loop further away along the aerial to approximately point B. Point A now carries a greater aerial current and hence has a lower impedance. Similarly the current loop at point X has also moved in a downward direction towards point D, thus upsetting the effective height of the aerial and radiation pattern.

Now if the loading coil E had been left out and a condenser of approximately 200pF maximum capacity been joined between point F at the earth lead, G8ON would still have been able to load up the aerial to bring the current loop down to point X at 1835 kc/s. The capacity should be reduced to maintain maximum current at point X for 1980 kc/s.

Actually with this arrangement one can modify the radiation pattern, within limits, by varying the ratio between C2 and the additional condenser to suit either local or DX working. C1 would no doubt want readjustment to maintain proper loading. This additional capacity has the effect of balancing out the unbalanced capacitance to ground that exists between the top and bottom horizontal legs.

I personally think that the aerial's horizontal portions could be reduced by as much as 25 per cent without running into any difficulties when capacity loaded.

Thirdly, when the aerial is used on 3·5 Mc/s, it operates in the condition of two half-waves in phase at approximately eighth wavelength spacing thereby favouring broadside radiation, voltage loops approximately occurring at points A, X and naturally F.

Finally BCI. May I suggest an A.T.U. instead of direct feed?

Yours faithfully,

Stourbridge, Worcs. J. R. BRIDGWATER (B.R.S. 20960).

Mr. H. S. Chadwick comments as follows:—

" Firstly, I would confirm that the ratio quoted refers to the capacitances, not the impedances, of the capacitors C1 and C2. I am not sure whether Mr. Bridgwater considers that the output impedance of the pi-network must therefore be two or three times the impedance of the input, but this is clearly not the case, notwithstanding that C2 is at all times set to a lower capacity than C1. The p.a. runs at 30 mA, and has an impedance of about 10,000 ohms. The aerial current at the pi-net output is about 50 to 60 mA of r.f. If the output impedance exceeded the input impedance, therefore, the r.f. output would exceed the d.c. input.

"In my opinion, the capacitance of the aerial to earth is the reason, or perhaps the principal reason, for the curiously low capacitance at C2.

"Secondly, with regard to the effect on signals of a change in frequency, I fully agree with Mr. Bridgwater, but I hope he will forgive me for saying that I did not elaborate this point because I thought it was so obvious as he says. However, further experiment has shown that the DX signal is reduced very little indeed, without the need for further adjustment, as he suggests.

"Thirdly, I would have agreed that the aerial behaves on 3·5 Mc/s as two half-waves in phase ' thereby favouring broadside radiation,' but for the fact that signal reports given in most QSOs suggest that the maximum radiation is in the plane of the aerial. Data is not yet so prolific as to nail this point, but what there is, like the radiation, points the other way!

"Finally, BCI. Since the HRO is unable to detect any signal other than on Top Band, in its rightful place, I do not see how an A.T.U. would help—unless it acted as an attenuator. If there are no spurious responses to eliminate, an A.T.U. would have nothing but its insertion loss to add."

Bi-Square Aerials

DEAR SIR,—We have read with interest the article in the October issue of the R.S.G.B. BULLETIN, entitled *More about the Minibeam* by Mr. G. A. Bird, and note that on page 170 he makes reference to an aerial called the bi-square.

Will you please be good enough to make quite clear to readers of the R.S.G.B. BULLETIN that there is no connection whatsoever between this aerial and the Labgear Bi-Square (pat. applied for). The Labgear Bi-Square definitely yields a gain of 10dB over a resonant half-wave dipole, or approximately 12dB over an isotropic radiator. This is in accordance with our claim in our advertisement, that it provides more gain than any currently known three element beam.

Finally, it is felt that some readers might possibly regard the Labgear Bi-Square aerial as a two element array. This is definitely not so; it is indeed a four element array, and consequently it will be appreciated that Mr. Bird's remarks, " . . . while mathematicians continue to prove that a two element array cannot possibly have a gain of more than 6dB over a dipole," therefore do not apply in the case of the Labgear Bi-Square.

Your co-operation in clarifying this point would be appreciated.

Yours faithfully,

Labgear Limited

Cambridge. S. R. KHARBANDA. (Director.)

DEAR SIR,—I am glad that Mr. Kharbanda has raised this matter of the term " Bi-Square." My article in the October issue was prepared for publication some little time before the Labgear aerial appeared on the amateur market, and it is therefore clear that the gain figures I quoted apply to a normal amateur bi-square, and should not be regarded as referring in any way at all to the manufactured product of the same name.

The bi-square aerial first became popular some ten years ago, due to the efforts of Walt Smith, W6BCX, and John Alvares, CR9AG (now CR9AH and pre-war VS6AG) with whom I conducted a number of tests during 1948 and '49. The aerial is normally constructed in the form of a square, using either wire or tubing, the sides of the square being each a half-wave long. It can therefore be correctly described as a four-element array, and the current issue of the Editors & Engineers *Handbook* (14th Ed. p. 397) quotes the free space directivity gain as being four decibels, which agrees closely with the figures given in my article. The effective radiating portions of the Labgear aerial are only one quarter wave long, and the frontal area is much smaller than that of a normal bi-square. The general structure is in fact, almost identical with that of the well known cubical-quad, for which it will be noted, I have quoted considerably higher gain figures. (The Editors and Engineers *Handbook* quotes a gain of 8db.)

After hearing Mr. Kharbanda's excellent lecture on September 27, during the course of which gain figures as high as 12-13db over a dipole were quoted for the Labgear Bi-Square, I realized that a certain amount of confusion might arise. To avoid any misunderstanding, I prepared a short note for inclusion with my article, emphasizing that my figures related to a normal amateur bi-square, and not to the aerial recently introduced by Labgear Ltd.*

I do not think it would be proper for me to make uninvited comment on *any* manufactured article in a journal which is devoted to the Science and Advancement of Amateur Radio, but should Labgear *wish* me to make gain measurements on any of their aerials, I would be most happy to oblige, and let them know the results of my tests. I am fortunate in being associated with several research organizations which are willing to put their facilities at my disposal for making such measurements.

I hope this letter will clear up any misunderstanding which may have arisen, and in closing, I would like to wish Labgear every success with their new aerial. I am confident that all those amateurs who decide to use it, will find it an excellent aerial for long distance communication on the ten-metre amateur band.

Yours faithfully,

G. A. BIRD (G4ZU).

*Editor's note.—Unfortunately, Mr. Bird's note arrived too late for inclusion in the October issue, as the article had already been passed for press.

Feeding Beams

DEAR SIR,—Having read with interest Mr. G. A. Bird's article "More about the Minibeam " in the October issue of the BULLETIN, I feel I must voice a mild protest regarding his statement: " The writer is still convinced that the most efficient method of feeding *any* beam is with 300-450 ohm open wire feeder because the losses are about one fiftieth of those with co-axial cable, . . . "

Whether or not this condition exists with the " 4ZU " beam I have no knowledge, but it certainly does not apply to *any* beam. In my view, a well-designed aerial presents an accurate match to the transmission line to which it is connected, and by so doing,

avoids the occurrence of appreciable standing waves on the feeder. In such circumstances the feeder loss at 28 Mc/s for a 100 ft. run of the popular " fringe " type TV co-axial is about 10 watts for 100 watts of transmitter output power. That is to say, under these conditions 90 watts of r.f. get to the aerial. In the case of open wire line, the feeder loss under similar conditions is about 1 watt, so 99 watts of r.f. get to the aerial. Needless to say a variation of aerial power from 90 to 99 watts would be exceedingly hard to detect at a distant receiving point.

The advantages of correctly used co-axial such as its mechanical flexibility, low radiation, consistency of performance under all weather conditions, etc., are too well known to need elaboration.

Yours faithfully,
SANT R. KHARBANDA,
A.M.Brit.I.R.E., Assoc.I.E.E.
Harston, Cambs. (G2PU).

Folded Dipoles

DEAR SIR,—I was very interested to read the letter headed " Folded Dipoles," submitted by G3HAT and published in the October BULLETIN. He and others may like to hear of my experiments.

After ironing out all the difficulties in my home built transmitter many years ago and being equipped with an HRO, the future appeared settled. My 67 ft. Windom type aerial gave every satisfaction, handling 40 watts to perfection, at least I thought it did, but as time passed and DLs appeared in ever-increasing number, and G3s had almost exhausted the alphabet, I came to the sad conclusion that my signal at DX must be a very insignificant one, and something must be done about it.

I finally decided on a plain half-wave dipole with twisted feeder, random length. From the local chain store I bought 20 yds. of plastic-covered flex and in no time untwisted 33½ ft., taped up the centre into a 5 in. triangle, slung it up, brought the remaining flex down to the tank coil, loose linked with four turns.

From that moment 7 Mc/s was orbiting and all was well for this band. A pity it would not harmonic, so now I have three dipoles, 7, 14, and 28 Mc/s, all very satisfactory.

Link turns to tank coil are as follows: four turns for 7 Mc/s, two for 14 Mc/s and one for 28 Mc/s, care being taken to wind them in the same direction as the windings on the tank coil.

Yours faithfully,
Tiverton, Devon. H. S. NAYLOR (G3AKO).

N.F.D. Reflections

DEAR SIR,—National Field Day may be " just another contest," but this year it was quite a different contest. Careful analysis of the results over the last few years has shown a change in the relative importance of each band, 3·5 giving way to 14 for instance, but little more than that. The results in any one band have, on the whole, been fairly well bunched together, with perhaps a trace of a bimodal distribution separating the more forceful stations from the others. This year, though, an entirely new element has crept in; something that looks like sheer technical know-how. I refer, of course, to the outstanding performance by Stamford on 21. I can recall nothing approaching such virtuosity in previous years. And they still found time to knock up 204 points on 3·5 (admittedly this only gave them 54th place on that band, but the going was tough). I do not wish to belittle Slough B station's tremendous total of 935, but I feel that their efforts do not represent such a radical departure from the pattern of previous years.

Incidentally, the results suggest to me that 14 was obviously the most important band, with 21 rather more prominent than might have been expected; and the contest was won, once more, by the B stations.

Yours faithfully,
South Croydon. J. B. ROSCOE (G4QK).

Christmas Gifts and Electrical Interference

DEAR SIR,—With the approach of the Festive Season there are opportunities for radio amateurs to help others—and themselves—in the selection of electrical gifts. Quite often an amateur is asked to suggest a type or make of article for a gift by a friend to a friend. We can help them and ourselves if we suggest only apparatus which *cannot* cause interference in preference to that which is " *suppressed.*" (I refer to those on a.c. mains—over 98 per cent of the country).

As an example, if our friend wants a hairdryer I suggest he buys one labelled " For a.c. only." It is then certain that it will be fitted with some form of induction motor which cannot possibly cause interference on any frequency. The " a.c./d.c." variety, on the other hand, will, even when suppressed, cause a lot of interference especially on the lower amateur frequencies.

It is worth noting that such " a.c." motors are generally much more robust and cheaper (being easier to make). They will, therefore, give much longer trouble-free service before needing repair, and so are a better buy anyhow.

Hairdryers, shavers, fans are examples of articles which can be obtained in non-interfering forms. Unfortunately, as far as I know, no one has put on the market a vacuum cleaner or a sewing machine motor of the induction motor type, so the best that can be done here is to suggest only the makes which include TV and Radio Interference Suppression. Electric pads and blankets are of two types. The one has a low watts per sq. inch loading and therefore does not have thermostats. The other with higher loading does but these are quite satisfactory if, as they now usually do, employ a snap action. These last remarks also apply to thermostatically controlled smoothing irons.

To repeat, if we use and recommend " For a.c. only " electrical equipment, we shall benefit by a reduction in QRM and the user will get a more satisfactory article.

Yours faithfully,
Upper Nazing, Essex. T. L. FRANKLIN (G5HO).

Venus

DEAR SIR,—" Radiations from Outer Space," by Mr. G. Elliott (G3FMO) in the September issue, certainly stirs up the desire to know more. His references to Venus are new to me and also leaves open many questions to be answered, as he obviously intended. We don't seem to know much about this planet, and I don't believe its surface has ever been observed, due to its heavy vapour atmosphere, mostly CO_2 if my memory serves me correctly. In this great speculation I should like to refer readers to two books which produce a very convincing theorem on Venus. Velikovsky, in *Worlds in Collision* and *Ages of Chaos* (Gollancz), the first I have read, sets out to prove that Venus entered into the solar concourse some 4,000 to 5,000 years ago.

Now, if Venus is " new," then one might expect a long period of settling down—organization, disorganization or reorganization, which would, obviously, produce unusual electronic effects and mediums, thus unusual reflecting or even emission conditions might be expected, such as Mr. Elliott suggests.

As an aside for those interested in astrology, it will be known that Venus is supposed to give to men the qualities of art and science, which is distributed amongst us in varying degrees. In this respect it is interesting to note that all recorded history, art and craft can only be traced back about 5,000 years, despite the aeon of time that man has inhabited this planet.

The speculation will still continue—knowledge still expand.

Yours faithfully,
Seven Kings, Essex. W. H. MATTHEWS (G2CD).

Silent Key

DAVID J. BEATTIE (G2WW)

WE record with sorrow the death on November 24, 1957 of David Beattie (G2WW) at Clacton-on-Sea, Essex. Born in Burnley, Lancs, David operated from there in the early thirties first with an A.A. licence and afterwards as G6BJ. Later he went south to become ultimately Town Clerk of Penzance, an office which he held for 15 years up to 1955. He retired two years ago owing to serious ill-health and moved to Clacton-on-Sea where he quickly endeared himself, as he had done earlier in Penzance, to the local group of radio amateurs.

David Beattie was a leading authority on the law relating to Local Government and had written several legal works of reference on the subject. He was often consulted by the Law Society for whom he acted as examiner from time to time. An intensely keen and loyal R.S.G.B. member he served as C.R. for Cornwall for several years and was President of the former West Cornwall Radio Society in its heydey.

As a phone operator his call became known far and wide on the DX bands. He held most of the major operating awards, both British and foreign. His friendliness on the air coupled with his sound technical knowledge and ability to impart information provided an example of good operating.

Sympathies are extended to his wife and family in their great loss.

R. V. A.

Representation 1958-9

THE Corporate Members listed below have been duly elected to serve, in the offices indicated, as from January 1, 1958.

Regional Representatives

Region	Name, Call-sign and Address
1	*B. O'BRIEN (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.
2	*J. R. PETTY (G4JW), 580 Redmires Road, Sheffield, 10, Yorkshire.
3	*W. A. HIGGINS (G8GF), 28 Kingsley Road, Kingswinford, nr. Brierley Hill, Staffordshire.
4	*E. G. S. K. VANCE, M.B. (G8SA), 43 Blackwell Road, Huthwaite, Sutton-in-Ashfield, Notts.
5	*T. A. T. DAVIES (G2ALL), Meadow Side, Comberton, Cambridge
6	*N. F. O'BRIEN, F.B.I., A.C.C.S. (G3LP), 143 Brunswick Street, Cheltenham, Gloucestershire.
7	*F. G. LAMBETH (G2AIW), 21 Bridge Way, Whitton, Twickenham, Middlesex.
8	Office vacant from January 1, 1958. No nomination received.
9	*W. J. GREEN (G3FBA), 82 Bloomfield Avenue, Bath, Somerset.
10	*C. PARSONS (GW8NP), 90 Maesycoed Road, Heath, Cardiff, Glam.
11	*F. G. SOUTHWORTH (GW2CCU), Samlesbury, Bagillt Road, Holywell, Flintshire.
12	A. G. ANDERSON (GM3BCL), " Helford," Pitfodels, Aberdeen.
13	G. P. MILLAR (GM3UM), 8 Plewlands Gardens, Edinburgh 10.
14	Office vacant from January 1, 1958. No nomination received.
15	Office vacant from January 1, 1958. No nomination received.
16	Office vacant from January 1, 1958. No nomination received.

**Nominated by the Council.*

Town or Area Representatives

Region	Town or Area	Name, Call-sign (or B.R.S.) and address
1	CHESHIRE	
	Wirral Area	NORMAN KENDRICK (G3CSG), 25 Cook Road, Leasowe, Wirral.
	LANCASHIRE EAST	
	Bury and Rossendale	JOHN E. HODGKINS (G3EJF), 24 Beryl Avenue, Tottington, Nr. Bury.
	Manchester (North) ..	LEO G. CRATCHLEY (G3IXC), 18 Duckworth Road, Prestwich, Manchester.
	LANCASHIRE WEST	
	Blackpool	H. G. NEWLAND (G5ND), 161 Penrose Avenue.
	Crosby	F. CLASBY (G3KFC), 78 Selby Road, Orrell Park, Liverpool 9.
	Liverpool	C. FOX (G3HII), 69 Feltwood Road, Liverpool 12.
	Southport and Formby	N. HORROCKS (G2CUZ), 32 Sandbrook Road, Ainsdale, Southport.
2	YORKSHIRE WEST	
	Barnsley and District	C. T. MALKIN (G5IV), 5 White Hill Terrace, Barnsley.
	Pontefract and Castleford postal areas ..	W. FARRAR (G3ESP), 6 Hemsworth Road, Ackworth, Pontefract.
3	WARWICKSHIRE	
	Birmingham (South)	G. SIMONITE (G3JAO), 19 Wistaria Close, Northfield, Birmingham 31.
	WORCESTERSHIRE	
	Stourbridge and District	F. A. BILLS (G3CLG), 29 High Street, Kinver.
4	DERBYSHIRE	
	Derby	F. C. WARD (G2CVV), 5 Uplands Avenue, Littleover.
	LEICESTERSHIRE	
	Leicester	F. E. WYER (G8RY), 21 Treddington Road, Glenfield.
	Melton Mowbray ..	S. CLARK (G8CZ), 125 Thorpe Road.
	LINCOLNSHIRE	
	Boston	A. OUGHTON (G8BQ), 49 Fydell Street.
	Lincoln	G. C. NEWBY (G3EBH), St. Minver, Sudbrooke Lane, Nettleham.
	Scunthorpe and District	J. STACE (G3CCH), 38 Skippingdale Road.
	Stamford	F. K. PARKER (G3FUR), 64 Tinwell Road.
	NOTTINGHAMSHIRE ..	
	Mansfield Area ..	A. W. FOWLER (G3FR), Cavendish House, Skegby Road, Sutton-in-Ashfield.
	Newark and District ..	W. A. G. DAVIDSON (G3EVG), 4 Orston Avenue.
	Nottingham ..	B. SHORTLAND (G3DJL), 58 Bracebridge Drive, Bilborough.
	Retford and Worksop	E. PRINCE (G3KPU) 12 Lidget Lane, Retford.
5	SUFFOLK	
	Lowestoft and Beccles Area	PETER HAYWARD (G3JMX), 58 Edgerton Road, Lowestoft.
6	GLOUCESTERSHIRE	
	Gloucester	C. COLE (G3GEN), 113 Stroud Road.
	HAMPSHIRE	
	Portsmouth	A. C. CAKE (G3CNO), 7 Wheatstone Road, Southsea.
	Southampton ..	G. A. ALLCOCK (G3ION), 29 Granby Grove.
7	LONDON NORTH	
	Enfield and District ..	P. M. ELTON (G3GOZ), 82 Kenilworth Crescent, Enfield.
	Southgate and District	E. P. ESSERY (G3KFE), 11 Tudor Way, N.14.
	LONDON SOUTH	
	Norwood and South London	E. W. YEOMANSON (G3IIR), 9 Trewsbury Road, Sydenham, S.E.26.
	LONDON SOUTH-WEST	
	Guildford and Woking	A. W. WARNER (G3FZC), Sunnyside, Manor Road, Send Marsh, Ripley, Woking, Surrey.
	LONDON EAST	
	Brentwood (Essex) ..	R. A. E. FRONIUS (G3MCW), (Staff) Warley Hospital.
	Ilford	F. F. RUTH (G2BRH), 579 High Road.
	LONDON WEST	
	Acton, Brentford and Chiswick	R. P. COLE (G6RC), 18 Chatsworth Road, Chiswick, W.4.
	Ealing	RAYMOND CAWS (G3BRL), 34 Greystoke Lodge, Hanger Lane, Ealing, W.5.
	Edgware and Hendon	P. THOROGOOD (G4KD), 35 Gibbs Green, Edgware.
8	KENT	
	Thanet Area	D. C. MAINHOOD (G3HZW), 12 St. Mildreds Road, Ramsgate.
	SUSSEX	
	Worthing and District	R. B. FORGE (G3FRG), 14 Poulters Lane, Worthing.
9	BRISTOL	
	Bristol	F H CHAMBERS (G2FYT), 25 The Crescent, Henleaze.
	DEVONSHIRE	
	Plymouth	P. CHARLES FRIZZELL (G3LFQ), 72 Glen Park Avenue, North Road.
	Torbay Area ..	B. SYMONS (G3LKJ), 23 Westhill Avenue, Torquay.
	SOMERSET	
	Bath	J. W. RUSSELL (G2ZR), 45 Shakespeare Avenue.
10	GLAMORGANSHIRE	
	Port Talbot Area ..	G. HUGHES (GW4CG), Clyne, Austin Avenue, Porthcawl.
	Aberdare-Merthyr-Rhigos Area ..	D. WILLIAMS (GW3HZZ), Wynwood, Neath Road, Rhigos.
12	ABERDEEN	
	Aberdeen	G. JAMIESON (GM3HTL), 93 Craigton Road, Mannofield.

Region	Town or Area	Name, Call-sign (or B.R.S.) and Address
12—*contd.*		
	ANGUS Dundee	G. SOMERVILLE (GM3KYI), 73 Balerno Street.
13	MIDLOTHIAN Edinburgh	IAN MACKENZIE (GM3FGJ), 14 Easter Drylaw Place, Edinburgh 4.
14	STIRLINGSHIRE Falkirk and Stirling ..	W. MCFARLANE (GM3GJB), 2 Comely Place, Falkirk.
	Glasgow and District	T. HUGHES (GM3EDZ), 53 Ancroft Street, Glasgow N.W.
15	Belfast	J. T. MCMILLAN (GI3JXS), "Ventnor," The Green, Dunmurry.

Affiliated Society Representatives

THE following Corporate Members of the R.S.G.B. have been nominated and elected as Affiliated Society Representatives for the year 1958.

ABERDEEN AMATEUR RADIO SOCIETY: C. F. Sherrit (GM3EOJ), 33 Kincorth Circle, Aberdeen.
COURTAULDS AMATEUR RADIO GROUP: W. P. Stevens (B.R.S. 4022), 143 Hall Green Road, Coventry, Warwicks.
DERBY SHORT WAVE EXPERIMENTAL SOCIETY: J. Anthony (G3KQF), 56 Sherwood Street, Derby.
GRIMSBY AMATEUR RADIO SOCIETY: O. Gillatt (G3LOP), 24 Station Road, Healing, Grimsby.
LIVERPOOL AND DISTRICT AMATEUR RADIO SOCIETY: C. Fox (G3HII), 69 Feltwood Road, Liverpool 12.
SCIENCE MUSEUM RADIO SOCIETY: L. E. Profaze (G3KAB), The Science Museum, South Kensington, London, S.W.7.
SOUTH SHIELDS AND DISTRICT AMATEUR RADIO CLUB: H. Martin (G3JDO), 30 Finchale Road, Monkton Lane, Hebburn, Co. Durham.
SOUTH MANCHESTER RADIO CLUB: C. M. Denny (G6DN), 18 Willoughby Avenue, Didsbury, Manchester 20.
THANET RADIO SOCIETY: J. P. Barnes (G3BKT), 18 Grange Road, Ramsgate, Kent.
WORTHING AND DISTRICT AMATEUR RADIO CLUB: J. R. Toothill (B.R.S. 20543), 113 Kings Road, Lancing, Sussex.

Ballot Necessary

TWO nominations for the office of Area Representative for Coulsdon and District were received at Headquarters after the official closing date. A ballot must therefore be held.

The two nominees are:—

Mr. R. M. Herbert (G2KU) of Sanderstead.
Mr. R. Pounder (G3DVQ) of Purley.

Coulsdon and District embraces the Urban District of Coulsdon and Purley and Warlingham.

Corporate Members resident in the area defined are invited to record a vote in favour of one of the above candidates and to forward same to the General Secretary, R.S.G.B. New Ruskin House, Little Russell Street, London, W.C.1., to arrive not later than 12 noon December 31, 1957.

An example of the type of voting card to be used appears on page 241 of the November 1957 issue of the BULLETIN.

Result of Ballot

THE result of the Ballot for the election of a Region 4 Representative was as follows:—

Dr. E. S. G. K. Vance	(G8SA)	212 votes
Mr. A. Walmsley	(G2HIO)	25 votes
Mr. W. A. Mead	(G5YY)	16 votes

Mrs. E. M. Smallwood

THE death on November 20, 1957, of Mrs. E. M. Smallwood has deprived the Southgate and District Group of a very good friend. Her husband (Mr. M. F. Smallwood, B.R.S. 18713) has been Publicity Officer to the Group for many years, in which activities Mrs. Smallwood played an important part. She did much to encourage young newcomers to Amateur Radio and frequently entertained the Group Committee and amateurs from abroad.

Regional and Club News

Aberdeen Amateur Radio Society—At the society's A.G.M. the following were elected: *President:* B. McK. Davidson (GM3ALZ); *Vice-President:* W. Beaton (GM3DWX); *Hon. Secretary and Treasurer:* A. G. Knight, 6 Blenheim Lane, Aberdeen; *Committee Members:* G. T. Donaldson (GM3FKS), L. Hardie (GM2FHH), J. Gall and A. Davie

Aldershot and District Amateur Radio Society—Meetings are held at " The Cannon," Victoria Road, Aldershot, on alternate Wednesdays, at 7.30 p.m. Morse classes are a regular feature. *Hon. Secretary:* S. E. Hume, 25 Kingsway, Aldershot.

Bristol—At the November meeting 58 members were present to hear Harry Gratton (G6GN) discuss " Design Features of Modern Amateur Transmitters." The December meeting featured a talk on " Receiver Alignment " by Vic Newport (G3CHW). " Radio Astronomy and the I.G.Y." will be the title of the topical lecture by A. F. Collins, F.R.A.S., F.B.I.S., on January 17. Any member who has not received a copy of the group's programme for January to June 1958 can obtain one on request from the *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol 7.

Bury Radio Society—There will be a debate " Phone versus C.W." at the George Hotel, Kay Gardens, Bury, on January 14 commencing at 8 p.m. Copies of the 1958 programme may be obtained from the *Hon. Secretary:* L. Robinson, 56 Avondale Avenue, Bury.

Glasgow—The December meeting will be held on the 20th (a week earlier than usual) at 7.15 p.m. in the Christian Institute, 70 Bothwell Street, Glasgow C.2.

Hastings and District Amateur Radio Club—The *Horst Jens Trophy* has been awarded to G3BDQ who has completed a low power 40m mobile transmitter and aerial for use under the club call-sign G6HH as soon as a mobile licence is received. The *G6QB* and *T. H. Parkman* trophies will be awarded in connection with competitions for home-made gear to be held in January. Meetings are held on Tuesdays at 22 Middle Street, Hastings, and commence at 7.30 p.m.

London Members' Luncheon Club—At the November meeting the Chairman, Stan Vanstone (G2AYC), welcomed G3AIZ, G3DIC, G3FFL and G3KZI. The first meeting of the New Year will be at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road, W.1, on Friday, January 17 at 12.30 p.m. for 1 p.m. Those who intend to be present are asked to telephone G2FUX (Ruislip 2763) or R.S.G.B. Headquarters (HOLborn 7373) not later than 12 noon the previous day.

Leicester Radio Society—Meetings have been arranged for December 16 (R.G.S.B. Recorded Lecture " Amateur Radio in the Antarctic "), January 6 (R.S.G.B. Recorded Lecture " Receivers "), January 13 (Work on Club Rooms), January 20 (Demonstration by Stratton & Co. Ltd.) and January 27 (N.F.D. Discussion). *Hon. Secretary:* R. Parry, 71 Braunstone Avenue, Leicester.

Northampton Short Wave Radio Club—At the A.G.M. the following were elected: *President:* B. Sykes (G2HCG); *Chairman:* I. C. Millar; *Vice-Chairman:* V. Hartopp (B.R.S. 15304); *Hon. Treasurer:* B. Cadd; *Hon. Secretary:* S. F. Berridge (G3ITW), 20 Ethel Street, Northampton; *Committee Member:* A. T. Shrewsbury (G3KAN). Due to increased expenditure the annual subscription has been raised to 7/6d. Meetings will be held at Allen's Pram Works, 8 Duke Street, Northampton, on Fridays until further notice. The club station is active on 40m and 80m using low power c.w.

Nottingham and District Amateur Radio Society—The next meeting will be held on December 20 at 7.30 p.m. in Room 2, Albert Hall Institute, Derby Road, Nottingham. It is hoped that by moving the venue into the city more members will be able to attend. *Hon. Secretary:* H. H. Pickering (G3DUL), 43 Plains Road, Mapperley, Nottingham.

Portsmouth and District Radio Society—This society is now meeting at 183 Albert Road (over Scarr's Drapers) on Tuesdays at 7.30 p.m..

Roche Valley Radio Club—Meetings are held at the Windmill Hotel, Sudden, Rochdale, on Tuesdays at 8 p.m. Further particulars may be obtained from W. Dorrell (G3HEC), 254 Whitworth Road, Rochdale.

South Shields and District Amateur Radio Club—The Annual Christmas Dinner Party will be held on December 18, when various awards will be presented. Recent activities have included a visit to the B.B.C. Sound Studios at Newcastle-on-Tyne and a talk by G2BCY and G3JDO on " Getting Started on Top Band." *Hon. Secretary:* K. Sketheway (B.R.S. 20185), 51 Baret Road, Walkergate, Newcastle-on-Tyne 6.

Spen Valley Amateur Radio Society—Meetings will be held at the George Hotel, Cleckheaton, on December 18 (" Communication Equipment in Civil Defence "), January 8 (" Standing Waves and Transmission Lines " by G3KRL) and January 22 (" Radio Fault Finding " by G4AD). Tickets for the society's annual dinner at the Kingsway Cafe, Dewsbury, on January 25 may be obtained, price 11/6d. each, from the *Hon. Secretary:* N. Pride, 100 Raikes Lane, Birstall, near Leeds.

Slade Radio Society—The society's annual dinner was held on October 19. In the course of his speech, the President (Mr. C. H. Young, G4AK) announced that 42 new members had been enrolled during the year, bringing the total membership to 112. Mr. H. F. Smith of *Wireless World* spoke of the early days of radio and of an occasion when he met Marconi.

Stockport Radio Society—At a recent " Hot Pot Supper " attended by 60 members and friends, G2AMV, Region 1 Representative, was the chief guest. Subjects for forthcoming lectures are " The Leak F.m. Tuner " (December 18), " Chloride Storage Batteries " (January 15) and " U.H.F." by G3BAK (January 29). Meetings are held at the Blossoms Hotel, Buxton Road, Stockport. *Hon. Secretary:* G. R. Phillips, 7 Germans Buildings, Buxton Road, Stockport.

Torbay Amateur Radio Society—At the November meeting, the President, W. B. Sydenham (G5SY) judged the Competition for the Constructor's Cup which was won by Roy Ashby with his home-built tape recorder. *Hon. Secretary:* G. Western (G3LFL), 118 Salisbury Avenue, Barton, Torquay.

Worthing and District Amateur Radio Club—At the December meeting G3GVM and G3KFH/T gave a talk on aerials. The speaker on January 13 will be G3JSU. Meetings are held at the Adult Education Centre from 8 p.m. Details of Morse classes may be obtained from the *Hon. Secretary:* J. Tootill, 113 Kings Road, Lancing.

Wrexham and District Amateur Radio Society—Meetings are held fortnightly at Bodhyfryd on Friday evenings. Technical lectures, demonstrations and discussions form the basis of the society's programme. Schoolboys and full-time students are not normally required to pay subscriptions. Prospective members may obtain full details from the *Hon. Secretary:* T. Corcoran, 3 Lea Road, Wrexham.

New Members

THE following have been elected to Membership of the Society:—

Corporate Members, Home (Licensed)

G3AL †J. O. JONES, 107 Fairholme Avenue, Gidea Park, Romford, Essex.
G3EKP †J. E. WHITTLE, 59 Belthorn Road, Belthorn, Lancs.
G3FFL †J. H. O. PARKER, 65 Marlborough Place, St. John's Wood, London, N.W.8.
G3FVE E. G. NORRIS, 3 Castle Street, Mere.
G3KKL P. M. RYLANCE, 18 Melbreck Road, Liverpool 18, Lancs.
G3LNZ G. J. Ralph, 16 Western Drive, Grassendale, Liverpool 9, Lancs.
G3GMK †K. W. MAY, 247 Brownhill Road, Millbrook, Southampton, Hants.
G3LUL *C. D. HARRINGTON, 75 Tewson Road, Plumstead, London, S.E.18.
G3LWE W. H. DAVIS, 481 Queens Drive, Stoneycroft, Liverpool 13, Lancs.
G3LXL A. Davis, 112 Wendover Drive, Aspley, Nottingham, Notts.
G3LXO G. E. SOUTHGATE, 12 Theodore Place, Green Street, Gillingham, Kent.
G3LYE M. TURNER, 58 Frederick Street, Loughborough, Leics.
G3LYK F/Lt. W. MCLARDY, Officers' Mess, R.A.F., Tangmere, Sussex.
G3LYO J. H. COX, 161 Newborough Road, Birmingham 28, Warwicks.
G3LYP *M. D. SCOTT, 30 Queens Park West Drive, Bournemouth, Hants.
G3LYQ M. F. WHARTON, 428 Chessington Road, West Ewell, Surrey.
G3LYW J. F. R. WESTON, Tudor Lodge, Kingsdown, Nr. Box, Chippenham, Wilts.
G3LZE M. J. HENRY, America Lodge, Higher Lincombe Road, Torquay, Devon.
G3MAX F. NICHOLLS, 29 Rectory Road, Abbey Hey, Manchester 18, Lancs
G8LC †B. E. ROGERS, 20 Priory Avenue, Harlow.
GC3LXK R. P. GIFFARD, Bon Secours, La Fosse, St. Martins, Guernsey.
GC8DO †J. DOWDING, Cranfield, Les Vardes, St. Peter Port, Guernsey.
GM3LRG J. F. GRAY, 36 South Street, Greenock, Scotland.

Corporate Members, Overseas (Licensed)

DL2BG J. H. EDWARDS, Australian Military Mission, 27-29 Schutzallee, Zehlendorf, Berlin, Germany.
EA3HE M. FLAQUE LLUBES, Travesera 29, Barcelona, Spain.
FE8AK J. SPENCER CHAPMAN, c/o John Holt and Co. (Liverpool) Ltd., P.O. Box 202, Yaounde, French Cameroons.
IITU Dr. DANTE BOLAFFI, C.so V. Emanuele 6, Torino, Italy.
K4IQV H. KETO, 3926, Shell Road, Hampton, Virginia, U.S.A.
K4KTR DWIGHT G. MCSMITH, 500 Chapel Street, Hampton, Virginia, U.S.A.
LA5HE RAGNAR OTTERSTAD, "Bellevue," Monradsgt 9, Oslo, Norway.
K9IFB A. BALINT, 4946 North Monitor Avenue, Chicago 30, Ill., U.S.A.
OZ9CW C. C. WAGNER, Annexgaardsvej 15, Copenhagen-Vanlose, Denmark.
VE7DT O. G. THOMAS, 1087 E. 38th Avenue, Vancouver 15, B.C., Canada,
VO1DH J. HANN, P.O. Box 478, Gander Airport, Newfoundland.
VP1IEE C. G. EGERTON EVES, Box 10, Melinda, Stann Creek, British Honduras.
W1EXZ ROBERT A. CURTIS, RFD No. 1, Danville, Vermont, U.S.A.
W1WF W. BRIDGHAM, 82 Noblehurst Avenue, Pittsfield, Mass., U.S.A.
W2NLK W. MAUER, 125 Bregman Avenue, New Hyde Park, Long Island, N.Y., U.S.A.
W4KAC J. M. KATSARAKIS, 2205 Broad Street, Selma, Alabama, U.S.A.
W5RKS JAMES I. POORE, 244 Utah Street, N.E., Albuquerque, New Mexico, U.S.A.
W6BAM SHELLEY E. TROTTER, Route 1, 15952 So. Ritchey Street, Santa Ana, Calif., U.S.A.
W6ZMU ROBERT G. WINSLOW, 12129 E. Magnolia, El Monte, Calif., U.S.A.
W7HDQ CLAUDE R. BRAND, 2639 East 3080 South, Salt Lake City 9, Utah, U.S.A.
W7JLZ PHILIP F. ALLEN, Box 246, Morenci, Arizona, U.S.A.
W9MSG R. P. BIRREN, 702 Spring Road, Elmhurst, Ill., U.S.A.
W9WFS H. V. LINDH, 4316 N. Francisco Avenue, Chicago 18, Ill., U.S.A.
ZC4TH T. C. HICKS, c/o 41 Lingwell Road, London, S.W.17.
ZL2ACM C. GORE, Roberts Line, Bunnythorpe, North Island, New Zealand.
ZL3RT Dr. A. W. LEWIS, Box 50, Kaiapoi, New Zealand.
ZS4MG S. COOSNER, Box 325, Kroonstad, South Africa.
ZS6DG R. D. WILSON, 21 Bashee Street, Three Rivers, Vereeniging, Transvaal, South Africa.

Corporate Members (British Empire Receiving Stations)

961 B. W. SCOTT, 5 Mills Street, Eltham, Taranaki, New Zealand.
962 A. G. GILBERT, General Delivery, Place d'Armes, Montreal, Province of Quebec, Canada.
963 J. H. COTTIER, c/o Ministry of Education, Federal House, Kuala Lumpur, Malaya.

Corporate Member (Foreign Receiving Station)

282 J. ALTMAN, 120-11 Beach Channel Drive, Rockaway Park, Long Island, N.Y., U.S.A.

Corporate Members (British Receiving Stations)

9587 †E. I. VAUGHAN, 46 Howick Park Avenue, Penwortham, Preston, Lancs.
14764 †J. A. GARRY, 6 Glenmore Road, St. Loyes, Exeter, Devon.
18054 †W. HAYNES, 37 Hawthorne Grove, Southport, Lancs.
19787 †G. M. DAVIES, Berwynfa, Denbigh, N. Wales.
21593 K. H. SMITH, Ten Trees, Parklands Close, Chigwell, Essex.
21594 R. H. DELVES, 7 High Street, Ticehurst, Wadhurst, Sussex.
21595 R. A. MORGAN, 61 Ravenswood Road, Redland, Bristol 6.
21596 E. MOTT, 22 Horsman Avenue, Cemetery Road, York.
21597 F. E. GARRETT, 28 Eversley Way, Shirley, Croydon, Surrey.
21598 R. S. SCALES, 17 Westfield Avenue, Cross Lane, Scarborough, Yorks.
21599 J. DENTON, 4 St. Mary's Road, Darfield, Nr. Barnsley, Yorks.
21600 W E. PARKER, 568 Rochdale Road, Manchester 9, Lancs.
21601 D. G. LANE, 26 Patmos Road, Brixton, London, S.W 9.
21602 E. J. REYNOLDS, Highfield, Bucklebury Common, Nr. Reading, Berks.
21603 A. M. LEARMONT, 158 Nether Hall Road, Leicester.
21604 Major E. W. MILNER, c/o T.A. Centre, 79-85 Worship Street, London, E.C.2.
21605 T. W. LEARY, 3 Shaftesbury Road, Cambridge.
21606 L. L. DOWNE, 7 Dale Lane, Appleton, Nr. Warrington, Lancs.
21607 C. W. DAVIES, 7 Harlescott Crescent, Shrewsbury, Shropshire.
21608 V. F. SOUL, 19 Charnwood Avenue, Merton Park, London, S.W.19.
21609 D. B. WHITFIELD, Lloyds Bank House, West Town, Hayling Island, Hants.
21610 D. C. R. AMBROSE, 93 Stanley Park Road, Carshalton, Surrey.
21611 D. F. ALLDRICK, 261 Boldmere Road, Wylde Green, Sutton Coldfield, Warwicks.
21612 W. F. LORIMER, 10 Lismore Road, Croydon, Surrey.
21613 L. B. Longley, 85 Canterbury Road, Worthing, Sussex.
21614 G. A. ALEXANDER, c/o 161 High Street, Linlithgow, West Lothian, Scotland.
21615 M. J. WILLIAMS, 35 Drybridge Street, Monmouth, S. Wales.
21616 C. BAKER, 36 Hollies Avenue, West Byfleet, Surrey.
21617 B. CLEGG, 29 Primley Park Crescent, Leeds 17, Yorks.
21618 *J. F. PICKEN, 440 Birmingham Road, Marlbrook, Bromsgrove, Worcs.
21619 B. FENWICK, 28 Waddon Way, Croydon.
21620 J. H. MOORE, 7 Weston Lodge, Portsmouth Road, Thames Ditton, Surrey.

Associates

1503 D. MCLENNAN, 8 College Road, Exeter.
1504 A. R. Powell, 8 Gray Street, Prestwick, Ayrshire, Scotland.
1505 P. J. CARPENTER, 57 Goodenough Close, Old Coulsdon, Surrey.
1506 P. STONEBRIDGE, Station House, Clare, Sudbury, Suffolk.
1507 J. HOGG, The Vicarage, New Seaham, Co. Durham.
1508 P. AINSWORTH, Abbotsholme School, Rocester, Uttoxeter, Staffs.
1509 M. R. SMITH, 3 Forge Avenue, Old Coulsdon, Surrey.
1510 R. T. Barrett, 41 Maypole Crescent, New North Road, Ilford, Essex.
1511 B. R. EDWARDS, 43 Link Road, Penngrove, Hereford.
1512 R. M. G. MAULE, 3 Brockham Warren, Box Hill Road, Tadworth, Surrey.

* *Denotes transfer to Corporate Grade.*
† *Denotes previously a member.*

Forthcoming Events

REGION 1

Blackpool (B. & F.A.R.S.). — Wednesdays, Gadsby Street Hall, off Nelson Road.
Bury (B.R.S.).—January 14, 8 p.m., George Hotel, Kay Gardens.
Chester (C. & D.A.R.S.).—Tuesdays, 7.45 p.m., Tarran Hut, Y.M.C.A.
Crosby.—Tuesdays, 8 p.m., over Gordons' Sweetshop, St. John's Road, Waterloo.
Isle of Man (I.o.M.A.R.S.).—December 18, January 1, 15, 7.30 p.m., Manor Guest House, 48 Victoria Road, Douglas.
Lancaster (L. & D.A.R.S.).—January 1, 7.30 p.m., George Hotel, Torrisholme.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Room "A," Wavertree Community Centre, Penny Lane, Liverpool, 18.
Manchester (M. & D.R.S.).—January 6, 7.30 p.m., Brunswick Hotel, Piccadilly. (S.M.R.C.) Fridays 7.45 p.m., Ladybarn House, Mauldeth Road, Manchester, 20.
Preston (P.A.R.S.).—Wednesdays, 7.45 p.m., 48 High Street, off Lancaster Road.
Southport.—Thursdays, 8 p.m., Sea Cadets' Camp, Esplanade.
Stockport (S.R.S.).—December 18, January 1, 15, 8 p.m., Blossoms Hotel, Buxton Road.
Warrington (W. & D.R.S.).—December 19, January 2, 16, 7.30 p.m., Royal Oak Hotel, Bridge Street.
Wirral (W.A.R.S.).—December 20, January 3, 17, 7.45 p.m., 4 Hamilton Square, Birkenhead.

REGION 2

Barnsley (B. & D.A.R.C.).—December 20, 7.30 p.m., King George Hotel, Peel Street.
Bradford.—December 24, 7.30 p.m., 66 Little Horton Lane.
Hull.—Second and last Tuesdays, 7.30 p.m. "Royal Oak" (Tony's).
Leeds.—Wednesdays, 7.30 p.m., 4 Woodhouse Square.
Pontefract.—December 19, January 2, 16, 8 p.m., Queen's Hotel, Tanshelf.
Rotherham.—Wednesdays, 7 p.m., "Cutler's Arms," Westgate.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street, Scarborough.
Sheffield (S.A.R.C.).—January 16, 8 p.m., Co-op Festival Room (Annual Dinner).
Slaithwaite.—Fridays, 7.30 p.m., 3 Dartmouth Street.
South Shields (S.S. & D.R.C.).—Last Wednesday in month, Trinity House Social Centre.
Spen Valley.—December 18, January 8, 7.30 p.m., Temperance Hall, Cleckheaton.
West Hartlepool (H.A.R.C.).—Mondays, 7.30 p.m., above the Farm Shop, Murray Street.
York.—Thursdays, 7.30 p.m., Club Rooms, Y.A.R.S., Fetter Lane.

REGION 3

Birmingham (M.A.R.S.).—December 17, 7 p.m. Midland Institute, Paradise Street (" Constructors Night "). (Slade).—December 20, (" Fun and Games ") January 6, 17, 7.45 p.m. The Church House, High Street, Erdington. (South Birmingham).—January 3, 7.30 p.m., No. 4 Committee Room, Cadbury Bros. (Bournville) Tuesdays, 7.30 p.m., No. 4 Committee Room, Cadbury Bros.

Coventry.—December 20, 7.30 p.m. Vine Street School, Coventry. (C.A.R.S.).—December 16, December 30, January 13, 1958, 7.30 p.m., 9 Queen's Road, Coventry. (Courtaulds).—Wednesdays, Courtaulds Ltd., Foleshill Road, Coventry.

Solihull.—December 16, December 30, January 13, 1958, 7.30 p.m., Civil Defence H.Q., Sutton Lodge, Blossomfield Road.

Stourbridge & District.—Friday, December 20, 8 p.m. " Xmas Informal," Tuesday, January 7, 1958, " White Horse," Amblecote, Brotherhood Hall, Scotts Road, Stourbridge.

Wolverhampton.—Mondays, 8 p.m., Nechells Cottage, Stockwell Road, Tettenhall.

REGION 4

Alvaston (D.S.W.E.C.).—Tuesdays, Thursdays, 7.30 p.m., Sundays 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, Derbys.

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 (I. & D.A.R.S.).—Thursdays from January 9, 1958, 7 p.m., Room 5, Ilkeston College of Further Education, Field Road.

Leicester (L.R.S.).—December 16, Mondays from January 6, 1958, 7.30 p.m., Old Hall Farm, Braunstone Lane, Leicester.

Lincoln (L.S.W.C.).—January 8, 7.30 p.m., Technical College, Cathedral Street.

Newark (N. & D.A.R.S.).—January 5, 7 p.m., North Gate House, North Gate, Newark.

Northampton (N.S.W.C.).—Fridays, 7 p.m., Club Rooms, Allen's Pram Works, 8 Duke Street, Northampton.

Nottingham.—December 20, January 17, 7.30 p.m., Room No. 2, Albert Hall Institute, Derby Road, Nottingham.

Retford & Worksop.—December 16, 7.45 p.m., Lincolnshire Road, Car Social Club, Grove Street, Retford.

Scunthorpe.—December 17, January 2, 14, 7.30 p.m., Talbot House, Earl Street.

REGION 5

Chelmsford (C.A.R.C.).—January 7, 7.30 p.m. Marconi College, Arbour Lane, Chelmsford. (" Rugby G.P.O. Station," P. Allatt, G3KWD).

Norwich.—Fridays, 7.30 p.m., The Golden Lion, St. John's, Maddermarket.

REGION 6

Cheltenham.—January 2, 8 p.m., Great Western Hotel, Clarence Street. (C.A.R.S.).—Wednesdays 8 p.m., Club Room, St. Mark's Community Centre, Brooklyn Road.

Gloucester (G.R.C.).—Thursdays 7.30 p.m., The Cedars, 83 Hucclecote Road.

High Wycombe.—December 18, 7.30 p.m., G2FDF, 106 Liberty Lane, Addlestone, Surrey.

Newbury (N. & D.A.R.S.).—December 27, 7.30 p.m., The Canteen, Elliotts of Newbury, West Street.

Oxford (O. & D.A.R.S.).—January 8, 7.30 p.m., Club Room, Cherwell Hotel, Water Eaton Road, Oxford.

Portsmouth.—Tuesdays 7.30 p.m., 183 Albert Road, Southsea (over Scarrs, Drapers).

Southampton.—January 4, 7 p.m., 1 Prospect Place, Above Bar, Southampton.

Stroud.—Wednesdays 7.30 p.m., Subscription Rooms.

REGION 7

London.—January 24, 6.30 p.m., I.E.E. Victoria Embankment (Presidential Address by L. E. Newnham, G6NZ, followed by " The Human Machine as a Radio Operator " by F. J. H. Charman, G6CJ).

London (L.M.L.C.).—January 24, 12.30 p.m., Bedford Corner Hotel, Bayley Street, Tottenham Court Road.

London (U.H.F. Group).—January 2, 7.30 p.m., February 7, 7 p.m. (Annual Dinner), Bedford Corner Hotel.

Acton, Brentford & Chiswick.—December 17, January 21 (A.G.M.), 7.30 p.m., A.E.U. Club, 66 High Road, Chiswick, W.4.

Bexleyheath (N.K.R.S.).—Second and Fourth Thursday, 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.

Chingford.—For date and venue phone Wanstead 2321 or Silverthorne 1740.

Croydon (S.R.C.C.).—January 14, 7.30 p.m., Blacksmith Arms, 1 South End, Croydon.

Ealing.—Sundays, 11 a.m., ABC Restaurant, Ealing Broadway, W.5.

Harlow & District.—Tuesdays, 7.30 p.m., rear of G. E. Read (G3ERN), 6 High Street, Harlow.

Holloway (G.R.S.).—Mondays (R.A.E. & Morse) 7 p.m., Montem School (ex-Isledon School), Upper Hornsey Road, N.7., Fridays (Club), 7 p.m., Grafton School, Eburne Road, N.7.

Ilford.—Thursdays 8 p.m., G2BRH, 579 High Road, Ilford.

Norwood & South London.—December 21, Windermere House, Westow Street, Crystal Palace (Junk Sale).

Slough.—January 7, QTH from G2HOX, 13 Quaves Road, or G3GYD, 5 Parklands Avenue, Slough.

Welwyn Garden City.—January 9, 8 p.m., I.C.I. Recreation Club, Blackfan Road, Welwyn Garden City. (" Amplifiers and Records " by Geoff Watts (Radar Lab. Murphy Radio Ltd.).

REGION 8

Worthing (W. & D.A.R.C.).—January 13, February 10, 8 p.m., Adult Education Centre, Union Place.

REGION 9

Bath.—December 16, January 13, 7.30 p.m., 12 James Street West.

Bristol.—January 16, February 7, 7.15 p.m., Carwardine's Restaurant, Baldwin Street.

Exeter.—Second Thursday in each month, 7.30 p.m., Wingfield Park, Heavitree Social Centre, Fore Street, Heavitree, Exeter (near Butts Road).

Falmouth.—First Wednesday in each month, 7.30 p.m., Y.M.C.A., Bar Road, Falmouth.

North Devon (Bideford).—January 2, 7.30 p.m., G2FKO, 38 Clovelly Road, Bideford.

Plymouth.—Thursdays, 7.30 p.m., Virginia House Settlement, Barbican.

Torquay.—Second Saturday in each month, 7.30 p.m., Y.M.C.A., Castle Road.

Weston-Super-Mare.—Second Wednesday in each month, 7.30 p.m., Albert Hotel, Sea Front.

Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—January 13, 7.30 p.m., " The British Volunteer," The Hayes, Cardiff. (Lecture on receivers).

Pontypool.—Tuesdays, 7 p.m., The Educational Settlement, Rockhill Road.

Port Talbot.—December 17, January 7, 7 p.m., GW5VX, 14 Holland Street, Port Talbot.

REGION 14

Falkirk & District.—December 20, 7.30 p.m., Temperance Café, Falkirk.

Glasgow.—December 20, 7.15 p.m., Christian Institute, 70 Bothwell Street, Glasgow C.2.

Slow Morse Practice Transmissions

G.M.T.	Call-sign	kc/s	Town
Sundays			
09.00	G3GYV	1900	Hartford, near Northwich
09.30	G3BKE	1900	Newcastle-on-Tyne
10.15	G3FBA	1910	Bath
10.30	G3GZB	1930	North London
11.00	G2FXA	1900	Stockton-on-Tees
12.00	G3LP	1850	Cheltenham
12.00	G3KAN	1850	Northampton
12.00	GI5UR	1860	Belfast
15.00	G3LGK	1850	Ilkeston, Derby
20.30	G3HTA	1850	Exeter
21.00	G2FIX	1812	near Salisbury
Mondays			
18.30	G3NC	1825	Swindon
19.00	G3KTP	1850	Heanor, Derby
19.00	G3LMT	1850	Exeter
20.30	G3LSF	1900	Southport
Tuesdays			
18.30	G2FXA	1900	Stockton-on-Tee
20.00	G2FCI	1850	Exeter
21.00	G3EFA	1855	Southport
21.45 †	G3ETP	1875	Lowestoft
Wednesdays			
18.30	G3GCY	1830	R.A.F., Dishfort
19.00	G3HUB/A	1902	Chelmsford
19.00	G8RQ	1850	Chesterfield
21.00	G3HWI	1987	Blackburn, Lancs
Wednesday—contd.			
21.00	G3LNS	1900	Birmingham
22.00	G3JJC	1990	S.E. London
Thursdays			
18.30	G3NC	1825	Swindon
20.00 †	G2ABR / G3FCY	1919	Hull, Yorks
21.00	G3GWT / G3KTO		
20.30	G3GDZ	1910	Kingsbury, N.W.9
20.30	G3JQM	1878	Barwick, Yeovil
21.30	G3HMY	1850	Exeter
22.00	G3JIT	1990	S.E. London
Fridays			
19.30	G3FUA	1850	Kilburn, Derby
20.00 †	G2FNI / G3EGX / G3ERB	1875	Wirral
20.30	G3ICX	1915	Sutton Coldfield
21.30 †	G3KLZ	1900	Bradford
	G3INW (or G3KSS)		Bradford
	G3KEP		Bingley
22.00	G3KYU	1859	Bournemouth
Saturdays			
13.00	G2FXA	1900	Stockton-on-Tees
14.00	G3LZC	1830	Heanor, Derby
21.00	G3HWI	1987	Blackburn, Lancs

† *Alternately.*

Slow Morse transmissions are organized by Mr. C. H. L. Edwards (G8TL), 28 Morgan Crescent, Theydon Bois, Essex. Members using the service are requested to send listener-reports to the station concerned.

HENRY'S

(RADIO LTD)

5 Harrow Road, Paddington, W.2

Opposite Edgware Road Station

PADdington 1008/9

OPEN MONDAY to SAT. 9—6. THURS. 1 o'clock

Send 3d. for 28-page Catalogue.

QUARTZ CRYSTALS

FT243—FUNDAMENTALS

80 Types 5706·667 Kc/s to 8340 Kc/s (in steps of 33·333 Kc/s).
120 Types 5675 Kc/s to 8650 Kc/s (In steps of 25 Kc/s).
(Excluding Types 7000/7300 and 8000/8300)

5/- EACH

Complete Sets of 80 Crystals **£6. 0. 0.**
Complete Sets of 120 Crystals **£7. 10. 0.**

7000 Kc/s to 7300 Kc/s, in steps of 25 Kc/s
8000 Kc/s to 8300 Kc/s, in steps of 25 Kc/s **7/6d. EACH**

FT241A—54th HARMONIC

80 Types 20 Mc/s to 27·9 Mc/s. (In steps of 100 Kc/s).
(Excluding 24/25·9 and 27 Mc/s). **5/- EACH**

24/25·9 & 27 Mc/s at **7/6**

Complete Set of 80 Crystals **£6**

100 Kc/s.	Gold Plated D.T. Cut	15/-
100 Kc/s.	Two-Pin Box	15/-
150 Kc/s.	Two Pin Round	12/6d.
160 Kc/s.	Two Pin 10X	12/6d.
200 Kc/s.	FT241A	10/-
500 Kc/s.	FT241A	7/6d.
500 Kc/s.	Brook's	15/-
2500 Kc/s.	Octal	12/6d.
5000 Kc/s.	Piezo 2-Pin Holder	12/6d.

P.O. Type 4B Ceramic

100 Kc/s. 819·6 Kc/s ...
163·9 Kc/s. 1000 Kc/s. ... **15/- EACH**

CERAMIC 2-PIN BANANA PLUG

15,010 Kc/s, 16,135 Kc/s, 16,435 Kc/s, 18,025 Kc/s.
15,110 Kcs, 16,335 Kc/s, 16,700 Kc/s, 18,125 Kc/s. **7/6 EACH**

MARCONI, S.T.C. 2-PIN10X FUNDAMENTALS IN KILOCYCLES

1506·75	1674·9	1815	2087·5	3270	4210	10,511	10,878
1544·4	1680	1870	2089	3280	4860	10,534	11,437
1561·1	1680·5	1875	2090	3310	10,166	10,545	11,501
1566·5	1700	1890	2118·25	33175	10,189	10,557	11,526
1566·75	1727	1930	2196	3390	10,233	10,567	11,587
1572·5	1740	1981	2261	3440	10,245	10,622	11,751
1579	1761	2012	2295	3630	10,300	10,755	11,788
1588·68	1764·5	2055	2312	3850	10,433	10,767	11,814
1613·25	1775	2065·75	2315	3920	10,445	10,823	11,851
1650	1780	2067·5	2430	3960	10,501	10,856	11,876
1668·2			at 7/6 each.				12,685

T.C.S. CRYSTALS, 3-PIN TYPE 249, IN KILOCYCLES

1522.5	1700	2070.3	2105	2667.5
1572.5	1962.5	2072.5	2410	2865
1665.5		at 7/6 each.		

FT241A 72nd HARMONIC CRYSTALS IN MEGACYCLES

32.5	32.7	36.4	36.6	at 5/-
32.6	36.3	36.5	36.7	each

SPUTNIK SPECIAL

Reception Set 208, Short wave Receiver, 10-60 Mc/s (5-30 metres).
Complete with six valves:—2-6K8G; 2-EF39; 6Q7G; 6V6G, and metal rectifier.
Built in 6½ in. P.M. speaker, Muirhead slow-motion drive.
Input 6 volt d.c. and 100-250 volt a.c.
Complete, working order, in metal transit case **£6. 19. 6**
Carriage 15/6d.

"EAVESDROPPER"

THREE-TRANSISTOR POCKET RADIO

(No Aerial or Earth required)

Pre-selected to receive the Light and Home Stations. Total cost, as specified, including Transistors, Transformers, Coils, Condensers and Battery, etc., with circuit and plastic case. **77/6** POST FREE

All items sold separately.
With single 'phone, 82/6 With Acos Mike, 90/- With Min. Hearing Aid, 90/-

The New "TRANSISTOR—8"

Push-Pull Portable Superhet

CAN BE BUILT FOR £11 - 10 - 0

This Portable 8 Transistor Superhet is tunable for both Medium and Long Waves and is comparable in performance to any equivalent Commercial Transistor Set. Simplified construction enables this set to be built easily and quickly into an attractive lightweight cabinet supplied.

TEN STAR FEATURES

★ 8 Specially Selected Transistors
★ 250 Milliwatts Output Push-Pull
★ Medium and Long Waves
★ Internal Ferrite Rod Aerial
★ 7 × 4 Elliptical High Resistance Speaker
★ Drilled Plastic Chassis 8½ × 2½ in.
★ Point to Point wiring and practical layout
★ Economical. Powered by 7½V battery
★ Highly sensitive
★ Attractive lightweight contemporary case

Pair XC101s supplied 40/- extra, or Mullard OC 72s

We can supply all these items including Cabinet for **£11 . 10 . 0**
All parts sold separately

Send for circuit diagrams, assembly data, illustrations and instructions, and full shopping list FREE p. & p. 3d.

Call and hear demonstration model.

TRANSISTOR SQUARE WAVE GENERATOR

Complete Kit with 2 Transistors, **TRANSISTOR SQUARE WAVE** Components, Circuit and Plastic Case. **25/-.**

WAVE-GUIDE WATTMETER

Type W8921 10 cm. Complete in transit case. BRAND NEW, **£5 10 0.** P.P. 7/6.

BC906D FREQUENCY METER

Range 150-235 Mc/s. **45/-.** P.P. 7/6

RT10/APS-3

3 centimetre Radar Unit complete with 725A Magnetron 2-723A/B's 2-6AC7's, 724A and IN23 pulse trans, etc. BRAND NEW in carton. **£10 10 0**

"HOMELIGHT"

2 Transistor Personal Portable Variable Tuning

We can supply all components including 2 Transistors, Diode, Resistors, Condensers and Miniature Hearing Aid and Plastic Case size 4½ × 2⅞ × 1⅜ and 1½ v. Battery. FOR **52/6.**
All items sold separately.

TRANSISTOR SIGNAL TRACER

Complete Kit with 2 Transistors, Components, Phones with Circuit and Plastic Case. **42/6.**

TEST SET 229
ADMIRALTY TYPE 600 Mc/s.

Complete in transit case.
BRAND NEW, **£5 10 0.** P.P. 7/6.

TRANSMITTER/RECEIVER, Army Type 17 Mk. II

Complete with Valves, High Resistance Headphones, Handmike and Instruction Book and circuit. Frequency Range 44.0 to 61 Mc/s. Range Approximately 3 to 8 miles. Power requirements: Standard 120v. H.T. and 2v. L.T.
Ideal for Civil Defence and communications.

BRAND NEW **59/6**

Calibrated Wavemeter for same 10/- extra.

WALKIE-TALKIE TRANSMITTER/RECEIVER ARMY TYPE "38"

Brand new, complete with valves, 1 pair Headphones, Microphone, Junction Box, Canvas carrying bag, 4 Section Aerial, spares and circuit.
Frequency Range 7-4·9 Mc/s. Range approximately 5 Miles.
BRAND NEW **65/-**, P.P. 5/-.

373 MINIATURE IF STRIP 97.2 Mc/s.

The ideal F.M. conversion unit as described in P.W. April/May, 1957. Complete with 6 valves, two EF91's, two EF92's and one EB91, I.F.T.'s, etc., in absolutely new condition. With circuit **12/6** (less valves), **42/6** (with valves),
Postage & Packing 2/6 (wither type).

TEST EQUIPMENT. U.S.A. R.F. WATTMETER TS/-87/AP

3 position 0-10/15/30 watts

Complete with photo-cell, 2 spare lamps and leads, with transit case. BRAND NEW. **£10 10 0.** P.P. 7/6.

WHEATSTONE BRIDGE

Consisting of four stud switches: 0-10 ohms, 0-100 ohms, 0-Inf. Galvometer centre zero F.S.D. 2·5 mA. Ranges easily extended. Housed in oak cabinet 16×7½×6. Complete with instructions. **40/-.** P. & P. 4/-.

TEST SET 102 250 v. 50 c. A.C. Emits 25 x 50 cycles. Transformer 280 v. at 80 mA. 12 v. at 2 amps. 6 v. at 3 amps. 1-DET 19, 1—6J5. S.T.C. metal rectifier. Bulgin plugs, sockets, ind. Lamps. Circuit diagram. **40/-.** Carriage 5/-.

INDICATOR UNIT SLC No. 5 Ideal for conversion into an Oscilloscope using 139A or ACR 10 tube. Unit consists of 2-VR65's, 1-VR66, various resistors, condensers and pots. Size 11 x 6 x 3in. Brand new, complete with modification circuit. **20/-**, P. & P. 4/-.

FILTER UNIT 503. Frequency 20-35 Mc/s, with silver plated coil. Condenser 140 pf, Veeder counter, coax input and output sockets. Suitable for conversion to absorption wavemeter. **12/6.** P. & P. 2/-.

POCKET VOLTMETERS. Read 0-25 v. and 0-250 v. D.C. Brand new. Only **15/-.** P. & P. 2/6.

FERRANTI TRANSFORMERS. Input 225 v., output 4 v. at 2 amps Potted type with ceramic bushes. Brand new. **7/6** each. P. & P. 1/-.

COMMAND RECEIVERS. 1·5-3 Mc/s, fully valved, with circuit **65/-**; P. & P. 3/6 each.

500 MICROAMPS METER. 2-inch circular calibrated 0-15 and 0-600 v., resistance 500 ohms. **12/6.** P. & P. 2/6.

WAVEMETER TYPE W 1433 Frequency 154-260 Mc/s, with crystal check and calibration chart. Mains, 50 cycle. **50/-.** Carr. 10/-.

R.F. UNITS

R.F. 25, 40-50 Mc/s, **8/6** each.
R.F. 26, 50-65 Mc/s. **20/-** each
all valved, with circuit. Post 3/6 on each.

PARMEKO CHOKES. 8H. 100mA. **7/6.** P. & P. 1/6.

DIPOLE AERIAL No. 4A. 52ft. hard drawn 7/22 copper wire with centre insulator, fitted with feeder sockets. Both ends have 3 link insulators and slotted wire adaptors. Brand new. Price **9/-.** P. & P. 2/-.

WESTINGHOUSE PENCIL RECTIFIER. Type J.50, output 500 v. at 5 mA. **5/-** post paid.

HIGH RESISTANCE HEADPHONES. Type No. 2. 4,000 ohms. Brand new **11/6** each. P. & P. 2/-.

RCAF AMPLIFIER UNIT. 12 v. input Vibrator. Pack 250 v. out. OZ4 Microphone Transformer into a 6K6 GT output valve with negative feed back. Size 8×5½×8½in. Brand new, **35/-** each. P. & P. 3/-.

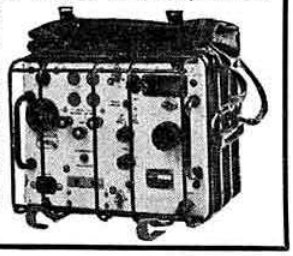
MONITOR TYPE 28. Consists of VCR138, 6-SP61, 1-5U4, 1-VU120, 3-EA50. 1 m/a meter scaled 100-0-100 v. Incorporates Y shift, X shift in u/secs., Focus, syns., Bias. Input to X plates switched x 20, x 5, direct, requires only suitable power pack for use as oscilloscope. **60/-.** Carriage 10/-.

COMMUNICATION RECEIVER R. 1155.

This magnificent receiver covers 5 ranges: 75-200 kc/s, 200-500 kc/s. 600-1500 kc/s, 3-7·5 Mc/s, 7·5-18·5 Mc/s Fully tested before despatch. Complete with circuit and instruction booklet. **£8. 10. 0.** Carr. 10/-.

R109 RECEIVERS

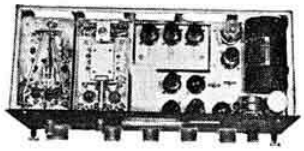
8 valves: 5-ARP12's, 3-AR8's, covering 1·8-8·5 Mc/s on two frequency bands. Contains 6 v. Vibrator Pack and built-in 3½in. Goodmans speaker, operates from 6 v. battery, consumption 1½ amps. Housed in metal case 13 x 12 x 11in. Designed for mobile or ground station. Operates with any normal aerial. Complete and tested, including circuit. Very good condition. Only **80/-.** Carriage 7/6.



VIBRATOR PACK

★ 12 v. input, 300 v. output at 150 mA. As a bridge rectifier will handle 450 v. RMS at 120 mA. Pack consists of 12 v. vibrator, 4 metal rectifiers, chokes and smoothing condensers. Only **30/-.** Carr. 5/-. ★

YOU CAN'T BEAT THIS FOR VALUE!!



R.T-7/APN-1 ALTIMETER TRANCEIVER

Brand New complete with 14 valves: 3-12SJ7, 4-12SH7, 2-12H6, 1-VR150, 2-9004, 2-955. Famous Wobulator Unit, Dynamotor, Relays 3500 ohms and 6500 ohms. A.F. amplifier. Receiver section covers 400-450 Mc/s. Transmitter sweeps 418 to 462 Mc/s With manual. Only **35/-**, carriage 10/-.

ORIGINAL AR88 MAINS TRANSFORMERS

Input 110 v.-240 v. Output 345-0-345 at 150mA, 5 v. at 2 amps and 6·4 v. at 4·5 amps. Fully shrouded, size 5½ x 4 x 4½in. Brand new. **50/-.** P. & P. 3/-.

No. 38 TRANSMITTER/RECEIVER WALKIE TALKIE

Range approx. 5 miles. Covering 7·4-9 Mc/s. Absolutely complete with junction box, headphones, microphones, webbing, haversack. Braad new only **60/-.** Carr. 7/6.

Relda Radio Ltd.

(Dept. "B"), 32A Coptic Street, London, W.C.1.
Phone: MUSeum 9607.

BENDIX RECEIVER R.A.10

A 4 wave band superhet covering 150 kc/s-10 Mc/s. Valves 6SK7 1st R.F., 6K8 mixer, 6SK7 1st and 2nd I.F., 6R7 2nd Det., 6C5 B.F.O., 6K6 output. Size 6½ x 15½in. Easily converted to mains operation as described on page 453 of the September "Practical Wireless." **£5/10/-**, carr. 7/6.

U.S.A. INDICATOR BC929A. Complete with 3PBI, shield and holder. Aerial switching unit, 7 valves: 2-6H6GT, 1-6X5GT, 122X2, 1-6G6, 2-62N7. Brand new. Original cartons. With modification circuit **60/-.** Carr. 7/6.

HOOVER ROTARY TRANSFORMERS. 11·5 v. input, 490 v. output at 65 mA and 6 v. input 300 v. output at 75 mA. Guaranteed and tested, only **27/6.** P. & P 2/6.

373 MINIATURE 9.72 I.F. STRIPS Supplied complete with 3-EF91, 2-EF92, 1-EB91. Ideal for modification to FM Tuner as described on page 107 of the April "Practical Wireless," Price **45/-** each.

U.S.A. INTERPHONE AMPLIFIER This unit uses 2-6V6's. Includes microphone transformer, output transformer, sidetone transformer, 60 mA choke. Fuse holders and double pole 10 amp. switch. Dynamotor, 12 v. input, 250 v. output at 50 mA. Size 9 x 9 x 5in. Brand new (less valves) only **55/-.** Carr. 5/-.

VIBRATOR PACK. 6 v. input, 230 v. output at 100 mA, complete 4-pin vibrator, OZ4 rectifier. Fully smoothed, **25/6** each. P. & P. 2/6.

PYE 45 Mc/s I.F. STRIPS. Complete with seven valves, 6-EF50, 1-VR92, 6 tunable I.F. transformers. Only **30/-** post paid.

MUIRHEAD VERNIER DRIVES Scaled 0/180 deg. Ratio 25 to 1, 3in. dia. **10/6,** p.p. 1/6.

TAG STRIPS. 6 way, 9 way, 12 way, 23 way. Brand New. 6 for **2/6.** P. & P. 6d.

BENDIX RECEIVER MN26.C Covering 150-1500 kc/s in 3 Bands. Valves used 5-6K7, 2-6N7, 2-6J5, 1-6F6, 1-6L7. Complete with switching motor and dynamotor. This superb unit has been modified for 12 v. operation, with circuit. Only **80/-.** Carriage 8/6.

AMERICAN GEARED MOTOR 24 v. D.C. with built-in precision gearbox. No. 1 drive 24 R.P.M. No. 2 drive 6 R.P.M. On 12 v No. 1 drive 16 R.P.M. No. 2 drive 4 R.P.M. Overall size of motor and gearbox 7½in. ×3½in. ×3in., weight 1 lb. 14 ozs. Brand New. Only **22/-.** P. & P. 3/-.

B.C. 733-D. RECEIVER. 108. 3-110. 3 Mc/s. 10 valves, 3-VT 269, 1-12AH7, 2-12SR7, 2-12SG7, 1-12SQ7, 1-12A6, 6 crystals. 12 v. operation. **£4.** Carr. 7/6·

AMERICAN ROTARY CONVERTERS With cooling Fan input 12 v. D.C. Output 250v at 90 mA. Completely suppressed. Brand new.

19/- each. Plus P. & P. 3/-

EXCHANGE AND MART SECTION

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge **5s. Trade Advertisements 9d.** per word, minimum charge **12s.** All capitals **1s.** per word, minimum charge **18s.** Write clearly. No responsibility accepted for errors. Use of Box number **1s. 6d.** extra. Send copy and remittance to **National Publicity Co. Ltd., 36-37 Upper Thames Street, London, E.C.4, by 22nd** of month preceding date of issue.

ALL types of Valves required for cash. State quantity and condition.—Radio Facilities Ltd., 38 Chalcot Road, N.W.1 (PRImrose 9090). (236

AR88D, excellent condition. S meter and manual £50. Pan-adapter, 3 in., 4·6 megs input with manual £22 10s. Latest Geloso 207DR, unused and guaranteed, very fine receiver, snip £75. M.S.S. disc recorder 33/45/78 r.p.m. Complete with amplifier, ready to use £50. Morse records (L.P. 33⅓) beginners or advanced course 45/- each. Various Vortexion amplifiers, cheap. Details s.a.e. Carriage extra.—G3HSC, 45 Green Lane, Purley. (Uplands 2896). (524

AVO 40 as new. 1 in. micrometer H.P. charger turns counter to 99,999, quick-set zero. All perfect. Offers, Box 528, The National Publicity Co. Ltd., 36/37 Upper Thames Street, London, E.C.4.

BC348R in mint condition, with internal power pack. No other modifications, £13. Carriage extra.—Heslop, 41 Parkhead Crescent, Edinburgh 11. (531

BC348R with usual modifications, real DXer, with p.p., £15. Army type 30 ft. sectional mast complete £3. Box of useful gear for new enthusiast, 10/-.—G3GMY, F. Green, 48 Borough Way, Potters Bar, Middx. (523

CAN anyone sell U.S.A. bug key to sea-going operator? Leonard or similar preferred.—Box 541, The National Publicity Co. Ltd., 36/37 Upper Thames Street, London E.C.4. (541

COMMUNICATIONS receiver, Marconi B.36. Very good condition. 2RF. 3IF. 1 to 20 Mc/s. Bargain, £5.—167 High Street South, London, E.6. (GRA. 3904). (533

COMPLETE station Minimitter transmitter, little used, A.T.U. low-pass filter. Hambander receiver £92 10s. —Straughan, Main Street, Keswick, Cumberland. KES 362 (evenings). (527

IMPORTANT NOTICE

All Exchange & Mart advertisements must be sent with remittance made payable to:

THE NATIONAL PUBLICITY CO., LTD.

36-37 Upper Thames Street, London, E.C.4.

The Society and its Advertisement Manager cannot intercede in any matters arising from advertisements appearing in this section.

CR100 £9. R1155, top band and p.p.a., £6. R1132A, £2. Wilcox Gay v.f.o., 50/-. Dismantled Monitor for scope with V.C.R. 138a, transformer and data, £3. Power Pack for transmitter/receiver, £2. 1147B with data, £3. Wavemeter W1310 155-220 Mc/s a.c. mains, 30/-. Audio design Oscillator, £5. Offers for any. Various valves and oddments to clear. 12, Vicarage Road, Harborne, Birmingham. (529

EXCELLENT AR88D Matching Speaker. Manual. £48. 160 Cabinet transmitter £9. Sphere Signal Generator £7.—G3JDJ, 360 Portland Road, Birmingham 17. (522

EXCHANGE latest model Super-Baldina, f2.8, 500th, Synchro-Compur with light values, D/A, coupled R/F, meter, accessories. Wanted AR88 etc., BC221 or Panda Cub.—G3FCV, 2 Palace Court, Chatham, Kent. (538

FOR SALE—BC348 p/p and S meter, £10. RX52. Canadian Marconi, £10. 5 CPI with base and mu-metal screen, 30/-.—216, St. Helier Avenue, Morden, Surrey. (536

FOR SALE. PR12OV new, £95. Also top band rig.—G3KP, Sycamore House, Messingham, nr. Scunthorpe. Bottesford 392. (545

G2DP has for sale S2OR, £18. Dural lattice mast 42 ft. in four sections, rotary head, £8. Many other items. Moving QTH. Offers to THO 2849, evenings. (526

G3CGD QSLs. Fixed and mobile samples on request. Printing inquiries welcomed.—30 St. Luke's Road, Cheltenham. (443

HALLICRAFTER Sky Challenger receiver, good working order, £10. Wanted Class D wavemeter v.h.f. gear.—Dunk, Casanina, Soldridge Road, Medstead, Hants. (496

(*Continued on page 304*)

MAINS transformer 260, 6·3, 5 volts 10/6d. 80 and 140 mA filter chokes 3/6d., 7/-. QCC 8055 kc/s crystal 20/-, 832 9/-. PT15, 6J6 3/6d. Meters 300 volt a.c., 150 mA 6/-. 300 volt selenium rects. 522 transmitter variables, coils, 832 holders. Microphone transformers 2/-. 100 kc/s crystal 8/6d. Post extra. Box 540, The National Publicity Co. Ltd., 36/37 Upper Thames Street, London, E.C.4. (540

METALWORK.—All types cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd. (G4BI), Chapman Street, Loughborough. (99

METERS. 2¼ in. sq. flush. 5, 10, 50, 125, 150 d.c./mA; 0·5, 3·5 RF/AMP., 5/-. Valves: 813, QQVO7-40, 3E29, 15/-: 7193, 6AC7, VU111, 6H6, VR65, 6K7, 6J7, VCRS22; transmitter variable condensers 40, 110, 140 pF 1500V; Ceramic formers 2 in. d. x 5 in. l., 1/- each. Post extra. G3DTX, "Chenies," Loudhams Wood Lane, Chalfont, St. Giles, Bucks. (546

MINIMITTER for sale; less than 10 hours use, with filter, £80; S-640 receiver with matched speaker, £15; Labgear W.B. Multiplier, £4; transformers; 1,000-0-1,000 volts, 300 mills., £2; 675-0-675 volts, 200 mills., £1 10s.; 400-0-400 volts, 150 mills., £1; TZ-40 mod. and driver trans., class "B," £2; BC221, no valves, charts or crystal, £1. S.a.e. for list.—G3JDA, 5 Hornshurst Cottages, Rotherfield, Crowborough, Sussex. (544

PANDA PR120V complete with A.T.U. low pass filter and spare valves, £70. Also AR88D, £45. All perfect.—J. French, 53 Reddal Hill Road, Old Hill, Staffs. (530

PRINT your own QSL cards. Adana No. 2 for sale (postcard). As new with type, etc., at half cost. £12 10s. plus carriage.—G3BHT, Sandy Lane, Hightown, nr. Liverpool. (543

QSL cards, G.P.O. approved. Log books, cheapest, best, prompt delivery. Samples—Atkinson Bros., Printers, Looe, Cornwall. (206

R.A.F. ground station rack type 6, containing amplifier, power unit, local and remote control panels. New meter and valves fitted, handbook, excellent condition £5.—M. F. Smallwood, Publicity Officer, Southgate Group, R.S.G.B., 7 Reservoir Road, Southgate, N.14. (525

REES-MACE receiver a.c./d.c. £9. Precision signal generators G.73 (Marconi) £5. 10., TF390G £10 and others. B.P.L. £4. Hallicrafters 5-10 receiver £9. 19 Set Mk. II in sealed carton 55/- carriage extra.—Wells, 37 Salvington Gardens, Worthing. (542

R1155 modified a.c./d.c. including output stage. Good condition, £9.—G2DPY, 160 Old Shoreham Road, Shoreham-by-Sea, Sussex. (535

SALE or w.h.y. Complete top band transmitter. Complete 60-90 Mc/s transmitter. Complete 80m v.f.o. and station control unit.—G3AAJ, Grangewood, 6732 (London) evenings. (539

WANTED.—Class-D wavemeter, also circuit of TCS12, 1·5 to 10 Mc/s receiver. For Sale—brand new 12V Command receiver, 1·5 to 3 Mc/s., £3.—G3HKQ, 29 School Road, Langold, Worksop, Notts. (532

WANTED: All types of communications receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R.T. & I. Service, 254 Grove Green Road, Leytonstone, London, E.11 (LEYton 4986). (241

WANTED BC610 Hallicrafters, E.T.4336 transmitters, BC312 Receivers, BC221 Frequency Meters and spare parts for all above. Best cash prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6. (266

53 clean copies QST 1928-1937, offers? 5 in. P.M. speakers, 7/6d.—Light, Mount, Germansweek, Beaworthy, Devon. (534

APPOINTMENTS SECTION

Situations Vacant

VACANCIES exist in a Government Communications Centre in Boreham Wood for two Electrical Inspectors and two Testers for work on high quality communication equipment. Inspectors must be able to read circuit diagrams and be acquainted with current production methods. Testers will be required to align super heterodyne receivers and check performance of transmitters.

vernment Industrial conditions and rates. Commencing salary not less than £11 per week.—Box 537, The National Publicity Co. Ltd., 36/37, Upper Thames Street, London, E.C.4. (537

INDEX TO ADVERTISERS

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, New Ruskin House, Little Russell Street, London, W.C.1 by Loxley Brothers Limited, Letchworth, Hertfordshire

IF UNDELIVERED Return to:— R.S.G.B., NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, W.C.1